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# NATIONAL QUALIFICATIONS FRAMEWORK FOR TERTIARY EDUCATION IN THE CZECH REPUBLIC



PART 2

SUBJECT AREAS

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SUBJECT AREAS



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# INTRODUCTION

The present text is the second publication of the project called National Qualifications Framework for Tertiary Education (Q-RAM) implemented by the Ministry of Education, Youth and Sports since 2009 as a so-called individual national project within the Operational Programme Education for Competitiveness. The publication contains a description of the education system in the Czech Qualifications Framework, and is thus directly linked to the volume devoted to the general background of creating the qualifications framework and to the presentation of the so-called national descriptors. The introductory section presents the general concept of education in the Czech Qualifications Framework, briefly describes the procedure for creating the education system, and indicates the possibilities of its further use. The second and significantly more extensive section is devoted to the characteristics of individual subject areas, as prepared by field-specific work groups in cooperation with a select project team.

The whole of the National Qualifications Framework for Tertiary Education is composed of the so-called national descriptors together with the education system. The national descriptors represent a general minimum standard which is, as regards the categories and types of the education output, binding for all awarded qualifications at individual levels of university education. In contrast, the subject areas are characterized by the typical professional knowledge and skills of graduates for a broader field-specific focus of study. A subject area in the Czech Qualifications Framework means a coherent and interrelated section of tertiary education under which study programmes are developed and executed. A subject area, therefore, is not only a sum of the currently implemented study programmes with a certain common core; it is in fact a field which should enable the further development of study programmes (integrations and other changes to the existing programmes and the creation of new ones). A subject area is primarily defined by descriptors describing the outputs of education and which express the education objectives in a uniform manner and also reflect the social, theoretical, methodological, or philosophical and value basis of study programmes in the given area. Within the Q-RAM Project, a total of 39 subject areas were expertly defined and described in this way in close cooperation with field-specific work groups; these areas bring together all the currently implemented study programmes in the Czech tertiary education.



# 1 GENERAL BACKGROUND

## 1.1 SYSTEM OF ACADEMIC DISCIPLINES

The need to divide the existing knowledge into specific areas has accompanied mankind since the very beginning of critical thinking. Like most classification systems, taxonomies of knowledge are to a large extent arbitrary and culturally conditioned. In the Western tradition, attempts at a comprehensive organization of knowledge go back to the Greek philosophers, whose systems maintained a fairly substantial degree of authority in later periods due to several positive reception waves in the ancient world. Until the 19th century, however, numerous classifications of knowledge typically set out borders between individual areas of human knowledge and also established their hierarchy; some domains of knowledge were thus considered superior to others. For example, learning at medieval universities was structured exactly according to this principle. The common part of education was first to cover the lower *trivium* (grammar, logic and rhetoric), which was a kind of propaedeutics to the higher *quadrivium* (arithmetic, geometry, astronomy and music). Only knowledge of these so-called seven liberal arts usually guaranteed access to further specialist training at the faculties of medicine, law or theology. As early as the Renaissance period, however, the relationships among the individual parts of this traditional university curriculum were transformed, and some universities established a system of so-called humanities (grammar, rhetoric, poetry, history, ethics) instead of the trivium and quadrivium, and the newly conceived physical sciences gradually became study fields in their own right. A rapid transformation was only brought about in the period of the “long 19th century,” during which dramatic changes in the area of human knowledge occurred, accompanied by a major rearrangement of university teaching. The development was aimed at linking university education with a system of newly emerging scientific disciplines, the establishment of which was closely related to the gradually strengthening model of a research university. The very essence of this new arrangement lay in focusing scientific disciplines on the relatively limited segments of reality, for which it was possible to formulate scientific laws. The metaphor of a single tree of knowledge, praised in the concepts of Renaissance and Enlightenment philosophers, was thus gradually replaced with an emphasis placed on the autonomy of individual scientific areas and fields. This development, despite the high potential for new specializations within academia, hardly met with unreserved approval; it was accompanied from the very beginning by mistrust of the excessive fragmentation of knowledge. It is likely that the traditional resistance to a narrow disciplinary division acquired a new form in the 20th century and began to emphasize the need to create and deepen interdisciplinary, trans-disciplinary and super-disciplinary approaches. Some researchers in this context highlight the importance of a deep transformation in the production of knowledge, which in their opinion more and more clearly abandons disciplinary logic in favour of a problem-focused, interdisciplinary form of learning. Even though there is no doubt that these rearrangements also have a number of implications for university activities, the backbone of tertiary education in the Czech Republic and at most European universities remains based on a relatively stable network of departments with clear links to the system of “traditional” academic disciplines. One of the primary objectives of the present publication is to map this somewhat blind area; the publication in the Czech context represents



# GENERAL BACKGROUND

the first comprehensive view of the established areas of academic education.



## 1.2 SUBJECT AREAS IN THE CZECH QUALIFICATIONS FRAMEWORK

The basic content and organizational components of higher education in the Czech Republic are study programmes, or study fields, the implementation of which is subject to the appropriate accreditation under the Higher Education Act, as amended.<sup>1</sup> The number of study programmes and study fields has been increasing for the past decade, and this fact is closely related to the gradual transformation of Czech higher education from the elite phase to the universal phase. This development was primarily motivated by the effort of universities to meet the various expectations of a growing number of diverse applicants; however, it was also a reaction of the academic environment to new stimuli coming from related scientific fields, which were affected by the continuing specialization on one hand and by the creation of interdisciplinary links or the establishment of new field alliances on the other. Although the expansion of programmes and fields was a natural and essentially positive process, it brought several new challenges, especially in terms of clarity and transparency in higher education. In connection with the ongoing growth of tertiary education and the concomitant diversification of its forms and contents, it was becoming clearer and clearer that the existing tacit consensus on the standards of higher education had ceased to exist to a significant degree, in the general sense, as well as within the individual disciplines themselves. Development over the last decade has also brought administrative problems, which are evident above all in the accreditation procedure due to the increasing number of study programmes and fields.

Bearing in mind these administrative and technical aspects, and also in the interest of enhancing the institutional autonomy and responsibility of universities for the creation, implementation and assurance of quality of study programmes, the Ministry of Education, Youth and Sports has recently adopted the idea of the accreditation of units larger than just individual programmes or fields.<sup>2</sup> An important argument for such a solution is compatibility with the need to express the essence of academic standards more explicitly, so that they can serve academics and students, as well as employers and the general public as a guide in the increasingly more complex environment of higher education. At the intersection of these closely related topics, discussion has begun on the concept of subject areas, which is also supported by the applicable legislation.<sup>3</sup>

In accordance with the approved project application, the Q-RAM research team has been charged with the task of elaborating the concept of subject areas for the purposes of the national qualifications framework, and also the task of proposing its own system of these areas, so that the system is directed at the internationally approved and comprehensible division on one hand, while taking into account the domestic disciplinary traditions on the other.

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<sup>1</sup> Sections 78-81 of Act No. 111/1998 Coll. on higher education institutions and on the amendment and supplementation of other acts (the Higher Education Act). The basic component of tertiary vocational education (which is generally considered a part of tertiary education), on the other hand, is an education programme that is subject to accreditation (Section 104 of Act No. 561/2004 Coll. on preschool, primary, secondary, tertiary vocational and other education).

<sup>2</sup> Cf. especially The long-term plan of the educational, scientific, research, developmental and innovative, artistic, and other creative activity of higher education institutions for the period of 2011-2015 (2010), objective 1.3, p. 14.

<sup>3</sup> The subject area itself is a legal institute, even though its meaning has not been precisely defined - see Section 45 (4), 46 (4) (5), 47 (5), 48 (3) of the Higher Education Act.

## THE CONCEPT OF SUBJECT AREAS IN THE CZECH QUALIFICATIONS FRAMEWORK

The concept of subject areas, on which the presented proposal of the Q-RAM Project is based, generally relies on the belief that it is not desirable to segment the sphere of academic education into a rigid system of strictly limited sections bound by exhaustive standards. Not even scientific branches to which university study programmes are inherently linked are closed disciplines nowadays; instead, they are centres that are interconnected by very complex relations and bonds. Similarly, subject areas should be understood as a system of reference points which characterize the main poles of academic education.

In line with this, **a subject area in the Czech Qualifications Framework means a coherent and interrelated section of tertiary education, under which study programmes are developed and executed.** Each subject area is primarily defined by descriptors that define the characteristic outcomes of learning, which express the objectives of learning in a standardized form, and also reflect a common theoretical, methodological, or philosophical, value and ethical basis of study programmes in the given area: their objective is thus to describe the learning outcomes decisive for the identity and coherence of the given area. **The education descriptors are related to a typical graduate from a primary field of education and take into account the academic as well as the professional purpose of education.** With regard to the nature of subject areas, it is not the objective of the respective descriptors to determine a minimum standard applicable to all the fields in the given subject area or to determine an academically ideal graduate profile. The education descriptors do not describe any particular profile of a specific study programme, not even the recommended descriptors; **they do not aim at a detailed specification and national standardization of the tertiary education curriculum.**

This way they differ from the national descriptors, which are constructed as a generally binding minimum standard for a Czech tertiary education graduate. It is natural that subject areas defined in this way include a wide and varying range of fields with different degrees of academic or professional focus, and that some fields are and will be legitimately established on the border of several subject areas. A subject area is not only the sum of the currently implemented study programmes with a certain common core; it is a field which should enable the further development of study programmes of similar direction (integrations and other changes to the existing programmes and the creation of new ones).

The national qualifications framework is based on the national descriptors that define the categories of knowledge, skills and general competencies in which the level of individual qualifications and the respective study programmes is determined. The national descriptors interconnect the Czech system of tertiary education with the European Higher Education Area Qualifications Framework (the Bologna Process) and the European Qualifications Framework for Life-Long Learning (the European Union). For this reason, the national descriptors strictly define the levels of difficulty of the individual learning outcomes at all the relevant levels of the National Qualifications Framework for Tertiary Education. Education descriptors must be in line with the national descriptors, and thus it is not permissible for them to introduce new categories of knowledge and skills beyond the national descriptors or to increase or decrease the levels of difficulty of the individual categories of learning outcomes or the levels of qualifications, contrary to what the national descriptors determine.

As regards the knowledge and skill category of descriptors, the education descriptors indicate the specific knowledge and skills which a typical graduate from the given primary field

should have upon graduation. These categories are explicitly described by the national descriptors as “professional knowledge” and “professional skills,” and the education descriptors are thus expected to specify them. In the course of the creation of the education descriptors, therefore, the objective was to ensure that the degree of detail is sufficient with respect to embracing the characteristics of the individual areas. As for the “general competencies,” the very name of this category indicates that they characterize a wider context in which the graduate will apply their professional knowledge and skills and the degree of independence and responsibility with which they will do so. The education descriptors in this category therefore usually indicate general formulations of the national descriptors that should be applicable across the entire spectrum of areas. In rare cases, the education descriptors also indicate that a typical graduate from a primary field should have other general competencies beyond the categories established by the national descriptors.

Descriptors have basically been prepared for all subject areas and all levels of the national qualifications framework, as described by the national descriptors. For short-cycle qualifications (EQF 5), however, it is a mere projection of the possible future state in the event that these types of qualifications are included in the Czech tertiary education. Within the current system, they do not match any type of study programme, and in many subject areas, their introduction was not recommended by the expert teams of the Q-RAM Project.<sup>4</sup> According to an expert opinion of the respective work group, however, in some cases it is impossible to expect some qualifications to be granted within the given subject area (especially short-cycle qualifications). If such qualifications are not and never will be granted due to the nature of the subject area, then the education descriptors do not include the description of such qualification levels at all.

## SYSTEM OF SUBJECT AREAS

The Czech Qualifications Framework is created as a tool to provide important functions within the Czech system of tertiary education in the future, in addition to its unquestionable international dimension. The system of subject areas should also meet both these needs. Several platforms were created within the project, ensuring that all the decisive aspects are reflected in the description of areas and that the final text expresses the consensus of a wide range of involved stakeholders (see Annex 1). Activities related to the definition and characteristics of individual areas thus had the character of a rather complicated application within the Q-RAM Project, in which several hundred experts were directly involved. In the first year, expertise focused on nine field-specific work groups, which included 93 renowned professionals representing above all the perspective of universities and tertiary vocational schools as well as employers, trade unions and the respective ministries. A selected expert team of the Q-RAM Project coordinated, led and continuously evaluated the activity of these work groups, which met about once a month. When defining and describing subject areas, the work groups used, in addition to the experience of its members, the following sources:

- national descriptors of the Czech Qualifications Framework;
- national and international classifications of education fields (especially KKO and ISCED);
- national and European field standards for some subject areas (at the European level, especially the Directive of the European Parliament and Council 2005/36/EC on the recognition of professional qualifications);
- informal national or international field initiatives (e.g. the Tuning Educational Structures in Europe Project);

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<sup>4</sup> Cf. especially The long-term plan of the educational, scientific, research, developmental and innovative, artistic, and other creative activity of higher education institutions for the period of 2011-2015 (2010), objective 1.3, p. 14.

the existing foreign systems that are methodically similar to the Czech subject areas (especially the system Subject Benchmark Statements for the tertiary education in England, Wales and Northern Ireland);

expert consultations of the work groups with other relevant partners of university and tertiary vocational education.

In accordance with the project specifications, the outputs of all the work groups then underwent a multistage defence, during which other professionals could express their opinion on the descriptions of individual subject areas, including individual external professionals, the Association of Deans of the respective faculties, or professional and employer associations. The proposal of the system of subject areas as a whole was commented on by the Body of the Q-RAM Experts, the members of which evaluated the project outputs especially from the positions of the representatives of the most important national institutions in the area of tertiary education - the Czech Rectors Conference, the Council of Higher Education Institutions, the Student Board of the Council of Higher Education Institutions, the Accreditation Commission, the Academy of Sciences of the Czech Republic, the Czech Chamber of Commerce, the Confederation of Industry of the Czech Republic, and the National Institute for Education. Based on the evaluation of a wide range of valuable external stimuli, a system of 39 subject areas, submitted as the final proposal for the Q-RAM Project, with predicted modifications at the end of the project, was stabilized in the autumn of 2011. The resulting system is based on internationally common and understandable categories; however, it also respects some specific domestic divisions of academic disciplines (see **Annex 2**).

## CHARACTERISTICS OF SUBJECT AREAS

Each properly defined subject area has been discussed in a separate document, the length of which is generally around 10-15 standard pages. This document consists of two main sections.

**The general description of the subject area** typically includes:

- a brief description of the history, character and thematic scope of the area;
- the function of the area with an emphasis on the subject and the objectives of learning in the given area;
- a list of characteristic (primary) study fields which, as academic disciplines, are determining for the given subject area;
- a definition of specific objectives of education in the given area;
- a general profile of graduates in the given area, indicating the typical occupations, especially the relevant regulated occupations;
- a description of the relations to other subject areas, including boundary fields.

**The education descriptors** transfer freely formulated descriptions of subject areas into the category of expected outcomes of learning, so that they conform to the national descriptors of the qualifications framework. They focus on:

**professional knowledge** that is an implementation of factual and theoretical knowledge and the degrees of understanding expected of a typical graduate from a primary field;

**professional skills**, i.e. an implementation of research, artistic or other practices applying professional knowledge of the given level.

As for general abilities, this category primarily reflects the context in which the graduate is expected to apply their professional knowledge and skills and the degree of independence and responsibility with which they do so. General abilities are described by the national descriptors as abilities that are common for all subject areas, so the education descriptors do not really specify this type of learning outcomes.

## THE USE OF SUBJECT AREAS

Subject areas as part of the National Qualifications Framework for Tertiary Education are designed to fulfil the following functions in particular:

- 1) To provide space for the implementation of various study programmes: describe their conceptual foundations and identity, create the basic framework for their establishment and ongoing innovations.**

It is assumed that the characteristics of the subject areas will be used above all by academic employees of higher education institutions, especially in connection with the specification of the expected professional knowledge and skills of graduates during the creation of specific study programmes and fields within them. The education descriptors are supposed to serve as the basic reference points, not as a generally binding standard. Instead, they will be the starting point for a deeper discussion about the content and outcomes of specific study programmes and fields.

The programmes established and implemented on the border of two or more subject areas will be expected to adequately fulfil the general aims of education in the given areas, based on their specific profiles.

- 2) To define a legitimate area for the implementation of study programmes in the context of institutional accreditation.**

In relation to the current state of discussion about the modernization of the Czech higher education quality assurance system, there is a possible option of a subject area gradually becoming the basic unit of higher education accreditation, granted to universities at the national level. The subject area would in such a case define the field in which the tertiary education institution (university) accredited for this area may carry out its educational activities.

- 3) To provide reference points for the assessment of quality of higher education**

Subject areas are expected to be used as the basic reference points for the section of the internal and external evaluation of universities related to the educational activity.

- 4) To express the essence of qualifications obtained in the study of the individual subject areas and specify the typical professional knowledge and skills of graduates.**

It can be assumed that subject areas will be used by universities and the Ministry as the basic reference points when recognizing university qualifications obtained abroad. Subject areas will continue to provide the basic presentation of the general typical objectives of higher education in the individual areas for applicants, students, employers and the general public.

## 1.3 DEVELOPMENT OF THE SUBJECT AREAS SYSTEM AFTER THE END OF THE Q-RAM PROJECT

The system of subject areas, as a part of the Czech Qualifications Framework, has been defined within the Q-RAM Project. After its completion, an expert proposal of the system will be handed over to the contracting authority, which is the Ministry of Education, Youth and Sports. The Q-RAM research team will also submit a methodology proposal, according to which the qualifications framework could be managed after the completion of the project itself. In connection with the management of the system of areas, this methodology will be based on several basic principles:

- 1) Regardless of the specific form of the formal anchorage of the subject areas system, which is currently in the phase of alternative proposals, the main sponsor of the system development will be the Ministry of Education, Youth and Sports.
- 2) The system of subject areas is not set once and for all; instead it must facilitate further development in line with changes within the academic disciplines and in accordance with the changing requirements of the external environment on higher education.
- 3) The system of subject areas will therefore undergo regular, general revisions which enabling a comprehensive evaluation of the experience with its use and a reflection of changes arising from the demands of the academic community and stimuli from the outside world, especially from the practical sphere.
- 4) Partial revisions will also be carried out continuously, both within the descriptions and descriptors of the individual areas and within the system of subject areas itself. This principle will enable the emergence of new areas, the merging of the old, changes in their titles, etc.
- 5) In both cases, the basic principles for assessing the relevance of changes to the existing system of areas will be as follows:

proposals for new areas must demonstrate that the proposed subject area has sufficiently legitimate common ground for the emergence of a new area, which is supported by the authority of the academic community representatives in the area as well as external stakeholders;

proposals clearly demonstrate in what aspects the current arrangement is unsatisfactory and to what extent it needs to be amended;

in the case of the establishment of a new subject area, it is demonstrated that a solution could not be found by modifying the existing subject areas;

proposals for adjustments prove to adequately reflect the views of all the major stakeholders in the subject area within the academic community (e.g. through dean associations), the representation of universities as a whole (Czech Rectors Conference and Council of Higher Education Institutions), and the main external stakeholders concerned (e.g. professional chambers, social partners).



A detailed proposal of principles and procedures in connection with the future changes to the system of subject areas will be published in the 3rd part of the present publication.

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# 2 SUBJECT AREAS

## 2.1 PSYCHOLOGY

### A BRIEF DESCRIPTION OF THE HISTORY, CHARACTER AND THEMATIC SCOPE

The psychological sciences form an intricately segmented group of fields, or subject areas, which is constantly being enriched by interdisciplinary fields. As the saying goes, psychology has a long past but a short history. As a scientific discipline, it originated in the 19th century, and since its beginnings there have been two traditions struggling with one another: one ecclesiastic, based on philosophy and social sciences, the other scientific, inspired by medicine, physics and mathematics. The development of psychology differed until the 1940s: the U.S. advocated behaviourism with an emphasis on the external, measurable behaviour, while European psychologists instead studied the internal mental processes. With the rise of Fascism and the subsequent emigration of prominent European psychologists to the U.S., the theoretical approaches merged, positively influencing one another, and new approaches emerged; we can thus speak of a plurality of paradigms. Psychology is more and more oriented at practical solutions to the problems of society. The necessity to address pressing social problems led researchers to focus on the examination and correction of negative psychosocial phenomena (distress, violence, neglect, frustration, fear, anxiety, depression, specific learning and behavioural disorders, conflicts between individuals, groups and nations), while the research of positive phenomena (e.g. joy, life satisfaction, happiness, strength, hope, wisdom) was neglected. As a reaction to this, so-called positive psychology was established in 2000; the programme of positive psychology focuses on the study of positive individual characteristics, positive life experience and the examination of positively functioning communities and institutions.

In recent decades, major changes have taken place throughout Europe as regards the content of psychological services and the means of their provision. In previous years, psychologists gained education and applied their knowledge and skills above all at the national level. Each country had its own educational tradition, its own forms of employment of psychologists, and its own means of intervention at the level of the national government. The education of psychologists developed differently in Europe depending on political and economic conditions. The growing internationalization of economies and the integration of the internal market of the national states into the European Union market stimulated free movements of professionals, as well as the provision of counselling services that go beyond the boundaries of the national state.

In the field of psychology, great efforts have been made in Europe in recent decades to create a uniform system of education and educational standards. Emphasis was placed on the output competencies, that is, on the outcomes of learning and training, rather than on the coordination of the content of education and the form of the university psychology curriculum. The European Commission generally emphasizes a competency-based approach, which highlights the transparency and possibility to assess the competencies of university graduates. This requirement also appears in the Tuning Project that is a part of the implementation of the Bologna Declaration. After twenty years of efforts on the part of European psychologists, a document prepared by the European Federation of Psychologists' Associations was approved at a conference in Oslo in 2009. It bears the short title of



EuroPsy, European Psychology Certificate<sup>5</sup>. The document unifies the requirements for the undergraduate training of psychologists in Europe, including the Czech Republic. A similar document is being prepared for graduate education.

## FUNCTION

Psychology, as an independent humanity, has three functions: theoretical-methodological, empirical-research and practical. Generally speaking, it studies the psychological traits, conditions and processes in individuals and social groups. It is concerned with the development of individual psychological characteristics over time, and with their being subject to heredity, as well as natural, social and cultural environment. Psychology improves its explanatory theories and methodological instruments. Learning focuses on:

- the implementation and verification of the scope of the conceived psychological programmes;
- the identification, understanding and analysis of mental problems and phenomena;
- a scientific explanation (including contextualization) trying to capture the operation mechanism and its alterations, including changes in individuals and society over time;
- an analysis of problem solving options and systematic verification of possible interventions;
- a study of the prevention of undesirable phenomena,
- a study of the facilitation of desirable phenomena;
- the provision of counselling and other assistance to individuals and social groups in need;
- the training of individuals in necessary skills in such a way that these individuals are able to manage stressful situations on their own.

## PRIMARY FIELDS

Psychology includes many subfields, from the traditional (e.g. general psychology, developmental psychology, social psychology) to applied subfields (e.g. clinical psychology, counselling psychology, engineering psychology, educational psychology, sports psychology and military psychology) and the newest subfields such as political psychology and positive psychology.

The European Psychology Certificate introduces four basic specific fields at which the undergraduate training of psychologists can be directed. These are fields that are distinguished by specific working conditions; the psychologist works with very specific categories of clients. They are the following primary fields:

1. pedagogical and school psychology,
2. clinical psychology and health psychology,
3. work and organization psychology,
4. other psychological fields (e.g. forensic psychology, sports psychology, etc.).

<sup>5</sup> Col. of authors: *Europský certifikát z psychologie* (trans. by J.Mareš and V. Polišenská). Prague: Grada 2009, 72 p. ISBN 978-80-247-2236-8.

## DEFINITION OF OBJECTIVES

The European Psychology Certificate defines two main groups of objectives: primary (typical for the field of psychology) and secondary (objectives not typical for the given field). These are summarized in two tables. First we will present six categories of primary objectives, which are classified into 20 primary competencies.

**Tab. 1 Specific objectives in terms of output competencies of a graduate**

Primary, specific competencies	Description
A. Specification of the objectives of psychological services	Interaction with the client, the function of which is to clarify and specify the objectives of the service which is to be provided to the client.
Analysis of needs	Collect data on the client's needs through appropriate methods. Clarify the client's needs and analyze them in such a way that further cooperation is meaningful.
The conditions for achieving the objectives	Propose the objectives and discuss them with the client. Formulate acceptable and achievable objectives. Define the criteria by which it is possible to recognize whether the chosen method is right and whether the client is closer to the set objective.
B. Diagnosis	Determine the relevant characteristics of individuals, groups, organizations and situations through appropriate methods.
Individual diagnosis	Use interviews, tests and observations of individuals under conditions which are the most suitable for the required psychological service.
Group diagnosis	Use interviews, tests and observations of groups under conditions which are the most suitable for the required psychological service.
Organization diagnosis	Use interviews, questionnaires and other methods suitable for the examination of an organization under conditions which are the most suitable for the required psychological service.
Situation diagnosis	Use interviews, questionnaires and other methods suitable for the examination of a situation under conditions which are the most suitable for the required psychological service.
C. Development	Create services or products based on psychological theory and methods intended for the clients or psychologists.
Definition of the required services or products and analysis of the requirements	Define the purpose of a service or product, identify the persons who will participate in the work, analyze the requirements and limits, define the specifications for a product or service with regard to the conditions under which the service or product will be used.
Designing a service or product	Design new services or adapt the existing services or products according to the requirements or limits with regard to the conditions under which the service or product will be used.
Testing a service or product	Test services or products and evaluate their feasibility, reliability, validity and other characteristics with regard to the conditions under which the service or product will be used.
Evaluation of a service or product	Evaluate a service or product considering its feasibility, the client's satisfaction, user friendliness, costs and other aspects relevant to the conditions under which the service or product will be used.
D. Intervention	Identify problems, prepare and carry out such interventions suitable for achieving the set objectives, use the diagnosis results and developmental activities.

# EDUCATION DESCRIPTORS

PROFESSIONAL KNOWLEDGE		
Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates		
<p>they know the content and focus of important psychological and non-psychological fields; such psychological fields mainly include the history of psychology and the theory of psychological specializations; non-psychological fields include epistemology, philosophy, sociology, anthropology;</p> <p>they know the scientific foundations of psychology, the basic characteristics of the functioning of the psyche, i.e. the diversity and variability, and understand them;</p> <p>they describe and explain the main concepts and explanatory theories of selected psychological disciplines such as general psychology and/or neuropsychology and/or psychobiology and/or cognitive psychology and/or differential psychology, social psychology, and/or developmental psychology and/or psychology of personality and/or work and organization psychology and/or clinical psychology and/or health psychology and/or educational psychology and/or psychopathology;</p> <p>they know and explain the basic theories of research techniques, such as the theory of tests, questionnaires and evaluations;</p> <p>they know and explain the basics of</p>	<p>they have in-depth knowledge of practical application in the field (e.g. specialized fields, follow-up education, legislation relating to the occupation, the conditions for practicing the occupation in European Union countries);</p> <p>they are familiar with selected parts of boundary fields (such as medicine, law, business administration) and understand them;</p> <p>they have an in-depth knowledge of the foundations of psychology as a scientific discipline, its historical roots, historical development and its possibilities and limitations;</p> <p>they know the differences between the explanatory theories of selected psychological disciplines: general psychology and/or psychobiology and/or developmental psychology and/or psychology of personality and/or social psychology, work and organization psychology and/or educational psychology and/or clinical psychology and/or other psychological disciplines, and are able to explain them;</p> <p>they know the theories of research methods, e.g. the research methodology in general psychology and/or psychobiology and/or</p>	<p>they have in-depth knowledge of the scientific basis of their specialized field, its historical roots, its historical development, its possibilities and limitations, both in the domestic and international context (e.g. the foundations of general psychology and/or developmental psychology and/or social psychology and/or clinical psychology and/or educational psychology and/or work psychology and/or organization psychology);</p> <p>they know selected parts of the psychological and non-psychological fields which border with their specialized field, and understand them;</p> <p>they have an in-depth knowledge of the current global state of knowledge in the field covering the topic of their dissertation thesis; they know the scientific use of their education in practice, both at home and abroad;</p> <p>they have an in-depth knowledge of the latest explanatory theories concerning their specialized fields, including open-ended questions and the scientific discussion around them;</p> <p>they have an in-depth knowledge of the</p>

Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates		
<p>psychological methodology, such as the basics of experimental methods, quantitative methods or qualitative methods;</p> <p>they understand psychodiagnostic methods; they demonstrate understanding via their choice of methods, leading an interview and the way they write a report on a psychological examination;</p>	<p>developmental psychology and/or psychology of personality and/or social psychology, work and organization psychology and/or educational psychology and/or clinical psychology and/or other psychological disciplines, and are able to justify them;</p> <p>they have an in-depth knowledge of the psychological methodology including research planning (e.g. basic and advanced multivariate statistics, including ANOVA, multiple regression analysis, factor analysis); they have adopted qualitative methods including interviews and qualitative data analysis;</p> <p>they know the latest developments in psychology and understand new trends and research efforts to integrate psychological knowledge and its practical application (e.g. the current research directions, even when there is no expert consensus, efforts to integrate research findings - psychology based on evidence).</p>	<p>psychological methodology (including research planning) used in the field of specialization and related fields;</p> <p>they know the “growth points” of their specialized fields in the international context (i.e. the latest concepts, theories, diagnostic methods);</p> <p>they have an in-depth knowledge of the open problems of their specialized fields and the problems of the boundary scientific disciplines, and understand them;</p> <p>they are able to explain the boundary overlaps of the chosen dissertation topic, and they understand them.</p>

PROFESSIONAL KNOWLEDGE

# PSYCHOLOGY

# EDUCATION DESCRIPTORS

PROFESSIONAL SKILLS		
Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates		
<p>they know how to correctly use basic assessment methods and conduct psycho-diagnostic interviews;</p> <p>they know how to write a brief professional report on the psychological examination of the client/clients;</p> <p>they have mastered the basic procedures of the collection of information (library and bibliographic skills);</p> <p>they are able to interpret scientific texts, find the key parts and assess the quality of arguments;</p> <p>they know how to apply the theory of research techniques: they are able to choose and correctly use a psycho-diagnostic test and conduct a psycho-diagnostic interview;</p> <p>they know how to apply the theory of intervention procedures: they are able to design, implement and evaluate a targeted individual and group intervention;</p> <p>they know how to formulate research hypotheses and research questions and how to verify them;</p> <p>under supervision, they are able to perform empirical research using various data collection methods (e.g. experiment, observation,</p>	<p>they have mastered the critical approach: they are able to look at an issue from various perspectives; their critical thinking enables them to reach conclusions; they are sensitive to the context (in which a matter takes place) and interpersonal factors;</p> <p>they take into account the complexity of factors that influence human behaviour and social interaction; they do not simplify the studied phenomena and processes;</p> <p>they have mastered skills related to the diagnosis performed within applied psychology and field research (e.g. error analysis, diagnosis of learning disabilities);</p> <p>they know how to conduct interventions in the area of applied psychology and field research (e.g. designing a training system, suggesting a therapeutic plan);</p> <p>they have mastered skills related to diagnosis carried out within research or in laboratory conditions (e.g. basic EMG evaluation, personality diagnosis);</p> <p>they know how to carry out research interventions, they are able to intervene in laboratory conditions (e.g. they can propose a new test principle, design a learning</p>	<p>they know how to write and submit a research project with all the requirements to the appropriate grant agency;</p> <p>they are able to work effectively on a scientific team (including home interdisciplinary cooperation);</p> <p>they know how to establish and maintain contacts with foreign scientific researchers as individuals and as teams;</p> <p>they are able to independently use complex methods of quantitative analysis of research data, and to critically interpret the results;</p> <p>they are able to independently use complex qualitative methods and to correctly interpret the results;</p> <p>in their specific field, they know how to draw up analytical overview studies that map the current state of global knowledge, development trends and open questions.</p>

PROFESSIONAL SKILLS			
Bachelor's study programme	Master's study programme	Doctoral study programme	
psychological testing, questionnaires, interview, field research);	Study programme graduates experiment);		

# PSYCHOLOGY

	they know how to correctly use basic assessment methods and conduct psycho-diagnostic interviews;	they have mastered the critical approach: they are able to look at an issue from various perspectives; programme graduates enables them to reach conclusions; they are sensitive to the context (in which a matter takes place) and interpersonal factors; they take into account the complexity of factors that influence human behaviour and social interaction; they do not simplify the studied phenomena and processes; they have mastered skills related to the diagnosis performed within applied psychology and field research (e.g. error analysis, diagnosis of learning disabilities); they know how to conduct interventions in the area of applied psychology and field research (e.g. designing a training system, suggesting a therapeutic plan); they have mastered skills related to diagnosis carried out within research or in laboratory conditions (e.g. basic EMG evaluation, personality diagnosis); they know how to carry out research interventions, they are able to intervene in laboratory conditions (e.g. they can propose a new test principle, design a learning experiment); they are able to independently formulate research hypotheses or research questions and to verify them; they are able to independently carry out complex empirical investigations (e.g. conduct an experiment, observation, psychological testing, questionnaires, interviews, field research); they know how to present their research to the public (both orally and in writing) and how to assess the quality of others' research information; they know how to analyze the obtained data using quantitative and qualitative methods, and how to interpret them (e.g. basic and advanced multivariate statistics, including ANOVA, multiple regression analysis, factor analysis, qualitative data analysis);	they know how to write and submit a research project with all the requirements to the appropriate grant agency; they are able to work effectively on a scientific team (including home interdisciplinary cooperation); they know how to establish and maintain contacts with foreign scientific researchers as individuals and as teams; they are able to independently use complex methods of quantitative analysis of research data, and to critically interpret the results; they are able to independently use complex qualitative methods and to correctly interpret the results; in their specific field, they know how to draw up analytical overview studies that map the current state of global knowledge, development trends and open questions.
<b>Professional skills</b>	<p><b>Bachelor's study programme</b></p> <p>they know how to write a brief professional report on the psychological examination of the client/clients;</p> <p>they have mastered the basic procedures of the collection of information (library and bibliographic skills);</p> <p>they are able to interpret scientific texts, find the key parts and assess the quality of arguments;</p> <p>they know how to apply the theory of research techniques: they are able to choose and correctly use a psycho-diagnostic test and conduct a psycho-diagnostic interview;</p> <p>they know how to apply the theory of intervention procedures: they are able to design, implement and evaluate a targeted individual and group intervention;</p> <p>they know how to formulate research hypotheses and research questions and how to verify them;</p> <p>under supervision, they are able to perform empirical research using various data collection methods (e.g. experiment, observation, psychological testing, questionnaires, interview, field research);</p> <p>they know how to analyze the obtained data using basic quantitative and qualitative methods;</p> <p>they know how to interpret the obtained research data, compare them with data in scientific literature and write a research report.</p>	<p><b>Master's study programme</b></p> <p>they know how to write and submit a research project with all the requirements to the appropriate grant agency;</p>	<p><b>Doctoral study programme</b></p>



## 2.2 EDUCATIONAL STUDIES

### A BRIEF DESCRIPTION OF THE HISTORY, CHARACTER AND THEMATIC SCOPE

The history of teaching dates back to ancient times. Starting with the modern age, teaching became an official occupation, the school became an institution and the teacher became a professional whose activity was subject to public inspection (controlled by the municipality, the Church and the state).

Grammar school teachers have been educated at universities since the 19th century. On the other hand, teachers at the level corresponding to present-day elementary school did not receive university education at the time. The First Czechoslovak Republic took over teacher institutes from Austria-Hungary in 1918; teachers of the so-called national schools were thus educated at the grammar school level. One of the first attempts at a change occurred in 1919. However, the Academic Senate and the teachers of the Faculty of Arts of Charles University rejected the introduction of university education for national school teachers. In that situation, teachers sought other than the officially approved ways. The Czechoslovak Teachers' Guild established a private college of education in Prague in 1921, later in Brno. In 1929, the private college in Prague was renamed the Faculty of Education, which in turn was renamed the Education Academy in 1932. This private Education Academy offered a two-year study and existed until the end of the First Republic. In addition, there were one-year state education academies in Prague and Brno.

After the Second World War, the network of universities started to expand (Olomouc, Hradec Králové, Plzeň, České Budějovice). Act No. 100 of April 1946 established faculties of education at all the universities in the Czech lands and Slovakia at the time. The new faculties had not been operating for even two years when the political regime dramatically changed.

February of 1948 brought many radical changes. The university system of teacher education was reorganized. Beginning in 1950, elementary school teachers were again educated only at the grammar school level; future teachers were educated at grammar schools of education, from 1953 at schools of education. In July of 1953, the existing faculties of education were turned into tertiary schools of education. Two months later, the Faculties of Education in Prague, Olomouc and Bratislava were renamed again, this time becoming Universities of Education; in other cities, tertiary schools of education remained. In the following six years, a much more significant change took place. The network of teaching institutions was reorganized again in 1959. Eighteen teaching institutes were established for prospective teachers of elementary and secondary schools. Educational studies became a three-year programme. The teaching institutes had existed for only five years in Czechoslovakia when it became apparent that they were not meeting the expectations. That was why they were renamed faculties of education and the study of teaching for elementary schools was extended to four years. The more or less positive changes which then occurred both in the field of teaching and at the faculties training teachers towards the end of 1960s came to an end when the troops of the Warsaw Pact invaded the country in 1968.

The so-called “normalization” period began in 1969. Education was one of the areas which the subsequent changes affected the most. The teaching staff was radically “purged” at all types of schools. The content and scope of subjects changed along with the system of accepting teacher applicants; ideological control began. In order to weaken the faculties of art and science, the faculties of education were given the right to train high school teachers as well. Formally, this study was combined with teaching for secondary schools, so it was generally known as teaching for the 5th - 12th grade.

The Velvet Revolution in 1989 revived the hopes of most people that the situation might change. Regional faculties of education were expecting a change not only to their curriculum but also to the

institution itself. It was time for the first division of the faculties of education - regional universities were established. An extensive autonomy of universities affected the form of teacher education at all the faculties of education. It was at this time that the previous ideologization of teaching, the forced search for ideological and educational elements in technical courses, and the indebtedness of the departments of education and psychology to the previous regime showed their negative impacts. The new - freely selected - heads of faculties significantly reduced the educational-psychological part of the teacher training. The autonomy of universities and the individual faculties also meant that there were huge differences in the undergraduate teacher training within the Czech and Slovak Federal Republic. While receiving the same degree for the same education level, the students of education studies basically completed different forms of undergraduate training.

At the time when the Czech Republic signed the Bologna Declaration, a debate arose over the possibility or necessity to structure the individual study programmes and fields into the bachelor's, follow-up master's and doctoral degrees. The debate was ended by another amendment to the Higher Education Act, which enacted the structuralization of university study, with only two exceptions (medicine and law). Disputes broke out at many levels in the Czech Republic regarding the future form of the undergraduate teacher training. In the end, the following solution was enforced: teaching for high schools would be structured as standard; teaching for secondary schools would be structured in various ways and the suitability of its structuralization would be investigated; teaching for elementary schools would have the form of a five-year, non-structured master's study. This situation continues to this day.

## FUNCTION

Teaching as a specific occupation has three functions:

- prepare children and the youth for future life;
- conduct applied research with a focus on education and training and the management of schools;
- continuously educate teachers and innovate the utilized teaching procedures in such a way that the education results are as good as possible.

Demands on teachers of all levels are increasing, since it is the teacher who can bring changes into the subject area. The academic level by itself does not guarantee that the undergraduate teacher training will be good enough for the performance of the job. The training must be closely linked to practice and must ensure the development of the social and personal characteristics of prospective teachers and the acquisition of not only professional knowledge, but also professional competencies.

## PRIMARY FIELDS

We may distinguish among five components of the teacher training that are common for teachers of all kinds and grades of schools. The terminology marking the components is not essential. It is more essential to determine their mutual proportions in such a way that graduates may qualify as professionally trained teachers, eligible for teaching independently. The components are the following:

**field-course**; in the case of teaching for secondary and high schools, this usually contains two probation courses;

**course-didactic**; in the case of teaching for secondary and high schools, this usually contains two field didactics (didactics of probation courses);

**pedagogical-psychological** (especially general pedagogy, general didactics, theory of education, educational diagnostics, general psychology, developmental psychology, social psychology, educational psychology);

**general-educational** - humanities, university basis (biology, philosophy of education, working

with computers);  
**teaching practice at schools** (a minimum of 4 weeks).

There should be a difference between teaching for elementary schools and teaching for secondary and high schools, as regards the representation of the pedagogical-psychological component in the undergraduate training. Its proportion should slightly decrease towards the higher school grades in favour of the field-course component.

## DEFINITION OF OBJECTIVES

Teaching takes many forms and the objectives of learning will vary according to the study programme type (specialization in pedagogy, teaching for elementary schools, teaching for high schools) and according to the individual study programmes. The difficulty lies in the fact that there is no common framework standard yet for teaching in the Czech Republic. The MEYS alternately starts and stops working on the standard, depending on personnel changes at the ministry.

## GENERAL PROFILE OF GRADUATES

Graduates of the **bachelor's study field** Teaching for Kindergartens will acquire a basic orientation in the area of pre-school education, and competencies that are necessary for a qualified performance of the teaching occupation at kindergartens. The competencies are as follows: course, didactic and psychodidactic, educational, diagnostic and interventional, psychosocial, social and communicative, managerial and prescriptive, professionally and personally cultivating.

Graduates of the Bachelor's study field Teaching of Practical Education and Vocational Training have professional qualifications needed for working as teachers of practical education and vocational training within the following types of schools: secondary vocational schools, vocational schools and schools of practical education (in accordance with Act No. 563/2004 Coll. on teaching personnel).

In all other cases, only graduates from master's teaching programmes may teach at elementary and high schools.

This means that a graduate from a bachelor's programme such as Teaching Assistant or Field XY with a focus on teaching is not a fully qualified teacher. Such graduates are qualified for jobs such as teaching assistant, educational worker or assistant at the following institutions: high schools, tertiary vocational schools, educational and counselling centres (e.g. pedagogical-psychological centres, etc.); they can find jobs with out-of-school facilities, leisure centres, etc.

Graduates of the **master's study programme** Teaching for Elementary Schools are equipped with teaching, psychological, didactic and psychodidactic, social and communicative, managerial, and professionally and personally cultivating competencies. They have mastered multidisciplinary knowledge and skills from the fields of language (including a foreign language and the foreign language didactics), mathematics, science, local history, music, physical education, art and practical activity. They are characterized by a broad knowledge of culture. They have knowledge and skills that contribute to the support of health and the prevention of socio-pathological and social phenomena; they have mastered information and communication technologies and are able to solve educational problems and evaluate their own teaching activities. They can be expected to develop their skills, as regards the creative, self-reflective and autoregulative aspects.

Graduates of Teaching for Secondary Schools usually complete the pedagogical-psychological and field-course training within the bachelor's programme. Both of these components are complemented with the field-specific didactics and teaching practice during the follow-up master's

studies. The graduate is fully qualified to teach their approbation fields at elementary/secondary schools.

With Teaching for High Schools, the situation is more difficult. The form of this programme depends on where the student completed their bachelor's studies and what form these studies took: whether they were intended for teachers or non-teachers. It is important to decide to become a teacher only after careful consideration and with a good knowledge of the matter, so that the training can *culminate* during the follow-up master's studies, so that the field-specific didactics are not separated from the given field, and so that there is enough time for the individual to identify with the profession of teaching. There are the following options:

The Bachelor's training is field-course (without the field-specific didactics), it is strictly non-teaching. The Bachelor's study provides the prospective teacher with a sufficient scientific and field-specific basis in one or two approbation courses. Those interested may take part in the optional pedagogical-psychological module, in addition to the compulsory courses. In the follow-up master's programme, the field-specific study culminates and teaching training is emphasized.

The Bachelor's training is field-course (without the field-specific didactics), it is strictly non-teaching. The bachelor's study provides the prospective teacher with a scientific and field-specific basis not in two approbation courses, but in a broader scientific context (scientific, socio-scientific, linguistic, etc.). In the follow-up master's study, the student concentrates on getting the teaching qualification, i.e. they complete all the pedagogical-psychological courses, teaching practices and the study of field-specific didactics, and in addition they develop their knowledge of two selected approbation courses.

The Bachelor's training is field-course (without the field-specific didactics), it is strictly non-teaching. The Bachelor's study provides the prospective teacher with a sufficient scientific and field-specific basis in one or two approbation courses. In the follow-up Master's study, the student concentrates on getting the teaching qualification, i.e. they complete all the pedagogical-psychological courses, teaching practices and the study of field-specific didactics.

The Bachelor's training is field-course (without the field-specific didactics), it is strictly non-teaching. The student then completes a follow-up Master's study in a non-teaching programme (e.g. mechanical engineering, chemical engineering, agricultural engineering). Only then (i.e. after graduation) does the student complete the *bachelor's* study that qualifies them to teach at secondary technical schools.

Bachelor's study programme	Master's study programme	Doctoral study programme
PROFESSIONAL KNOWLEDGE		
Study programme graduates		
<p>they demonstrate theoretical knowledge of the basic components of the fields of their course specialization;</p> <p>they demonstrate a multidisciplinary understanding of the basic subject areas required for the creation of the educational offer at kindergarten;</p> <p>they explain and evaluate the principles of effective communication;</p> <p>they are well acquainted with the basic secondary literature pertaining to the scientific fields of the course specialization;</p> <p>they explain the relations between the basic pedagogical and psychological categories and their functioning in the educational process;</p> <p>they demonstrate theoretical knowledge of the basic psychological disciplines (knowledge of general, developmental and social psychology), basic knowledge of the biology of the child and basic knowledge of the school legislation;</p> <p>they interpret the psychological and pedagogical principles of the development, education and training of man;</p> <p>they describe and evaluate the philosophical,</p>	<p>they demonstrate a broad knowledge of the scientific disciplines in their course approximations and understanding of these disciplines, the principles of their structures, relations both within and without the disciplines of their course approximations;</p> <p>they interpret and explain facts, concepts, and statements of the scientific disciplines underlying the courses of their approximation;</p> <p>they demonstrate a broad knowledge of the content of elementary education and understanding of the content;</p> <p>they demonstrate a deep knowledge of the theory of teaching and learning, the curriculum theory and the theory of school and teaching resources, and they also interpret and evaluate the forms and methods of teaching;</p> <p>they are well acquainted with a wide variety of teaching methods, and they interpret and evaluate teaching strategies and representations in relation to the teaching of a specific subject;</p> <p>they demonstrate a deep knowledge of pupils' personal development, particularly in relation to the processes of learning;</p> <p>they demonstrate knowledge and understanding of the criteria of evaluation and self-assessment;</p> <p>they interpret and evaluate the objectives of teaching the field of their course</p>	<p>they have complex, deep and systemic knowledge of their specific field, corresponding with the contemporary state of knowledge;</p> <p>they are deeply familiar with the scientific basis of their specific field, its historical development and interdisciplinary overlaps;</p> <p>they have complex, deep and systemic knowledge of the theory of teaching and learning, corresponding to the contemporary state of knowledge;</p> <p>they have complex, deep and systemic knowledge of pedagogy and psychology, corresponding to the contemporary state of knowledge;</p> <p>they demonstrate specialized knowledge of the theory, concepts and methods in pedagogy, psychology and didactics of their specific field;</p> <p>they demonstrate specialized knowledge of the theory, concepts and methods in their specific field;</p> <p>they know the methodology of educational research at the contemporary international level;</p> <p>they demonstrate the knowledge of</p>

# EDUCATION DESCRIPTORS



# EDUCATION DESCRIPTORS

PROFESSIONAL KNOWLEDGE		
Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates		
<p>sociological and political context of education;</p> <p>they demonstrate knowledge of cultural and social contexts of the educational process;</p> <p>they didactically transform multidisciplinary knowledge and skills necessary for the educational process in pre-primary education;</p> <p>they reproduce and evaluate the principles of creating an educational environment for children of pre-school age;</p> <p>they interpret, evaluate and explain some of the concepts and methods of the fields of their course specialization;</p> <p>they interpret, evaluate and explain the theory of pre-school and out-of-school education;</p> <p>they identify the constraints of pedagogical, didactic and psychological processes in pre-school education;</p> <p>they identify the limitations of some basic concepts and methods in solving specific selected problems in the fields of the course specialization;</p>	<p>approbation;</p> <p>they understand the methodology of pedagogy, psychology, and the sciences of their course approbation;</p> <p>they are well acquainted with teaching concepts and directions, the development of views on the concept of the teaching process in the historical context; they evaluate the current trends;</p> <p>they are well acquainted with the major trends of European education, and alternative and innovative education concepts;</p> <p>they understand the theories, concepts and methods of contemporary knowledge in pedagogical and psychological disciplines related to the process of teaching and learning;</p> <p>they are well acquainted with the current methods, techniques and tools of research in professional didactics of their approbations, they are able to interpret the methodological problems of research in professional didactics of their approbations;</p> <p>they understand the socio-scientific educational context, they interpret and evaluate the relations between the knowledge within various socio-scientific disciplines (philosophy, sociology, ethics, psychology, pedagogy) and the processes of teaching and learning;</p>	<p>quantitative and qualitative approaches to solving specific problems in the theory of teaching and learning in the specific fields;</p> <p>they identify the ethical and legal context of scientific activities;</p> <p>they understand a broad philosophical and socio-scientific context of education and training;</p> <p>they apply interdisciplinary approaches to solving specific problems of the theory of teaching and learning in the specific fields;</p> <p>they identify related problems in the area of pedagogical-psychological disciplines.</p>



Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates		
<p>in accordance with the biological and psychological needs of the child and with respect to its psychosomatic development, they are able to plan, organize, manage and evaluate the pedagogical process at the level of pre-school education;</p> <p>they have mastered the basic teaching practices and resources for getting the attention of the pupils and for the formation of a favourable psychosocial climate in the classroom;</p> <p>they are able to methodically implement concrete educational programmes for the specific contents of pre-school education and training;</p> <p>they apply the theoretical knowledge of the methods and concepts of the fields of their course specialization on the solution of individual technical problems;</p> <p>they apply the principles of effective communication when working with children and in contact with parents;</p> <p>they analyze and evaluate the educational process, reflect the level of their professional competencies and creatively develop such competencies;</p> <p>they methodically process and ensure the</p>	<p>they have mastered the process of transferring knowledge of the field of their course approbation into a curriculum, i.e. the establishment of learning objectives, critical analysis, interpretation and structuring of the curriculum, selection of appropriate forms and methods of teaching, taking into account the possibilities and needs of individual pupils;</p> <p>they select appropriate methods of evaluation and self-assessment of the process of teaching and the learning outcomes, and reflect the processes and results of teaching in order to improve the planning of further education;</p> <p>they plan their lessons considering the objectives set out in the curriculum and with regard to the individual abilities of pupils;</p> <p>they select and operationally use teaching tools and materials when teaching the given field;</p> <p>they utilize functional-information and communication technologies in education;</p> <p>they apply various teaching methods and organizational forms in relation to their course specialization;</p> <p>they create a high-quality environment for learning, especially a social emotional climate based on mutual respect, cooperation</p>	<p>they identify and evaluate the research procedures of pedagogical and psychological disciplines, and they adequately apply them in their own research in the theory of teaching and learning;</p> <p>they devise their own research in the theory of teaching of the chosen field specialization, i.e. define the research problem and the hypothesis, choose an appropriate methodological approach, plan and carry out their own research and evaluate the obtained data;</p> <p>they independently use complex quantitative and qualitative methods of analysis of research data and they are able to critically evaluate and interpret the obtained results;</p> <p>they critically evaluate the methodology, results and benefits of their own research, particularly in relation to the current state of knowledge;</p> <p>at a high professional level, they present the results of their research activities to the relevant professional community;</p> <p>they are well acquainted with a wide range of scientific literature including foreign literature, related to the theory of teaching</p>

# EDUCATION DESCRIPTORS

PROFESSIONAL SKILLS		
Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates		
<p>organization of learning courses within their course specialization;</p> <p>they apply the basic theoretical knowledge of pedagogy and general didactics in the analysis of a lesson within their course specialization; they are able to assess the didactic effectiveness of the teaching methods and forms of work;</p> <p>they are able to find, organize and interpret information relevant to solving a defined practical issue;</p> <p>they interpret selected pedagogical and psychological texts and they are able to compare and critically evaluate the gained knowledge;</p> <p>they interpret the basic literature of their course specialization and they classify and compare the gained knowledge and apply it on solving practical issues and problems in the area of their course specialization;</p>	<p>and adherence to the agreed upon regulations and rules of behaviour and coexistence in the classroom;</p> <p>they suitably adapt knowledge and skills to the specific context of the given class, grade, school, and the community in which the school is located;</p> <p>they apply appropriate diagnostic methods in the evaluation of the pupils' performance;</p> <p>they communicate with pupils in a refined manner, with dignity and appropriately to their age; they also communicate appropriately with parents and colleagues;</p> <p>they adapt the educational programme in relevant disciplines to the specific conditions of the pupils and school grades;</p> <p>they independently and suitably implement the teaching process in all its stages (planning, teaching, teaching reflection); based on their knowledge and self-reflection, they evaluate their educational activities and creatively improve their teaching performance;</p> <p>they analyze the educational programme in terms of expected learning outcomes in the field of their course approbation;</p> <p>they formulate the research problem within the area of their field approbation, didactics, pedagogy and psychology;</p>	<p>and learning and to the fields of the course specialization;</p> <p>they critically evaluate the theories, concepts and methods of the theory of teaching and selected scientific fields of their specialization;</p> <p>they evaluate new knowledge, theories, concepts and methods in terms of the teaching practice.</p>



## CHARACTERISTIC OCCUPATIONS AND RELEVANT REGULATED OCCUPATIONS

The teaching profession has a relatively large number of *regulated occupations* in the Czech Republic. They are the following occupations (in alphabetical order):

- 577 - teacher's assistant
- 579 - teacher of free-time activities
- 489 - kindergarten director
- 583 - director of high school, language school, conservatory, tertiary vocational school, educational facility for institutional and protective education and preventive-educational care
- 495 - teacher at elementary school, elementary art school and school facility
- 493 - teacher at secondary school
- 488 - kindergarten teacher
- 580 - religion teacher
- 581 - vocational training teacher at social care facility
- 491 - teacher at elementary school
- 627 - special education teacher
- 497 - teacher at high school
- 499 - teacher of artistic courses at elementary art school, secondary technical school and conservatory
- 513 - teacher at facility for further education of teachers
- 575 - teacher at tertiary vocational school
- 510 - educator

## RELATIONS TO OTHER SUBJECT AREAS (INCLUDING BOUNDARY FIELDS)

Teaching is closely related to practically all other subject areas: within the individual approbation courses at various levels and types of schools there are the following areas:

- art
- philosophical sciences and religious studies;
- theology
- philology
- history,
- sociology;
- social work;
- economic sciences
- law
- biology and ecology
- physics
- Earth sciences
- chemistry
- mathematics and statistics
- informatics
- mechanical engineering and materials
- electrical engineering
- mining and mineral processing
- civil engineering
- architecture
- information technology and cybernetics
- psychology
- general medicine and dentistry.

## 2.3 PEDAGOGY FOR NON-TEACHERS

### FUNCTION

Pedagogy is a field which, like other humanities, has several functions. We can define the following functions: (1) theoretical-methodological, (2) empirical-research and (3) practical.

Pedagogy is focused on the study of education of individuals and groups of people as a lifelong process that is biologically and socially conditioned. It studies the phenomena and processes of educational reality and tries to improve the explanatory theories and methodological instruments and to offer support for the implementation of educational practices.

One can generally speak of a common core of non-teaching pedagogical fields and of some specific profiles that are more or less built on this common core or arise from it - especially social pedagogy, pedagogy of free time, tutoring and special education.

### PRIMARY FIELDS

The primary disciplines of the common core include general pedagogy, general didactics, the history of pedagogy, comparative pedagogy, the theory of education and methodology of educational research.

These form the basis of a number of application disciplines focusing on subsections/subfields - e.g. according to the age of the educated individual or group (pre-school education, adult education, gerontopedagogy etc.), according to the education environment (family pedagogy, school education, corporate pedagogy), according to the specific activities that form the framework for the educational activity (sports pedagogy, ...), etc.

The so-called boundary pedagogical disciplines then form a bridge between pedagogy and other fields and help to capture the complexity of the observed phenomena and processes of pedagogical reality.

The separate branches, i.e. the individual fields based on this general framework, are listed in the annexes. Those fields generally include pedagogy, social pedagogy, special education and tutoring.

### DEFINITION OF OBJECTIVES

The educational objectives in the programme Pedagogy differ according to the level of higher education.

At the **bachelor's level**, the main objectives are to understand the main pedagogical theories of education and training in their historical development and current concepts, to adopt the basic procedures of getting to know the educational reality, and to acquire knowledge, skills, habits and other qualities that enable one to participate in the planning, implementation and evaluation of activities in the subject area and training in various environments. The graduate is thus prepared theoretically

Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates		
<p>they have a broad knowledge and understanding of the basic concepts, main theories and methods in the area of pedagogy and its fields (for example general pedagogy and general didactics, the theory of education and the basics of social education, the basics of special education);</p> <p>they are well acquainted with the broader historical and contemporary context of pedagogy and its fields, including its developmental trends (for example the history of pedagogy and education, the main concepts and their representatives, the main issues of the contemporary pedagogical discourse);</p> <p>they are well acquainted with the basic concepts and theories of related fields such as philosophy, psychology, sociology, etc. (they have, for example, mastered the psychological, biological and pedagogical ontogeny, including the developmental specifics - age peculiarities - of the given age group);</p> <p>they have a broad knowledge and understanding of the basic processes and phenomena of educational reality, both in the field of school and out-of-school activities,</p>	<p>they have a deep understanding of the context of their field and pedagogy as a whole, to the full extent and at the level of the current state of knowledge;</p> <p>they know and understand important theories, research and conceptual approaches in their field and pedagogy as such in the national, European and broader international context (they understand, for example, the European educational policy, the strategy of education in the European Union; they have an overview of the basic accents of the international pedagogical discourse and are able to perceive the national educational policy in the context of broader European and international trends);</p> <p>they have a deep knowledge and understanding of the historical and broader contemporary context of their field and pedagogy as a whole, including the respective developmental trends, in the national, European and broader international context (they are able, for example, to perceive shifts in pedagogical fields and developments in their field and pedagogy as a whole);</p> <p>they are well acquainted with the basic concepts and theories of related fields such as</p>	<p>they have a deep and systematic knowledge and understanding of the subject and scope of their field and pedagogy as a whole, in a historical as well as contemporary context, and at the level of the current state of knowledge;</p> <p>they have a deep and systematic knowledge and understanding of important theories, concepts and methods which are at the forefront of knowledge in the field, in the national and international context;</p> <p>they know and understand the system of sciences and its development, as well as research problems on the border between pedagogy and other fields.</p>

## PROFESSIONAL KNOWLEDGE

# EDUCATION DESCRIPTORS

PROFESSIONAL KNOWLEDGE		
Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates		
<p>in the sphere of formal and informal education and informal learning, in relation to individuals and groups of all age categories and different educational needs (for example, they understand the conditions for inclusive education);</p> <p>they are acquainted with the basic methodological and conceptual approaches to learning and pedagogical influencing of processes and phenomena of educational reality in a broad scope; they are, for example, able to plan a case study of a pupil with special educational needs; they have mastered the methods of learning and diagnostics of personality, basic communication strategies and approaches including educational and communication methods used with individuals with special educational needs.</p>	<p>philosophy, psychology, sociology, politicalology, biology, management, anthropology, etc.; they understand the relations between pedagogy and these fields; they know, for example, the basic principles of the formulation of educational policy and are able to analyze them critically;</p> <p>they are able to use knowledge of other fields in a multifaceted educational activity; based on the knowledge of theoretical and practical issues and approaches to their solving, they can independently define and creatively solve theoretical and practical issues in the field, or design a qualitative and quantitative research, plan its individual steps - problem formulation, research questions, operationalization, method selection, sample selection, data collection, analysis and interpretation; they are able to argue in favour of the selected method;</p> <p>they can relate the acquired knowledge to existing theories and practices and thus enrich the existing knowledge.</p>	

Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates		
<p>they are able to find, organize and interpret information relevant to solving a defined practical issue;</p> <p>they are well acquainted with the relevant databases and are able to critically evaluate and interpret them;</p> <p>they can devise ways of solving practical problems and situations in an appropriate way based on knowledge and understanding of the theory and methodology of pedagogy and with respect to the characteristics and needs of such problems and situations;</p>	<p>they are able to design and manage the implementation of appropriate solutions to practical problems and situations in education based on a broad and deep knowledge and understanding of the theory of pedagogy, the methodology of research and practice, and with respect to the characteristics and needs of such problems and situations (for example, they know how to work with children/pupils with special educational needs as special teachers - special educational diagnostics, individual educational plan, intervention, working with individuals and groups);</p> <p>they are able to work creatively and independently, and also to lead others when addressing a multifaceted educational issue;</p> <p>they are able to creatively plan and implement and systematically evaluate specific educational measures in all the main areas of educational reality (for example, they can plan and evaluate educational programmes for specific groups in the educational environment; they are able to apply approaches to the education of children and pupils with special educational needs to the teaching - individual approach and working with</p>	<p>independently and in communication and cooperation with others, they are able to select, plan, implement and evaluate creative research methods in their field and pedagogy as a whole, learn the processes and phenomena of educational reality through these methods, and enrich scientific knowledge with respect to the ethics of research work;</p> <p>they know and understand the organization of the life of the scientific community in its many layers, both at the national and international level;</p> <p>they are able to fully participate in the life of the national and international scientific community, including publication activities, planning research projects, acquiring sources for their implementation, etc.</p>

## PROFESSIONAL SKILLS

# PEDAGOGY FOR NON-TEACHERS

and, to a certain extent, also methodologically, but they are also able to work in pedagogical practice; especially in some branches (fields), these generally formulated objectives are further specified.

## RELATIONS TO OTHER SUBJECT AREAS (INCLUDING BOUNDARY FIELDS)

Pedagogical fields are closely related especially to the sciences concerning the man and the society, that is:

- educational studies;
- psychology
- anthropology
- philosophical sciences and religious studies;
- theology
- sociology;
- social work;
- economic sciences
- law
- biology and ecology
- mathematics and statistics
- general medicine and dentistry,
- health care.

## 2.3.1 SUBFIELD SPECIAL EDUCATION

### A BRIEF DESCRIPTION OF THE HISTORY, CHARACTER AND THEMATIC SCOPE

The disabled have been treated in different ways during the development of human society; significant changes occurred in the 18th and mainly the 19th century, when more and more schools and institutions for such individuals were established (cf. Monátová, L. 1998). The methods of working with the physically disabled gradually improved; they mainly concerned students with compulsory school attendance. As regards **caring for the visually impaired**, the most significant improvement was the possibility of written communication; the most well-known means of such communication is Braille, which was created by Louis Braille (1806-1852) in the first half of the 19th century. At the beginning of the 19th century, three generations of the Klar family helped to establish care for the visually impaired in Bohemia. Alois Klar, who founded the Hradčany Institute in 1807, opened a new institute in Prague in 1832, the so-called Klar Institute. The well-known Deyl Institute was established in Prague in 1910. Successful development of the care for **the hearing impaired** began in the 18th century. Abbé Charles Michel de L'Eppé (1712-1789) established the first institute for the deaf and mute in Paris; he also introduced sign language. An additional 13 institutes for the deaf and mute were established in the 18th century, one of these in Prague in 1786. Both the sign and oral methods were used. One of the important Czech figures was Miloslav Seemann (1892-1975), who, among other things, founded a kindergarten for deaf and mute children and emphasized the importance of timely special communication education. The sign and oral languages form a bilingual means of communication; UNESCO recognizes sign language as the mother tongue of the hearing impaired and spoken language as the second language. One of the significant figures dealing with the **care for children with speech disorders** was Miloš Sovák (1905-1989), the founder of the first speech therapy institute in Prague in 1946. Karel Slavoj Amerling (1807-1884), a Czech scholar dealing with **mental disabilities**, founded the first institute for abnormal children at Hradčany in Prague – the Ernestinum – in 1871. The latest special institutions in the Czech Republic are those for the **physically handicapped and disabled**. In 1913, the Jedlička Institute for physically disabled children was established in Prague; Kociánka, another institute for the physically disabled, was established in Brno in 1919. Among the well-known figures in this field are Rudolf Jedlička (1869-1926), František Bakule (1877-1957), August Bartoš (1888-1957) and František Kábele (1913-1998).

### FUNCTION

Special education is understood as a science which concerns the laws of special education and training of an individual who, due to their disability, requires a special educational approach and support when trying to integrate into the labour market and society.

**Special education has the following functions:**

- preparation of special teachers;
- research;
- further education.

**Strategy of the education of teachers and special teachers with regard to an inclusive form of**

## school

The current concept of special education deals with disadvantaged individuals from birth to old age, that is the periods of early and pre-school age, school age, adolescence, adulthood and old age. In response, faculties of education expand the offer of study fields to include the study programme Special Education, in accordance with current legislation; they also accredit new fields: special education for teachers, special andragogy (Olomouc, Brno, Prague).

With the change of perspective on the education and training of pupils with special needs (inclusive education), the status of teachers and special teachers also changes, as does the nature of their tasks during the educational process. At a number of schools, the position of a special teacher has been established. The training of teachers of all the school grades is enriched by the basic knowledge of special education (the inclusion of a special education course in educational studies for 1 or 2 semesters). Specific requirements are placed on the education of professionals in educational and psychological counselling services, the meaning of which is increasing in relation to the inclusive education of pupils with special educational needs. The reflection of all the facts above serves as the basis for the current concept of the study of special education, which has been extended to a number of universities (Prague, Olomouc, Brno, Ostrava, Hradec Králové, Liberec).

## PRIMARY FIELDS

**The training of a special teacher takes place in four modules:**

1. common basis (pedagogy and psychology, university basis);
2. the basics of special education (medical propaedeutic, psychopathology, special education diagnostics, integrative (special)/inclusive pedagogy);
3. specialization:

**psychopaedia** - (special) education of persons with mental disabilities;

**somatopaedia** - (special) education of persons with physical disabilities or chronic and long term illness;

**speech therapy** - (special) education of people with impaired communication abilities;

**surdopaedia** - (special) education of hearing impaired persons;

**typhlopaedia** or **ophtalmopaedia** - (special) education of visually impaired persons;

**etopaedia** - (special) education of persons with behavioural disorders;

**combined disability** - (special) education of persons with multiple disabilities;

**specific learning or behavioural disorders;**

4. course didactics (inclusive didactics for pupils with special educational needs).





## GENERAL PROFILE OF GRADUATES

### Bachelor's studies

The main focus of the study programme is the training of specialists (in two fields) with abroad socio-scientific knowledge focused on pedagogical and psychological disciplines. The study contains the basic field-specific university course with an emphasis on the application aspect of the field. An equivalent part of the study is a common basis that covers psychological, pedagogical, communicative (including a foreign language) and generally cultivating courses. In addition, there is a field and pedagogical-psychological practice. Pedagogical and psychological disciplines provide the training for educational work.

The study is intended as preparation for the follow-up master's study in the programme of Teaching for Secondary Schools. The graduate can also find work directly, especially as a teaching assistant at secondary schools. The graduate has acquired the basic competencies for educational work at school and non-school facilities. They are also qualified to work as instructors of the given field at leisure centres. Due to the generality and wide range of fields, the graduate can find a number of jobs, e.g. in state administration, business management, etc.

Knowledge, skills and attitudes acquired during their studies are the basis of the competencies needed to perform the profession of a teaching assistant at elementary schools in the educational and auxiliary educational work with a focus on special education.

**The objectives of the study field Special Education:** to train special teachers for special teaching activities in special classes at elementary schools, schools for pupils with special educational needs, special elementary schools (as teaching assistants), at school facilities, kindergartens for children with special educational needs, children's and youth homes (according to Act No. 563/2004 Coll. on teaching staff), and for work at social facilities (according to Act No. 108/2006 Coll.), in health care, in non-profit and non-governmental organizations, etc.

**The graduate profile** is defined by the output knowledge: general (common basis), professional and special (special pedagogical basis and specialization of special education).

**The qualification** and the degree of professional adaptability to the practical conditions and requirements: the acquisition of competencies for the education of individuals with special educational needs.

### Follow-up master's studies

The study programme is primarily focused on the training of elementary school teachers of the general educational field (in the combination of two approbation courses). The study contains a course on the field didactics for elementary schools with the addition of complementary field disciplines. An equivalent part of the study is formed by pedagogical and psychological courses that provide the field didactics with a theoretical basis. Everything is connected via the professional teaching practice at elementary schools.

The graduate is directed primarily to the field of teaching at elementary schools. They have the potential for retraining and subsequent work in the areas of their field and in the educational field.

**The aim of the study of the Special Education study field** is the training of graduates for special educational activities at special school facilities, in common types of schools for integrated pupils, integrated pedagogical and psychological counselling (pedagogical and psychological centres, special pedagogical centres, centres of educational care, speech therapy centres), alternative education, penal and preventive care.

#### **Profile of the graduate of the study field Special Education:**

##### **definition of the output knowledge and skills - general, vocational and special:**

broad professional knowledge and skills of special education;  
 basic communication knowledge and skills;  
 general basis: pedagogy, psychology, methodology;  
 special pedagogical basis: special pedagogical diagnostics, psychopathology II, neuropsychology, pedagogical and psychological counselling, methodology and didactics of the courses for elementary schools for pupils with special educational needs;  
 specialization (select one): surdopaedia and speech therapy, education of individuals with several disorders (psychopaedia, somatopaedia, opthalmopaedia), education of individuals with mental disabilities, education of individuals with behavioural disorders, surdopaedia in sign language), specific learning disorders (optional);

##### **qualifications and the level of adaptability to the conditions and requirements of practice:**

knowledge and skills in the field, communication and educational knowledge and skills;  
 adaptability and the possibility of requalification for employment in the given field, in educational activities, in the state administration and corporate management;  
 the acquisition of competencies for the education and training of pupils with special educational needs and special pedagogical diagnostics and counselling with all types of disabilities and all age groups.

#### **Doctoral studies of special education**

The objective is to train scientific workers eligible to pursue research and scientific activity in special pedagogy and speech therapy, surdopaedia, psychopaedia, somatopaedia, opthalmopaedia, etopaedia or specific learning disorders.

The aim is to enable the excellent students to continue in their selected specialization via the doctoral study programme Special Education and to allow them to pursue scientific and research activities (pursued by many already during the master's study) and thus train highly qualified professionals for further work at universities or research and science facilities in the Czech Republic or abroad. The studied programme/field of Special Education is conceived **in an interdisciplinary way** and implemented in cooperation with, for example, the departments of education, psychology, philosophy, etc.

## Bachelor's studies

**Learning outcomes**, i.e. specific (measurable) knowledge, skills and abilities which the student should acquire within the study (or what the student is capable of upon a successful completion of the field/course):

- they have the general knowledge and skills of special education;
- they have a broad professional knowledge and skills of special education;
- they have mastered auxiliary educational and communication knowledge and skills;
- they are able to apply approaches to education and upbringing of children and pupils with special educational needs to the teaching;
- they are able to work with children/pupils with special educational needs at the level of a teaching assistant;
- they are able to methodologically design and prepare a case study of a pupil with special educational needs.

**Learning outcomes with respect to compulsory and compulsorily optional courses:**

### Compulsory

*Introduction to Special Education 1 - Psychopaedia* - they know the basics of psychopaedia - the characteristics of mental retardation, classification, dementia, pseudooligophrenia, Down syndrome, education system, social facilities - they are able to apply the knowledge to teaching pupils with mental disabilities.

*Introduction to Special Education 2 - Somatopaedia* - they are acquainted with the basic issues of somatopaedia (education and training of people with physical disabilities and chronic diseases), they are able to apply the knowledge to teaching pupils with physical disabilities and handicaps.

*Special Educational Diagnostics* - they have the basic knowledge, are acquainted with the area of diagnostics in special education, are able to apply the knowledge to the diagnostics of pupils with special educational needs.

*Pathopsychology 1* - they have the basic knowledge in pathopsychology, are acquainted with the technical terms and issues of the field, are able to use the knowledge when teaching pupils with special educational needs.

*Ophthalmology* - they know the basic terms (anatomy, physiology, pathology), are acquainted with the field and are able to apply the knowledge to teaching visually impaired pupils.

*Introduction to Health Sciences* - they know the basic terms (anatomy, physiology, pathology), are acquainted with the field and are able to apply the knowledge to teaching pupils with special educational needs.

*Pediatrics* - they know the basic terms (anatomy, physiology, pathology), are acquainted with the field and are able to apply the knowledge to teaching pupils with special educational needs.

*Psychiatry* - they know the basic terms (anatomy, physiology, pathology), are acquainted with the

field and are able to apply the knowledge to teaching pupils with psychiatric illnesses.

*Introduction to Special Education 3 - Ophthalmopaedia* - they are acquainted with the basic issues of the field of ophthalmopaedia (education and training of visually impaired people) and are able to apply the acquired knowledge to teaching visually impaired pupils.

*Introduction to Special Education 6 - Speech Therapy* - they have theoretical knowledge of the basic terms of impaired communication ability, they know the organization of providing speech therapy in the Czech Republic.

*Inclusive Education* - they are acquainted with the issue of integration and inclusion in the contemporary education system in the Czech Republic and abroad, are capable of a comparison with selected educational systems abroad; they have acquired knowledge and skills necessary for a successful organization of environment and education in the classroom, are able to apply this knowledge and skills to the integration of pupils with special educational needs, are able to integrate the acquired knowledge of the individual sub-disciplines and find adequate links between them.

*Integrative Education* - they know the current concept of special education and the system of care for disabled people in the Czech Republic and abroad; they are capable of a comparison with selected systems abroad. They have mastered the basic terminology, theories and methods of special education, know the basic legislation, are well acquainted with the system of education at special schools and school facilities and with integration; they know the preventive methods and the counselling system, can use their knowledge when teaching pupils with special educational needs.

*Introduction to Special Education 7 - Surdopaedia* - they know the basic concepts of surdopaedia (education and training of the hearing impaired) and can apply the acquired knowledge to teaching hearing impaired pupils.

*Introduction to Special Education 4 - Specific Learning Disorders* - they know the basic concepts and issues in the field of specific learning disorders and are able to apply the acquired knowledge to teaching pupils with specific learning disorders.

*Introduction to Special Education 5 - Etopaedia* - they know the basic concepts and issues in the field of etopaedia and the current approaches to the education of pupils with behavioural problems and disorders; they are able to apply the acquired knowledge to teaching pupils with behavioural disorders.

*ENT - Phoniatics* - they have the basic knowledge of the issue of phoniatics and are able to apply the acquired knowledge to teaching pupils with speech and hearing impairments.

*Methodology 1* - they know the basic concepts of methodology, are well acquainted with the issue of research, are able to use the acquired knowledge when planning research with pupils with special educational needs and are able to process the acquired data.

*Sociology for Special Teachers* - they know and understand the interdisciplinary context of special education and its social foundations and are able to apply the acquired knowledge to teaching pupils with special educational needs.

*Neurology* - they have the basic knowledge of neurology for the purposes of special education and can apply the acquired knowledge to teaching pupils with special educational needs.

*Professional Practice 1* - they master assistant work under supervision and observe other teachers during classes according to their second study field. They are able to apply theoretical knowledge to teaching practice.

### **Compulsorily optional courses**

*Specialization 1a - Speech Therapy* - they acquire theoretical knowledge of the individual types of impaired communication ability, are able to apply this knowledge to practical cases of pupils with impaired communication ability; they are also able to incorporate acquired knowledge of other courses (Surdopaedia, ENT - Phoniatics, Neurology, Special Educational Diagnostics).

*Specialization 1b - Psychopaedia* - they acquire the knowledge of psychopaedia based on the introduction to psychopaedia (the characteristics of mental retardation and the individual degrees, classification, dementia, Down syndrome), are well acquainted with the system of education, know how to work with families with mentally ill children, know selected therapies and the basic methods of practical and special elementary schools; they are able to apply the acquired knowledge to teaching mentally ill pupils within special educational diagnostics.

### **Follow-up master's studies**

**Learning outcomes**, i.e. specific (measurable) knowledge, skills and abilities which the student should acquire within the study (or what the student is capable of upon a successful completion of the field/course):

- they have a broad professional knowledge and skills of special education;
- they have basic communication knowledge and skills;
- they have knowledge and skills in the field, communication and educational knowledge and skills;
- they are able to apply approaches to education and upbringing of children and pupils with special educational needs to the teaching (individual approach or working with groups);
- they are able to work with children/pupils with special educational needs as a special teacher (special education diagnosis, individual education plan, intervention, working with individuals and groups);
- they are able to methodologically design and prepare research of the education of a pupil with special educational needs and to argue in favour of the selected method.

### **Learning outcomes with respect to compulsory and compulsorily optional courses**

#### **Compulsory courses**

*Didactics of the Courses of Elementary Schools for Pupils with Special Educational Needs 1* - they acquire the basic didactic methods of the deduction of mathematical operations in the approach to pupils with special educational needs, and know how to use them in practice.

*Pathopsychology 2* - they are well acquainted with the issue of psychology of disability and can use

the acquired knowledge when teaching pupils with special educational needs.

*Specialization: Specific Learning Disorders* - they know the issue of approaching individuals with specific learning disorders, re-education, approaches in education, they can apply the acquired knowledge in teaching pupils with specific learning disorders.

*Didactics of the Courses of Elementary Schools for Pupils with Special Educational Needs 3* - they are well acquainted with the issue of approaching pupils with special educational needs. They are acquainted with the specifics of education, with the courses of special educational care, with the didactics of individual types of disabilities, they can use the acquired knowledge in teaching pupils with special educational needs.

*Didactics of the Courses of Elementary Schools for Pupils with Special Educational Needs 2* - they know the didactics of approaching the methods of initial reading and writing, they can use the acquired knowledge in teaching pupils with special educational needs.

*Methodology 2* - they know the principles of qualitative and quantitative research, the basic techniques and rules and they are able to apply them to their own research.

*Teaching Practice 1* - they know the assistance work under the supervision of a tutor, they make observations and prepare the outputs according to the second approbation course.

*Teaching Practice 2* - they know the assistance work under the supervision of a tutor, they make observations and prepare the outputs according to the second approbation course.

*Teaching Practice 3* - they know the assistance work under the supervision of a tutor; they make observations and prepare the outputs according to the second approbation course.

## Compulsorily optional courses

*Specialization S4e1: Education of Individuals with Mental Disabilities 1* - they have knowledge related to the specialization of the bachelor's study. Focus on a minor mental disability - the characteristics, system of education, the knowledge of educational programmes at practical elementary schools, methods of teaching, didactics of the courses. They know how to apply the theoretical knowledge to teaching.

*Specialization S4b1: Education of Individuals with Special Needs 1* (somatopaedia, combined disabilities) - they have deep knowledge of the concepts and methods in the subject area and support of people with physical and combined disabilities, they are able to use the acquired knowledge when teaching pupils with physical and combined disabilities.

*Specialization S4a1: Speech Therapy and Surdopaedia 1* - they have deep theoretical knowledge and practical skills in the subject area and training of children and pupils with hearing impairments and they are able to use the acquired knowledge and skills when teaching hearing impaired pupils.

*Specialization S4a2: Speech Therapy and Surdopaedia (Speech Therapy) 2* - they have a deep knowledge and skills in the area of speech therapy intervention with individuals with communication disorders and in the area of communication with the hearing impaired; they can use the acquired knowledge and skills when teaching pupils with communication disorders.

*Specialization S4b2: Education of Individuals with Special Needs 2* (ophthalmopaedia) - they are acquainted with the field of ophthalmopaedia, they know the context and are able to connect theoretical knowledge with practical skills; they can use the acquired knowledge and skills when teaching visually impaired pupils.

*Specialization S4e2: Education of Individuals with Mental Disabilities 2* - they have deep knowledge based on the specialization in the bachelor's study (focus on moderate mental disabilities - characteristics, system of education); they know the educational programmes of special elementary schools, the teaching methods and the course didactics. They are able to prepare a research project on the education of pupils with moderate mental disabilities.

*Specialization S4b1: Education of Individuals with Behavioural Disorders 1* - they have knowledge of the diagnostics of behavioural disorders and risks, they acquire the competencies for intervention and elimination and for the support of children with behavioural disorders both at normal schools and



in a segregated school environment.

*Specialization S4b1: Education of Individuals with Behavioural Disorders 2* - they know the theoretical concepts in the approaches to the issue of emotional or behavioural disorders (terminology, tendencies, trends, approaches, the theoretical concepts of intervention with children with behavioural disorders and risks).

## CHARACTERISTIC OCCUPATIONS AND RELEVANT REGULATED OCCUPATIONS

Teachers of children, pupils and students with special educational needs in kindergartens, elementary, secondary and high schools, special elementary school classes, schools for pupils with physical disabilities and visual and hearing impairments, speech therapy schools, practical elementary schools, special elementary schools (Act No. 563/2006 Coll., on teaching staff, as amended);  
special teachers in educational and psychological counselling services (educational and psychological counselling centres, special educational centres, educational care centres), speech therapy centres, etc.;  
in health care (e.g. speech therapist);  
in social services (pursuant to Act No. 108/2006 Coll.);  
in non-governmental and non-profit facilities.

## 2.3.2 SUBFIELD SOCIAL EDUCATION

### A BRIEF DESCRIPTION OF THE HISTORY, CHARACTER AND THEMATIC SCOPE

Social education as an independent pedagogical discipline came to the attention of the Czech public only in the second half of 1990s, even though its origins are earlier. They date back to the early 20th century and are connected with the names of G. A. Lindner (1828-1887), A. Diesterweg (1790-1866), P. Bartl (1858-1922), P. Bergman (1862-1946) and others. Social education in the period of the First Republic was presented mainly in the works of A. I. Bláha (1879-1960), S. Velinský (1899-1991), etc. In that period, well-known empirical studies were conducted by F. Hauser, M. Nečasová-Poubová and J. Schneider on the impact of war on children, and research was done by J. Šíma and A. I. Bláha on the family environment. The development of the field after the Second World War and the effort of O. Chlup (1875-1965) to define the area of social education were thwarted by the change of regime in February 1948 and the establishment of a society without social class differences.

In retrospect, it is apparent that many research topics are repeated, but they are supplemented by the current socio-educational phenomena. For example, researchers no longer focus solely on children and youth but place an emphasis on all age groups and specific social groups (ethnic minorities, disadvantaged and vulnerable groups in society, subcultures, etc.). If we define the subject of research in social education as a field of social interventions, the influence of peer and informal social groups and environment, shaping of attitudes, value system, the meaning of life, etc., we can say that there is wide and very interesting space for research which in many aspects differs from research conducted in the school environment (school pedagogy). Social education is currently based on a range of research projects implemented, for example, in the bachelor's and diploma theses of students, which include not only the descriptions but also explanations of a number of specific social education phenomena and thus develop the given

scientific discipline that gradually gains respect among other humanities.

As a study field, social education has been fully developing since the second half of 1990s. The field in the Czech environment is characterized by relatively wide diversity. Individual university departments devise their study programmes in different ways according to the required graduate profile and the work possibilities. At present, there are the following subfields: social education and leisure time, social education and counselling, social education with a focus on the state administration, resocialization education, social education and andragogy, etc.

## FUNCTION

Social education is a field which has the following functions in accordance with its parent field (pedagogy): (1) theoretical and methodological (the development of methodology and theory); (2) empirical and research (the implementation of specific research surveys); (3) practical (the training of professional social teachers; assistance to clients - children, youth and adults in difficult life situations, the support of socialization and resocialization of individuals, providing social support, etc.).

## PRIMARY FIELDS

The described fields include general (common) disciplines which form the basis of all pedagogical fields, and specific (extension) disciplines profiling the specific focus of the field. An integral part of the professional profiling is formed of disciplines that help develop the professional (personal) competencies which are key to the helping professions, contribute to self-knowledge and create conditions for the successful social interaction with individuals (clients).

**general disciplines** - the objective is to acquire a theoretical knowledge of the processes of human experience and behaviour, cognition and learning, forming opinions on humans and their education, forming educational concepts and systems, learning and research of social and pedagogical phenomena (the basics of pedagogy and psychology, developmental psychology and personality psychology, social psychology, history of pedagogy and comparative pedagogy, sociology and sociology of education, philosophy and philosophy of education, biology, special education, pedagogical methodology, ICT, applied law, etc.);

**specific disciplines** - the objective is to acquire theoretical and applied knowledge in the field of specific and difficult educational situations, the methodologies of educational activities and strategies, the methods of getting to know the personality and educational work with socially disadvantaged individuals, etc. (social education, theory and methodology of education, pedagogy of free time, social pathology, pathopsychology, pedagogical and psychological diagnostics, social work, social policy, etc.);

**professional competency disciplines** - the objective is to develop specific skills needed for working with various age groups and socially specific groups. The fulfilment of this objective entails a certain degree of personal prerequisites for working with people (the methods of learning and self-knowledge, communication methods, personality training, supervised practice, supervision, etc.).

## DEFINITION OF OBJECTIVES

The objective of the study programme is to train qualified professionals capable of a positive

education, to develop the personalities of children, youth and adults, motivate the entrusted and lead them in terms of values, participate in the education of social relations and attitudes as motivational sources for a healthy lifestyle and shaping the meaning of life. Among the subjects of their influence are children and youth but also the adult population, especially in the issue of relations with the elderly and socially disadvantaged groups.

The target group includes children, youth and adults of the general population and people coming from socially disadvantaged environments (abused and neglected children), members of different cultures (subcultures) and nationalities, etc. The training is directed at educational and managerial activities that are applied in the following areas:

- direct social and educational activities in the direction of prophylaxis and comprehensively conceived prevention;
- managerial social and educational activities (organizational, managerial, conceptual, research and implementation - the concept of educational projects);
- designing and creating new concepts in the subject areas;
- theoretical and research work and application of new knowledge into practice, and the theory of pedagogy.

## THE EDUCATIONAL OBJECTIVES IN THE PROGRAMME SOCIAL PEDAGOGY DIFFER ACCORDING TO THE LEVEL OF HIGHER EDUCATION.

**Bachelor's degree:** The objective of the study is to understand the main pedagogical, social pedagogical, psychological and sociological theories which are a prerequisite for the ability to describe, recognize and interpret pedagogical phenomena which the graduate encounters in practice. The graduate acquires knowledge, skills, habits and other qualities that enable them to participate in planning and implementing extracurricular activities for various diversified groups of children and youth (adults). They are able to carry out simple surveys which provide them with feedback on educational reality (e.g. action and evaluation research, etc.).

The aim of the study field is to develop the following competencies:

**educational** - the ability to lead educational activities with a certain target group; methodical - provide concrete activities (games, sports activities, artistic activities, crafts, aesthetic activities, etc.);

**social and communication** - establish an interaction with the target group and other participants in the educational process,

**professionally and personally cultivating** - the ability to teach the entrusted individuals noble values, self-knowledge and general personality development.

**Follow-up master's degree:** The objective of the study is a deep understanding of the main pedagogical and psychological theories that are a prerequisite for the ability to describe, recognize and interpret educational phenomena. The graduate acquires knowledge, skills, habits and other qualifications that enable them to participate in planning, implementing, assessing and examining educational phenomena. Based on the implementation of research investigations, they are able to describe and

explain educational phenomena directly connected to their work. The graduate acquires broad and deep theoretical and practical skills in the area of the implementation of qualitative and quantitative research. They master the basic methods and techniques of pedagogical and psychological diagnostics and are able to administer and interpret basic pedagogical and diagnostic tools. They are able to lead a team and provide its members with supervision.

Graduates of the follow-up master's programme have acquired the competencies of the bachelor's degree in addition to the following competencies:

**theoretical, methodological and conceptual** - based on the knowledge of various theoretical (historical, pedagogical, psychological, philosophical and sociological) concepts, they have the ability to create long-term educational strategies for the given facility (e.g. leisure centre, youth centre, etc.), including a methodological development of individual game, educational and extracurricular activities;

**research and project** - the ability to implement basic research strategies (qualitative and quantitative) within simple research investigations with the aim to describe, understand and explain the given phenomena and propose possible measures for specific educational activities;

**managerial** - the ability to manage educational programmes, lead a group of people within the given institution (facility), project teams or occasional groups of volunteers (within short-term programmes), including the ability to provide supervision;

**counselling** - the ability to analyze the needs of target groups, design the offers of counselling services according to the needs of specific target groups, provide basic intervention in the field of social and career counselling, etc.

**Doctoral degree:** The doctoral degree is not offered in these fields.

## CHARACTERISTIC OCCUPATIONS AND RELEVANT REGULATED OCCUPATIONS

Graduates of the bachelor's study programme Social Education acquire basic knowledge and skills for educational, preventive, resocialization and counselling work. They are qualified for the professions of social teacher, educator, social worker and teaching assistant. They work in schools and facilities for institutional care under the Ministry of Justice and in facilities of civic associations dealing with social, social-pedagogical and preventive work. They are able to work with specific and socially disadvantaged groups of people (children, youth and also adults and older people).

### 2.3.3. TUTORING, PEDAGOGY OF FREE TIME

#### A BRIEF DESCRIPTION OF THE HISTORY, CHARACTER AND THEMATIC SCOPE

The semantic meaning and content of tutoring and pedagogy of free time are very close, and that is why they are associated in this subfield. Tutoring is a certain Czech particularity which developed simultaneously with the area of school education. Out-of-school education, education outside classes,

## 2.4 PHYSICAL EDUCATION AND SPORTS. KINANTHROPOLOGY

### A BRIEF DESCRIPTION OF THE HISTORY, CHARACTER AND THEMATIC SCOPE

#### a) Physical Education in the general systems of education

Physical education has been a part of education at elementary schools in the Czech lands since 1869. The professional training of physical education teachers in the Czech lands dates back to 1892. The suggestions and preconditions for its development, the definition of objectives, the content of the training of teachers and other specialists, etc., the creation of teaching methods and organizational forms, however, originated much earlier.

A historical overview of the key periods of the training of physical education experts - teachers and other specialists and professionals - reveals integration and eclectic tendencies, curricular diversity and critical reflection in the evaluation of their current state and the expected developmental trends in the Czech Republic and other European countries.

The subject area of physical education and sports is closely related to the history of the cultural development of the man and society. First as a part of the general concepts of education and training, later as a specific training of teachers, physical education teachers and other professionals. A stimulating factor in the development of physical education was the realization of the positive impact of exercise on human health and social integration. An increase in leisure time allowed people to pursue physical activities, games and competitions in which physical fitness and natural physical skills (running, dancing, wrestling, hunting) played a key role. The need for a deliberate development of motor skills (strength, speed, endurance, agility, etc.) initiated the creation of the first concepts of “physical education,” “physical exercise” and the subsequent need for the education of specialists - teachers and other professionals.<sup>1</sup>

Further development of the discipline of physical education and sports was supported by significant pedagogical personalities (Vives, Comenius, Locke, Rousseau, Pestalozzi, etc.). Comenius in particular correctly understood the importance of harmonious education, physical exercise and proper diet, and he also proposed the restoration of the ancient Olympic Games.

A new approach to the school curriculum and teacher training was brought by philanthropists: Basedov, Salzmann, Guts-Muths and Vieth. They introduced physical culture in schools (private institutions) as an equivalent course. Besides scientific justification of physical education, they required

<sup>1</sup> Physical education and sports, and subsequently the training of physical education specialists, are associated with the emergence and development of states or state establishments, with the development of educational institutions and schools (China, India, Mesopotamia, etc.).

European educational concepts emphasizing the importance of physical education originated in ancient Greece and Rome. Although their objectives were not always identical, their common basis was calocagathia - a harmony of the body and soul, hygiene, military training and “sports” competitions in ancient Games (Olympic, Pythian, Nemean, Isthmian). Education and training in Gymnasiums - Academies were provided by renowned and educated Greek personalities.

Medieval education pioneered the development of seven knightly virtues and arts (horseback riding, archery, wrestling, fencing, hunting and later dancing), and mental skills (chess, versification), both at monastery schools and within the individual education of nobles (squires, knights).

The humanists returned to the ancient approach to physical education: Hieronymus Mercurialis, Francois Rabelais, Thomas More, Erasmus of Rotterdam (1467-1536) and others. At universities, students pursued fencing, and one of the duties of the rectors at the time was the care for the students' health.

quality professional training for physical education teachers.

The pedagogical directions and concepts of philanthropism, herbartism, pedocentrism, behaviorism, deep pedagogy, reflective pedagogy, etc. influenced further development of physical education.

The so-called physical education trends of the 19th century had a strong influence (Jahn, Eiselen, Ling, Arnold, Hébert, Lesgaft, Tyrš, etc.); there was also the development of the sports movement, callisthenics and dancing (Coubertin, Delsarte, Duncan, Mensendieck, etc.), technological and social progress, changes in the physical exercise mode of man, national cultural and ethnic traditions and ultimately empirical and scientific knowledge in the field of sports sciences (biomedical, social, physical education), combined in the integrated discipline of kinanthropology.

## **b) Physical Education and Sports as an independent subject area in Europe and the Czech lands**

The subject area of Physical Education and Sports first included the training of teachers of physical education, and later, in connection with the development and professionalization of sports, it started to cover the education of coaches, sports managers, specialists in the field of care of people with specific needs, animators in sports and health, recreology, etc.<sup>2</sup>

A requirement for the professional training of physical education teachers was determined in the Czech lands as early as 1867. It preceded the obligatory introduction of physical education as a course in elementary schools. However, a more systematic shift in dealing with the difficult path towards university training of teachers of physical education for elementary and secondary and high schools did not occur until 1882; this year, the Czech Educational Course for Teaching Physical Education at High Schools and Teacher's Institutes was established at the Faculty of Medicine of Charles University. The content of education was divided into three blocks: a practical block, focused mainly on physical education with equipment; a block focused on theory, system and methodology; and a block focused on anatomy, physiology and hygiene.

After the founding of Czechoslovakia, teachers for general and primary schools were trained at four-year institutes, completed by the school-leaving examination. The education of prospective grammar school teachers took place at universities. However, in the former Czechoslovakia, there was no university or faculty with a focus on physical education. That is why prospective physical education teachers completed a three-year training course. They were accepted based on the school-leaving examination and a medical certificate, as of 1931 on the basis of a practical entrance exam. However, they only acquired the approbation for teaching at high schools when they successfully completed the study of a different university field in addition to physical education.<sup>3</sup>

## **c) Subject area in Physical Education and Sports in the years 1945-1989**

In the years 1945-1949, universities established Institutes for Educating Physical Education teachers, which became a part of the faculties of education after 1949. A historical turning point was the establishment of the Institute of Physical Education and Sports in 1953. It also included a school for coaches. The institute was oriented toward the single-subject non-teaching study of physical education and sports. In 1954, a distance learning programme and the training of military physical education

<sup>2</sup> A significant role in the initial training of physical education teachers in the Czech lands was played by Orthopaedic Institute established in Prague in 1839 and managed by the doctors Johan J. Hirsch and Rudolf Stephany, who in 1843 was named the first municipal teacher of physical education with a duty to teach twelve scholarship holders free of charge; these scholarship holders were to become physical education teachers after two years of study. One of them, Jan Malypetr (1815-1899), established the Physical Education Institute in Prague and in 1849 was named the first Czech physical education teacher at the Old Town Grammar School. Mr. Malypetr taught dr. M. Tyrš and witnessed the beginnings of the Prague Sokol.

<sup>3</sup> Two unsuccessful proposals to establish a college for the study of physical education in the interwar period were submitted both by the Czech Sokol and later by the Ministry of Health, namely a working group led by Professor Weigner. Thus, the full-fledged university study of physical education for specialists was not established until 1945.



specialists opened. The Institute of Physical Education and Sports was later merged with the Department of Physical Education of the University of Pedagogy and in 1959 became a part of Charles University; in 1965, it was renamed the Faculty of Physical Education and Sports. In addition to studying the teaching of physical education as a double-subject study, the subject area expanded by a single-subject study focused on coaching and methodological and organizational activities in sport. Physical education teachers were also trained at pedagogical institutes, later at faculties of education.

## **d) Changes in the subject area of Physical Education and Sports after 1989**

After 1989, two new physical education faculties were founded - the Faculty of Physical Culture in Olomouc in 1991 and the Faculty of Sports Studies at Masaryk University in Brno in 2002. The offer of study fields thus expanded.

The application of the Bologna Declaration associated with the structuralization of study at the bachelor's and master's level and the application of the credit system ECTS brought changes in the study fields.

In addition to a double-subject study for teachers, the Faculty of Physical Education and Sports today also offers a single-subject study of teaching and non-teaching fields (bachelor's and follow-up master's, full-time and combined, coaching and military specializations); there are also the bachelor's and follow-up master's study of Sports Management (full-time), Physical Education and Sports for Persons with Specific Needs and Civil Protection.

At the Faculty of Physical Culture (Palacky University), in addition to teaching physical education, other courses have been accredited - Applied Physical Education (bachelor's, master's, full-time and combined form), Recreationology (master's only full-time) and Civil Protection (bachelor's degree both full-time and combined). At the Faculty of Sports Studies of Masaryk University in Brno, in addition to the traditional fields of study, the following fields have been accredited - Regeneration and Nutrition, Special and Applied Education of Security Services, Tourism Management, etc.

Teaching Physical Education in double-subject study is provided at all the faculties of education in the Czech Republic. Single-subject bachelor's programmes in the study programme Physical Education and Sports are accredited at the faculties of education and at the first private higher school of physical education, Palestra in Prague.

The awarding of professional doctorates (PhDr. between 1965-1980 and 1990 to the present, PaedDr. between 1980-1990) was first accredited by Charles University in Prague, and later at the Faculty of Science in Olomouc, and the Faculty of Sports Studies in Brno.

Postgraduate scientific training (CSc., DrSc.), training and defence departments in the fields of Teaching in Physical Education and Teaching in Physical Education – Anthropomotrics, were first accredited at the Faculty of Physical Education and Sports in Prague (1995), later at the Faculty of Science in Olomouc and the Faculty of Sports Studies in Brno.

Doctoral studies (Dr., later Ph.D.) in the field of Kinanthropology were accredited at the Faculty of Physical Education and Sports in Prague, the Faculty of Science in Olomouc and the Faculty of Sports Studies in Brno after 1990.

## **e) The current state of accredited fields in the subject area of Physical Education and Sports**

There are several study fields in the programme Physical Education and Sports. Some of them have common features (for example the study of teaching physical education), others are clearly distinct (Physical Education and Sports Management, Recreationology, Applied Physical Activities etc., Coaching, etc.). The specification of the national descriptors in one area of Physical Education and Sports is thus very complex and therefore considerably generalized. A list of currently accredited courses is given below.

## **f) Prospects for development and expected changes in the subject area of Physical Education and Sports**

After 2000, in support of the application of the Bologna Declaration, projects were initiated by the European Commission in tertiary education in the field of physical education and sports to address how seemingly different degree programmes enable students to study at various universities in Europe and, at the same time, allow teachers to use the offers of the Erasmus or Socrates programmes.

The idea to create the project AEHESIS (Aligning a European Higher Educational Structure In Sport Science) originated in 2002. The project was financed within the Socrates project from 2003 to 2007. The AEHESIS project was coordinated by the Institute of the Development of European Sport of the German University of Sports in Cologne, on behalf of the European Network of Sport Science, Education and Employment. The project was managed by a management group, a team of experts and four research teams. The aim was to identify and implement key subject areas, especially in the sports sectors: Teaching Physical Education, Health and Fitness, Sports Management and Coaching.

The aforementioned subject areas, in line with the Bologna Declaration, the Lisbon Process and in relation to the Education and Training Agenda 2010 and the European Qualifications Framework, were accepted as common for further education in Physical Education and Sports. The result was a proposal of a methodology with a six-level model that helps to analyze and formulate model curricula in the subject area and provides instructions for the creation of new common standards in the sports educational programmes. Teaching Physical Education, Health and Fitness, Sports Management and Coaching, in line with other European partners (ENNSEE, EASM, EHFA, EOSE)<sup>4</sup>, will be prospective programmes of the subject area Physical Education and Sports in the future.

The main problems of the individual educational sectors in physical education are:

### **Coaching:**

- unresolved relationships between university and non-university providers of coaching licenses and their different expertise;
- sport-specific skills are not well defined;
- there are various models and outcomes in tertiary education of coaches, various licenses are granted (for example for young people; in the case of elite sports, licensing is not uniform and belongs under the control of international or national sports federations);
- the development of the standard model of the curriculum in the field of coaching is not uniformly defined.

### **Educational Studies:**

- development of “good practice” and a model curriculum in physical education and in teacher training across Europe are well regulated (usually by the state),

- further development and the path towards European accreditation could be problematic, mainly because of differences in the political and legal status of member countries in a highly professionalized and regulated environment.

<sup>4</sup> The European Network of Sport, Science, Education and Employment (ENSSEE) is a non-profit association. Its members are institutions, faculties of sports science and sports organizations responsible for educational programmes and/or research in sports which are found across the European Union. The European Association for Sport Management (EASM) is an independent association of individuals who are engaged in sports management or are interested in it. Its aim is to stimulate and support research, scientific publications and professional development in the field of sports management.



## **Sports management:**

in different cultural environments, it is difficult to find common principles as well as general concepts and methods;

there are different models of the study, with different preferences, and the ratio of primary fields of physical education and sports and economics.

## **Health and fitness:**

health and fitness are not precisely defined;

the professional focus can be oriented toward both health and fitness;

these programmes covers a wide range of curricula and do not specify a particular career path;

there are close links both to physiotherapy and physical health education (which is not a field, but a course of the study programmes in Physical Education and Sports).

## **FUNCTION**

The function of the subject area Physical Education and Sports - Kinanthropology is:

preparation of specialists with a range of application in the field of physical education and sports, in sports administration, in the organization and management of physical culture and sports, including related teaching professions;

ensuring the quality of tertiary education in physical education and sports in terms of historical, current bio-psycho-social and research perspectives and practical requirements and employment of graduates;

analysis of education and training and research of professional training in physical education and sports; conducting a regular tracking of graduates of physical education and sports, keeping in touch with employers and revising the curricula of the preparation of graduates; contribute to general education via a specialized educational content and the development of research methodology in physical education and sports; standardization of research methods and statistical models in kinanthropology research;

protect and develop the concept of fair play, sporting ethics and Olympic values to promote cooperation and mutual understanding, develop character and volitional traits through sport and adequate physical and mental load;

plan and organize research in order to develop the knowledge base of physical education and sports, its methodologies and effective implications of the results into practical physical and sports activities, educational programmes and extracurricular school activities;

systematic research on teaching physical education and sports and their role in prevention, preservation and development of health and quality of life; define the problems and protection of physical, mental and social health of the man in relation to sports and sporting activities;

verification of experimental physical intervention programmes and their impact on the practice of physical education and sports of youth, adults and seniors; special emphasis on the prevention of childhood obesity in the context of the diet and sedentary lifestyle;

analysis, verification and standardization of methods of interdisciplinary research of motor abilities and skills to improve the quality of human life and the development of sports performance;

promote and spread the results of research in the field of sports and their practical application in cultural and educational contexts,  
develop recreational, travel, cultural and leisure facilities in organizations focused on physical education and sports, and their promotion.

## DEFINITION OF THE OBJECTIVES OF EDUCATION

The aim of education in the educational field of Physical Education and Sports is to provide the high-quality tertiary education to specialists in physical education and sports in the form of relevant content and structure of the curriculum, both in general and according to the primary fields in the area; specifically:

- a balanced, coherent curriculum with a sufficient breadth and depth of professional and academic knowledge, suitable for teaching (training, managing, etc.) physical education and sports in schools, or extracurricular activities, in selected professions and services;
- via a formal, developmental and intense programme and content of study with clearly defined objectives, results and key concepts which will provide students with the necessary information and assistance when preparing them for the future profession;
- a curriculum which allows the development of knowledge and skills and the acquisition of experience and physical skills in the required range of sports and physical activities and knowledge of the natural sciences and biomedical, social and human sciences;
- a balanced selection of practical physical and sporting activities and skills in line with the development of the studied profession;
- mastering the content of the knowledge base and theories, including key concepts and skills of a wide range of teaching, educational and managerial methods, selected appropriately and adequately to the age and gender of the subjects, their health, effectively achieving the desired learning outcomes and the development of academic and professional competencies;
- effective supervision of the teaching and professional practice of students through qualified and experienced providers (mentors) and the identification of students with the professional culture of schools, sports clubs and centres, opportunities to apply both internal and external evaluation procedures for ensuring the quality of learning;
- writing a (bachelor's, diploma) thesis in the field of the study programme.

As regards study programmes and the content of study, it can be expected that a set of learning outcomes is reflected in the competencies needed to pursue careers in teaching and management or work as animators and coaches in schools, or services, clubs and sports centres.

The objectives, content and learning outcomes support the continuous development of specialist knowledge and application of interventions and teaching skills that are typical for a professionally effective teacher, coach, manager, animator, etc.

## PRIMARY FIELDS

1. teaching of physical education (double-subject, single-subject);<sup>1</sup>
2. coaching;<sup>2</sup>
3. sports management and recreology;<sup>3</sup>
4. physical education and sports for persons with specific needs;
5. applied physical education;<sup>4</sup>

Content blocks, modules in the study programmes in the area of Physical Education and Sports	Academic disciplines characteristic and determining for the area of Physical Education and Sports
theory and practice and special didactics of physical and sports activities	games (net, goal, bat games), gymnastics, swimming, athletics, dancing, skating, outdoor adventure activities (skiing, hiking, canoeing, windsurfing, etc. (new, local, national and traditional physical activities and sports) <sup>1,2,4</sup> , selectively <sup>3</sup> ;
pedagogy, didactics	general pedagogy, sports pedagogy / didactics, special education <sup>4</sup> , didactics of physical education and sports, didactics of sports training, didactics of physical recreation <sup>1,2,4</sup> , selectively <sup>3</sup> ;
biomedicine sciences (general and applied)	anatomy, kinesiology, physiology, physiology of physical load <sup>5</sup> , biomechanics <sup>1,2,4</sup> , selectively <sup>3</sup> ; anthropometrics, hygiene, traumatology, health-based physical education <sup>5</sup> , applied mathematics <sup>3</sup> ;
social sciences / humanities (general and applied)	philosophy, sociology, ethics, history of physical culture, aesthetics, psychology, sports psychology <sup>5</sup> , sensorimotor learning <sup>1,2</sup> , statistics <sup>5</sup> , communication <sup>3</sup> , legislation in sports <sup>5</sup> ;
scientific work (in relation to physical education and sports, diploma and Bachelor's thesis)	methodology of scientific work, quantitative and qualitative methodologies of research <sup>5</sup> , sociological research <sup>5</sup> , marketing research <sup>3</sup> ;
economics	microeconomics <sup>3</sup> , macroeconomics <sup>3</sup> , managerial economics <sup>3</sup> , economic theories <sup>3</sup> , sports economics <sup>5</sup> ;
management and marketing	management <sup>3</sup> , personnel management <sup>3</sup> , sports management <sup>5</sup> , management of sports organizations <sup>3</sup> , management of sports facilities and events <sup>3</sup> , management of the public administration in sports <sup>3</sup> , management of tourism <sup>3</sup> , management of human resources <sup>3</sup> , stress management <sup>3</sup> , ethics of managerial work <sup>3</sup> , psychology of management <sup>3</sup> , marketing, marketing in sports <sup>3,5</sup> ;
finance in sports	accounting <sup>3</sup> , public finance <sup>3</sup> , financial markets <sup>3</sup> ;
professional practice	school teaching practice <sup>5</sup> , professional practice <sup>5</sup> , coaching practice <sup>2</sup> , managerial practice <sup>3</sup> .

## SPECIFICITY OF THE SUBJECT AREA OF PHYSICAL EDUCATION AND SPORTS

The subject area Physical Education and Sports is specific in that most of its fields include an educational application framework, and they thus share similar and structurally specialized primary fields, learning outcomes and competencies. There are very close links between teaching and coaching and between applied physical activities and physical education for persons with specific needs. Graduates of these fields, even of the single-subject Physical Education, acquire the competencies to teach physical education and sports at all grades of schools as well as in the non-education sphere. Therefore, they have some descriptors in common; these are the pedagogical and psychological training in the primary fields of general pedagogy and didactics, the theory of education, educational diagnostics, general, developmental, educational and social psychology or biomedical fields. In the case of applied physical activities and physical education and sports for persons with specific needs, they also include special and comparative education. The field of Physical Education and Sports Management is rather different, since it includes generic and specific managerial knowledge, the knowledge of sports economics, skills and competencies in the application framework and the environment of physical education and sports, in addition to the knowledge, skills and competencies in the field of physical education and sports. In comparison with other academic professions, granting the highest coaching licences is rather unusual. In this area there is cooperation between the academic environment and sports federations (national, European and international), as well as some conflicting opinions and standards, since the descriptors and the duration of practice in coaching specializations are determined by sports federations. Universities and their faculties provide the academic education in the bachelor's and master's degrees; coach licences are provided by sports federations.

## GENERAL PROFILE OF GRADUATES IN THE SUBJECT AREA OF PHYSICAL EDUCATION AND SPORTS

Graduates are thoroughly familiar with the subject area of Physical Education and Sports as well as with related academic disciplines. Graduates understand and know how to connect the basic and advanced theories in the field of kinanthropology and related socioscientific and biomedical disciplines, and, according to the internal specialization, also specific fields and professions with teaching, coaching, applied physical education, physical education for persons with specific needs, sports management, recreology and other highly specialized subject areas; they are able to apply them in a creative way and enrich them through research. According to the level of education, graduates can work as teachers, teaching assistants, educators, etc. in education, coaches, managers, instructors, animators of physical activities, workers in civic associations and cultural and leisure-time centres, experts in the commercial sphere and sports management, experts in military physical education and in state and public administration, in civil security services, in the area of education and research, in counselling, mass media, etc.

## PROFILES OF GRADUATES ACCORDING TO THE LEVEL OF EDUCATION AND STUDY FIELDS OF THE SUBJECT AREA PHYSICAL EDUCATION AND SPORTS

### **Assistant Teacher, educational assistance, Bachelor's degree, double-subject study**

The graduates acquire university qualifications, knowledge, skills and competencies that allow them to work for sports clubs, physical education and school facilities, fitness centres and travel agencies. They can continue in the follow-up master's study in the field of Teaching Physical Education for High Schools in combination with a second approbation field.

## **Teaching for Elementary, Secondary and High Schools - Physical Education (in combination with a second approbation field), master's degree**

The study trains qualified teachers for elementary, secondary and high schools and universities; these teachers can also work as coaches or methodologists with the highest possible qualification, apply for the doctoral degree or work in the area of science and research. The study is predominantly intended for graduates of the bachelor's degree Physical Education and Sports with a focus on education (in combination with a second approbation field).

## **Physical Education and Sports, bachelor's degree, single-subject study**

The graduates acquire a university qualification and competencies that allow them to work for sports clubs, physical education facilities, fitness centres, travel agencies, cultural and recreational leisure centres, etc. The offered optional study tracks: health supporting activities, outdoor activities, protection of the population, physical education and sports for persons with specific needs, sports and coaching specialization, etc.

## **Physical Education and Sports, master's degree, single-subject study**

The study trains qualified teachers for elementary, secondary and universities; these teachers can also work as coaches or methodologists with the highest possible qualification, apply for the doctoral degree or work in the area of science and research. The study is intended for the graduates of Bachelor's programmes Physical Education and Sports. The selection of compulsorily optional courses enables the graduates to earn the qualification of physical education teachers for elementary, secondary and high schools. The offered study tracks: health supporting activities, outdoor activities, protection of the population, physical education and sports for persons with specific needs, sports and coaching specialization, etc.

## **Physical Education and Sports - Military Physical Education, bachelor's degree**

The graduates acquire the prerequisites for completing the follow-up master's studies, the completion of which is a prerequisite for working in a wide range of professional services in the area of military physical education and professional sport within the Ministry of Defence and Armed Forces of the Czech Republic. Soldiers and members of security forces in active service must be sent to study by their employer, according to the applicable personnel regulations of their department; civil employees working in these departments must first conclude agreements on increasing their qualifications.

## **Physical Education and Sports - Military Physical Education, master's degree**

This study provides the graduates with university qualifications in a wide range of professional management in the area of physical education and sports with all types of troops of the Armed Forces of the Czech Republic. The study trains qualified physical education chiefs and teachers for military high schools and universities; these graduates can also work as coaches or methodologists with the highest possible qualification, apply for the doctoral degree or work in the area of science and research. The study is intended for the graduates of the Military Physical Education bachelor's programme. The qualification acquired by completing this study field can be used even after leaving the service for civil life, without the need for retraining.

## **Physical Education and Sports - Physical Education and Sports Management, bachelor's degree**

The graduates are qualified to work in the economic departments of non-profit sports organizations: in civic associations, public service companies, interest groups, foundations and endowment funds, sports companies (professional sports clubs, travel agencies, agencies in tourism, etc.). The graduates of the bachelor's programme may continue in the follow-up Physical Education and Sports Management master's study.

## **Physical Education and Sports - Physical Education and Sports Management, master's degree**

The graduates can train managers of sports organizations, both profit (business sports companies, such as professional sports clubs, travel agencies and marketing agencies) and non-profit (civic associations, public service companies, interest groups, foundations and endowment funds); they can also work for the public administration and other public organizations with managed sports activities. The study of the field Physical Education and Sports Management is intended for the graduates of the Physical Education and Sports Management bachelor's programme or closely related study fields.

## **Physical Education and Sports - Recreationology, bachelor's degree**

The graduates can use their qualifications in social practice in the area of physical culture, as specialists in their chosen fields with a predominantly practical focus. The graduates become specialists in the field of leisure time, management of leisure time, and support of health in the area of work and environment.

## **Physical Education and Sports - Recreationology, master's degree**

The graduates can work as experts, managers and organisers in the implementation of recreational, fitness, reconditioning, regenerating and resocializing physical education programmes. The graduates prepare and create programmes for the individual use of leisure time, and the management of sports activities at special and school facilities.

## **Physical Education and Sports - Physical Education and Sports for Persons with Specific Needs, bachelor's degree**

The graduates acquire university qualifications and competencies that allow them to work for sports clubs, physical education facilities, fitness centres, travel agencies, cultural and recreational leisure centres, municipal authorities, etc., especially at facilities specializing in work with persons with specific needs. The studies are open to persons with special needs as well. The graduates of the bachelor's programme may continue in the follow-up Physical Education and Sports for Persons with Specific Needs master's study.

## **Physical Education and Sports - Physical Education and Sports for Persons with Specific Needs, master's degree**

The study trains qualified teachers for elementary, secondary and high schools and universities, and special schools for persons with specific needs; these teachers can also work as coaches or methodologists with the highest possible qualifications, apply for the doctoral degree or work in the area of science and research. The study is intended for the graduates of the bachelor's programmes Physical Education and Employment of Disabled Persons, Physical Education and Sports for Persons with Specific Needs or Physical Education combined with special education. The studies are open to persons with special needs as well.

## **Physical Education and Sports - Applied Physical Education, bachelor's degree**

Applied physical education provides education in the area of physical education and activity as a means of socialization and harmonization of subjective feelings, as regards both physical and mental health. It covers a wide range of physical activities for individuals of different ages, characters and intensity of their disability, in various forms of organization. It creates significant space for persons with specific needs in accordance with their interests and abilities. The graduates can work as educators with a focus on physical education in social care institutes and other facilities (school children's centres, children and youth centres, etc.), as leaders, promoters and advisors of physical education and sports programmes - regular, integrated and separated for persons with special needs, in educational and charity centres, fitness centres and studios, civic associations, in municipal politics, sports clubs, or as physical education teacher assistants.



**Physical Education and Sports - Applied Physical Education, master's degree**

The aim of the study field is to train specialists in the area of physical education and sports for disabled children and adults, and thus increase the level of physical education at high schools as well as special schools. The training includes the teaching of physical education and special education. The graduates acquire teaching and educating competencies in the area of applied physical education and physical education. The study is intended only for the graduates of the Physical Education and Sports bachelor's study programme and related programmes.

**Physical Education and Sports - Applied Physical Activity, bachelor's degree**

The study field trains qualified professionals for varied areas of the management of recreational physical activities for children, youth and adults with special needs in educational and social facilities. The graduates provide or manage comprehensive educational and coordinating activities in the area of leisure time for children, youth and adults with disabilities in various facilities. The studies are open to applicants with special needs as well.

**Physical Education and Sports. Education of Security Services, bachelor's degree**

The graduates of the three-year bachelor's study, as qualified professionals, can work in the area of practical application of legal and ordinal standards via the security services. The labour market will offer them a wide range of jobs with civil security services, judicial guards, correctional and educational facilities, protection of airports and railways; the graduates can also work as private teachers of self-defence and martial arts, or for the Police of the Czech Republic, the municipal police or special military units.

**Physical Education and Sports - Professional Education of Security Services, master's degree**

As qualified professionals, the graduates can work as managers of further education within the security services that is focused on special physical training and the management of legal and ordinal standards. The labour market will offer them a wide range of jobs with public and state administration, civil security services, judicial guards, correctional and educational facilities, protection of airports and railways; the graduates can also work as private teachers of self-defence and martial arts, or for the Police of the Czech Republic, the municipal police or military units.

**Physical Education and Sports - Regeneration and Nutrition in Sports, bachelor's degree**

The graduates will work as consultants in the field of leisure and professional sports activities, especially when there is a health risk resulting from an incorrect way in which the given person pursues their sports activity (the use of dangerous dietary supplements, loss of fluids, nutrients, minerals or vitamins, overheating, hypothermia and overtraining). In the area of professional as well as leisure sports, they will manage the regeneration of athletes in gyms, fitness centres, training centres, sports classes and schools, sports clubs, etc.

# EDUCATION DESCRIPTORS

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
<p>they know the basics of the subject area Physical Education and Sports, the functions of Physical Education and Sports and the mission of their profession - specialization, and understand them;</p> <p>they have an overview of the theoretical basis of Physical Education and Sports and a detailed overview of their specialization (profession);</p> <p>they know the related basics of biomedical and socio-scientific disciplines, including accident prevention and first aid in the sports of their focus and in different target groups;</p> <p>they are acquainted with the basic principles of sports management, particularly in the lower levels of the Physical Education and Sports sector;</p> <p>with regard to the context of the problems encountered in their profession or specialization, they use the theoretical and</p>	<p>they know the general objectives, functions and scope of Physical Education and Sports in the historical, socio-political context and in relation to other subject areas;</p> <p>they know the educational effects and the effects of Physical Education and Sports on individuals and society, and understand their contribution to a healthy lifestyle, quality of life and development of human resources;</p> <p>they define the role and importance of socio-scientific knowledge for the subject area of Physical Education and Sports, the scope of the study field (for example, the scope and content of knowledge are modified in accordance with the primary fields in the study fields of single-subject Physical Education and Sports, Physical Education and Sports Management, Coaching, Recreation, etc.);</p>	<p>they identify the historical and socio-economic context and scope of subject areas, and the objectives and functions of physical education and sports in the Czech Republic, Europe and the world;</p> <p>they understand the meaning of physical education and sports for individuals and society, health, fitness, recovery and regeneration, social inclusion, human resource development, etc. in national, European and world sport;</p> <p>they know the principles of management and marketing in the profession: programs, projects, events, competitions and priorities in the local, national and international sports environment (e.g. mainly in the field of Physical Education and Sports Management, selectively in single-subject Physical Education and Sports and Physical Education and Sports for persons with</p>	<p>they have complex, deep and systematically structured information about the content and scope of the scientific field of kinanthropology, including its development trends, and about the latest directions in the leading national and international scientific institutions;</p> <p>they have knowledge about the possibilities for utilising the computer, laboratory and instrumentation techniques, and about the conditions and limits of the application of advanced statistical methods;</p> <p>they have innovative and creative abilities, as well as academic integrity with a focus on the ethics of the scientific and research activities;</p> <p>they know and understand the modern kinanthropological methodology and its paradigms in devising experimental solutions to the problems that arise;</p> <p>they document and interpret</p>

PROFESSIONAL KNOWLEDGE



Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
<p>methodological foundations of biomedical and socio-scientific disciplines;</p> <p>they have mastered the techniques needed to evaluate the effectiveness and performance of their professional career, including self-assessment;</p> <p>they know the basic diagnostic methods for assessing the physical education process: observation, interviewing, testing;</p> <p>they have mastered the rules, principles, methods and algorithms of didactic and methodological applications and concepts of their specialization; they have knowledge of the professional literature;</p> <p>they know the physical training, managerial and other methods necessary to perform their skilled trades, including the basic theories and methods of their application in their field;</p> <p>they know the theoretical and didactic principles for establishing</p>	<p>they define the importance of biomedical disciplines (anatomy, kinesiology, biomechanics, physiology, traumatology, sports medicine) for the subject area of Physical Education and Sports, the scope and content of their study fields (for example, the scope and content of knowledge in these academic disciplines are modified in accordance with the primary fields in the study fields of single-subject Physical Education and Sports, Physical Education and Sports Management, Coaching, Recreation, etc.);</p> <p>they know the nature and patterns of human motor development, the relations between sensory periods, maturation and intentional education of the individual;</p> <p>they know and understand the theoretical and didactic foundations of learning and teaching physical skills and activities in basic sports (athletics, swimming, gymnastics, games,</p>	<p>special needs);</p> <p>they define the contribution, roles and importance of the knowledge of biomedicine and humanities - general and applied, their impact on health, quality of life and stimulation of the motor performance in different target groups including people with special needs (e.g. adequate knowledge of philosophy, ethics, psychology, sociology, pedagogy, economics, management, marketing, anatomy, kinesiology, biomechanics, physiology, hygiene, traumatology, sports medicine, etc. is used. The scope and depth of its acquisition varies according to the study fields in the subject area of Physical Education and Sports.);</p> <p>they understand the nature and determination of motor development, the relations between sensory periods, maturation and learning, the development of motor skills in selected types of</p>	<p>research results not only from the positions of kinanthropology, but also in terms of other disciplines;</p> <p>they have a comprehensive overview and a deeper insight into the processes of solving contemporary kinanthropological problems within domestic and foreign institutions, in information databases and periodicals;</p> <p>they understand the current kinanthropological approaches in solving the structures and functions of the purposefully directed physical activities and related theories in related fields and teaching and research concepts, and their comparison at the international level, for example in anthropology, sports philosophy, sports history, sports psychology, sports sociology, anthropometrics, biomechanics, kinesiology, etc. (depending on the nature of the problem);</p>

## PROFESSIONAL KNOWLEDGE

# EDUCATION DESCRIPTORS

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
<p>an appropriate physical load, the limits of educational interventions, the ethical principles of professional behaviour in the field of Physical Education and Sports;</p> <p>they apply the acquired theories, methods and algorithms of their practical use in a familiar</p>	<p>dancing, outdoor activities, etc.) and the specificity of their application in different target groups (e.g. the sports above are obligatory for the Physical Education and Sports graduates, while in other study fields their scope and content are different);</p> <p>they understand the theories, concepts, projects and studies in relation to the educational field of Physical Education and Sports;</p> <p>they understand the theories, classifications and structures of the motor skills and their development in Physical Education and Sports;</p> <p>they understand the related knowledge and theories of health-oriented fitness, biological and social determination and specificity of the physical loading of children, youth, seniors and people with special needs (e.g. compulsory in the case of the graduates of single-subject</p>	<p>sports;</p> <p>they understand the current theories, concepts, projects and scientific studies in the subject area of Physical Education and Sports, and also in relation to other subject areas;</p> <p>they understand the theories, classifications and structures of motor skills according to the physical education empirics and analyses of the results of scientific research;</p> <p>they understand the related knowledge and theories of the development of physical fitness, their peculiarities in different target groups, approaches and criteria in the selection and care for athletic talents as well as for talentless and handicapped individuals;</p> <p>they understand the classifications of sports activities in terms of concepts, knowledge and methodology of the socio-scientific and biomedical academic disciplines (e.g.</p>	<p>they know and critically evaluate the kinanthropological concepts and methods in terms of interdisciplinary context;</p> <p>they understand the position of kinanthropology in the system of socioscientific and biomedical disciplines;</p> <p>they identify the role and importance of kinanthropology and related academic disciplines in clarifying the purpose of sports and physical activities, structures and functions and their effects in a defined environment of physical education, health-oriented physical education, sports, recreation, etc.;</p> <p>they are aware of the philosophical and methodological issues in the context of solving kinanthropological tasks and problems, including a wide range of quantitative and qualitative methodological approaches.</p>

Short-cycle programme		Bachelor's study programme	Master's study programme	Doctoral study programme
		Study programme graduates		
<p>context and in defined tasks of their profession;</p> <p>they know the theoretical and methodological basics of the evaluation of effectiveness and performance of their professional career, including self-assessment;</p> <p>within their profession, they know and distinguish the specificity of different environments in their practical applications, including the social, economic and managerial context.</p>		<p>Physical Education and Sports, in the case of other study fields</p> <ul style="list-style-type: none"> <li>- Physical Education and Sports Management, Recreation, Physical Education and Sports with Special Needs, etc. - selectively and in accordance with the graduate profile;</li> </ul> <p>they define and interpret sports activities in concepts, knowledge and methods used in the science fields of anthropomotrics, biomechanics, biochemistry, didactics of kinesiology, physiology of physical load, sports pedagogy, sports psychology, etc. (for example, the scope and content of knowledge are modified in accordance with the primary fields in the study fields of single-subject Physical Education and Sports, Physical Education and Sports Management, Coaching, Recreation, etc.);</p> <p>they know the basic methods of scientific work in kinesiology, the principles of interpretation, generalization</p>	<p>anthropomotrics, biomechanics, biochemistry, didactics, physiology, kinesiology, sports pedagogy, sports psychology, etc. The scope and depth of the acquisition of knowledge varies according to the study fields in the subject area of Physical Education and Sports);</p> <p>they know the theory and methodology of scientific work in kinanthropology and related disciplines, and quantitative, qualitative and triangulation methods, including the application of advanced statistical methods;</p> <p>they know the principles related to management and marketing, macro- and microeconomics, financing of the sports sector in an environment of clubs and organizations, gaining support from donors and sponsors (e.g. especially in Physical Education and Sports Management and Recreation, and selectively in other study fields in the subject area of Physical Education and Sports);</p>	

## PROFESSIONAL KNOWLEDGE

# PHYSICAL EDUCATION AND SPORTS.

# EDUCATION DESCRIPTORS

PROFESSIONAL KNOWLEDGE			
Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
	<p>and presentation of results (for example, the scope and content of knowledge are modified in accordance with the primary fields in the study fields of single-subject Physical Education and Sports, Physical Education and Sports Management, Coaching, Recreationology, etc.);</p> <p>they know the related principles of management and marketing in the sports environment of clubs and organizations, and in donating and sponsoring;</p> <p>they know and understand the theoretical concepts of education and the possibilities and limits of their application in the Physical Education and Sports practice;</p> <p>they know their (selected) sports specialization (physical activity), and the possibilities and limitations in achieving the set performance targets depending on age, acceleration and retardation of motor development, and they understand</p>	<p>they understand the theoretical concepts of education, the possibilities and limits of their application in the Physical Education and Sports practice (especially in single-subject Physical Education and Sports and Physical Education and Sports for persons with special needs);</p> <p>they know their (selected) sports specialization, the concepts and structure of sports training in relation to the ontogeny of motor development (acceleration and retardation) in the conditions of recreational, performance and elite sport, and they understand them (especially in single-subject Physical Education and Sports with a focus on coaching and Physical Education and Sports for persons with special needs);</p> <p>they identify opportunities of pedagogical, didactic, psychological and managerial procedures and interventions in physical</p>	

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
<p>they are able to plan and, according to the assigned tasks, lead exercise or training sessions in sports organizations as well as in the sector of paid services;</p> <p>they can devise and, in accordance with the acquired knowledge and under expert guidance, design and evaluate short-term training programmes;</p> <p>they are able to demonstrate specialist knowledge and practical skills in solving common problems in the management of recreational, fitness and sports activities;</p> <p>they are able to accept and, within the assigned tasks and in accordance with the ethical principles and demands of the clients, choose appropriate goals and means of achieving them;</p> <p>they are able to find the information needed to fulfil the assigned task and to use it in the practical activities of their specialization or profession;</p>	<p>they have mastered the skills and activities in basic sports: athletics, sports games, swimming, gymnastics, dancing and outdoor activities and seasonal sports, and are able to demonstrate them practically with the healthy population as well as with individuals with specific needs (for example the students of single-subject Physical Education and Sports must master all the sports; students of the other study fields in the subject areas – Physical Education and Sports Management, Recreology, Physical Education and Sports for Persons with Specific Needs, etc. – selectively and in accordance with the graduate profile);</p> <p>they are able to plan, budget, organize and manage teaching, training and conditioning programmes and activities, and evaluate the results according to the assigned task and set priorities (for example, the scope and</p>	<p>they are able to demonstrate skills, sports activities, physical activities applied in popular sports and their specialization in the school, physical and recreational, sports and fitness conditions as well as their own physical and mental performance and the care for their development;</p> <p>they are able to plan, organize, budget and, creatively and in a differentiated way according to the current conditions, lead learning, training and fitness programmes and applied physical activities, and evaluate the results according to the specifications and set priorities;</p> <p>according to theoretical knowledge, the level of sensorimotor development and the individual needs of the entrusted persons, they are able to determine the relevant frequency, intensity, scope and content of the physical load, the strategy of management, and monitoring of</p>	<p>they can control and propose unusual methodological approaches to solving research problems so that their results can enrich the current level of knowledge in both kinanthropology and closely related disciplines;</p> <p>they are able to define and, after a partial or final resolution of the research problem, suggest the possibility of other practices in order to enhance and acquire new knowledge, establish new standards, norms, etc.;</p> <p>they can initiate research activities of a creative nature and independently create or co-create the conditions to carry out these activities (including the acquisition of resources or grants);</p> <p>they demonstrate the ability to pursue independent research activities, including the application of advanced research approaches and self-reflection;</p> <p>they are able to participate in</p>

## PROFESSIONAL SKILLS

# PHYSICAL EDUCATION AND SPORTS.

# EDUCATION DESCRIPTORS

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
<p>they are well acquainted with the scientific literature and searching for adequate information needed to solve the assigned task;</p> <p>they can consult professionals and field experts in terms of selected solutions and decisions taken;</p> <p>they are able to generalize their own approaches in optimizing results in their profession, including further self-education.</p>	<p>content of knowledge are modified in accordance with the primary fields within the study fields of Physical Education and Sports Management, single-subject Physical Education and Sports, Coaching, Recreation, etc.);</p> <p>depending on the level of physical development, the individual needs of entrusted individuals and knowledge of motor development, they are able to define the relevant frequency, intensity, scope and content of physical load and evaluate its efficacy;</p> <p>they are able to implement the basic management and marketing techniques in developing strategies, programmes, projects and organizing events in areas of recreation, fitness, performance and elite sports as well as sports for individuals with special needs (for example, predominantly in the study field of Physical Education</p>	<p>the training, exercise and managerial process;</p> <p>they are able to apply the principles of management and marketing in the creation, organization and management of programmes, projects and events; purposefully exploit donating and sponsoring for the development of the main and auxiliary activities in clubs, organizations, commercial companies, within the municipality and the region (for example, predominantly in the study field of Physical Education and Sports Management and Recreation);</p> <p>they are able to develop strategies for selecting sports talents, professional athletes and coaches, plan competitions on schedules and creatively apply the main principles of leadership of athletes in competitions;</p> <p>they are able to create varied</p>	<p>international scientific discussions and collaborate on design proposals for new national and international projects;</p> <p>they are able to plan further self-education, acquisition of new knowledge, skills and competencies of others through self-study and practice;</p> <p>they are able to develop a large-scale work (monograph) which contributes to expanding the frontiers of knowledge and to publish this work or present it in public;</p> <p>they are able to popularize the latest findings in kinanthropology and clearly communicate these to the professional as well as general public;</p> <p>in their field of focus, they are able to manage as well as establish efficient national and international scientific teams for resolving complex field-specific and interdisciplinary research tasks, generalize research results</p>



Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
	<p>and Sports Management and Recreation, selectively in other study fields);</p> <p>they are able to organize the selection of talented individuals, plan and coordinate sports competitions, manage athletes in competitions in accordance with the principles of fair play and Olympic values;</p> <p>they are able to apply methods of diagnosis in kinanthropology when resolving practical problems, continuously evaluate the success and performance of entrusted individuals in sports and physical activities;</p> <p>they are able to identify the current as well as the long-term educational, managerial and other problems in their profession, find information and appropriate research procedures in the existing national and partly international databases, evaluate it critically, apply it accordingly and handle in writing</p>	<p>sports programmes for children, youth, adults and seniors, healthy and disabled, in various types of facilities (school, sports, social, etc.) using the theories of learning as well as the recommended and their own research projects;</p> <p>in accordance with the theories of developing mobility skills, they are able to plan and organize, manage and evaluate the process of physical education of entrusted persons in interactive environments of Physical Education and Sports as well as in their specialization: at the level of a youth coach, coach in elite sport as well as in coach training (predominantly in the single-subject Physical Education and Sports focused on coaching);</p> <p>they can apply the recommended kinanthropological research methods for verifying effective ways of learning and teaching, design and implement individual action pedagogical experiments</p>	<p>(theories, concepts, methods, etc.) and publish them in scientific journals, monographs, textbooks, etc.;</p> <p>they can monitor new knowledge, theories, concepts, recommendations, etc., both from the perspective of their application possibilities and in terms of the social consequences of their utilization;</p> <p>they are able to provide consultancy, professional and expert service for government, industry and private institutions and individuals.</p>

## PROFESSIONAL SKILLS

# EDUCATION DESCRIPTORS

PROFESSIONAL SKILLS		
Study programme graduates		
Bachelor's study programme	Master's study programme	Doctoral study programme
<p>the assigned topic, including its presentation and documentation (for example in a differentiated manner in the study fields of the subject area Physical Education and Sports);</p> <p>they can utilize and, in planning and implementing programmes, also analyze the published results of research; they are able to critically evaluate the data and information received based on the results of their own series of repeated observations and testing, applying the one-dimensional data analysis;</p> <p>they know how to involve entrusted persons (students, athletes, the disabled, etc.) in the methods of action experiments, and based on their results improve the incentive structure and interest in physical and sports activities;</p> <p>they are able to select suitable kinanthropological methods in the assessment of the quality of the ongoing processes within the</p>	<p>(predominantly in single-subject Physical Education and Sports focusing on coaching);</p> <p>they are able to use kinanthropological diagnostic methods in correcting the continuous as well as the final solution to problems, including physical and statistical evaluation of the significance of achieved changes;</p> <p>they are able to present evidence on the quality of the educational processes in the assigned group, critically analyze different opinions, rationally argue and create grounds for the application of independent decisions;</p> <p>they can process and, using the adopted recommendations, selected theories, concepts and methodologies, independently solve research tasks, elaborate them in writing, and subsequently present, defend and publish them if possible;</p> <p>according to the nature of the tasks, they are able to modify</p>	



Bachelor's study programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
<p>entrusted group or individuals, critically analyze different opinions, rationally argue and create the ground for the application of independent decisions (e.g. in a differentiated way in the study fields of Physical Education and Sports and primarily in the case of single-subject Physical Education and Sports with a focus on coaching);</p> <p>they can use the basic literature and journals related to their field and apply the acquired knowledge and recommendations to innovations of the solved practical problems in the subject area Physical Education and Sports;</p> <p>they are able to apply pedagogical, didactic and managerial concepts, and modify the already accepted decisions in the managed pedagogical, training and managerial process within Physical Education and Sports (for example, the scope and content of knowledge are modified</p>		<p>the research procedures and methods, and to devise and implement individual action experiments;</p> <p>they are able to design complex research projects, formulate hypotheses according to the obtained quantitative and qualitative data, and, based on their verification, accept appropriate conclusions and generalizations, including a comparison with similar domestic, possibly foreign research projects (e.g. to verify the suitability of the chosen physical load in the training process of different target groups);</p> <p>they can use the interim data to describe the fitness and performance levels in small groups of probands, interpret changes based on an intraindividual approach, apply idiographic observations of extreme cases (for example the evaluation of time series and changes in the performance of the observed subjects);</p>	

## ACCREDITED FIELDS – CAREER IN THE SUBJECT AREA OF PHYSICAL EDUCATION AND SPORTS

The following occupations can be identified in the subject area Physical Education and Sports.

### **Tertiary vocational education:**

fitness instructor, health physical education trainer, masseur for sports and remedial massage outside the health care field, swimming instructor, instructor of school ski trips, outdoors instructor, instructor of sports and leisure activities, the operator of physical education and sports facilities.

### **Bachelor's and master's education:**

1. Teaching of Physical Education: assistant teacher, teacher of Physical Education.
2. Physical Education and Sports: coach, methodologist, specialist in military physical education, sports and leisure-time teacher.
3. Sports Management: sports manager, manager in tourism, recreologist, recreologist - leisure-time teacher.
4. Physical Education and Sports for persons with specific needs: specialist in applied physical education, specialist in physical education and sports for persons with specific needs.
5. Miscellaneous: advisor in the area of regeneration and nutrition in sports\*, education of security services, sports and conditioning specialist\*, specialist in the field of security services, specialist for outdoor activities\*, expert in the area of the population protection\*.

\*Bachelor's degree only

### **Doctoral studies:**

Experts in kinanthropology - in science and research according to the profile field given by the dissertation thesis and to the internal structure of the scientific field of kinanthropology.

## RELATIONS TO OTHER SUBJECT AREAS (INCLUDING BOUNDARY FIELDS)

The subject area Physical Education and Sports, despite its specificity, is closely related to the following subject areas, as regards their common methods of scientific research and similar learning outcomes oriented toward education, as well as similar skills and competencies:

- educational studies;
- psychology
- sociology;
- philosophy;
- economic sciences
- general medicine and dentistry,
- health care;
- anthropology;

## 2.5 ART AND ART SCIENCES

### A BRIEF DESCRIPTION OF THE CHARACTER, THEMATIC SCOPE AND HISTORY OF THE FIELD

Art has accompanied the human community since ancient times as an expression of creativity, aesthetic feeling and cultivation; it is one of the creators of the value system and ethical standards. In the historical development of art, creative activity appears in two complementary parallel forms - in the form of original works and in the form of interpretations in certain fields; both forms can be performed either individually or collectively. The evaluation of an artwork is exceptionally difficult and is usually influenced by one's subjective perception. Artistic creation is by its nature a unique and meaningful way of learning and self-knowledge, and as such is equal to scientific research.

Live art is not only a source of inspiration for the creation and interpretation of one's own artworks, but also an efficient tool for the support of creativity across all fields of human activity. It significantly contributes to shaping the lifestyle of modern man. The field of art has an extremely wide thematic scope which naturally increases with the development of individual artistic disciplines and with the establishment of new disciplines related especially to modern audiovisual technologies.

Art sciences provide a way of aesthetical and philosophical thinking about art, while building upon both the historical context and an examination of the developmental trends and tendencies in contemporary art. In combination with a knowledgeable interpretation and critical analysis, they offer the possibilities of original and systematic comparison, and can thus provide not only valuable feedback, but in their highly qualified expressions also a source of individual creation and inspiration in relation to live art.

### PRIMARY FIELDS

The primary fields in the area of art and art sciences are:

1. musical arts;
2. visual arts;
3. dramatic arts;
4. dancing;
5. film arts;
6. literary arts;
7. history of art.

### DEFINITION OF OBJECTIVES

The objective of education in the field of art and art sciences is above all the development of talent; in the educational process, there is the need for individual contact teaching that develops the

originality of the personality, helps the students master the creative methods and techniques of the selected field, gain the capability of critical reflection and self-reflection, and follow and seek new ways of artistic creativity.

The range of approaches to the artistic education is based on a number of professional traditions, and applies the traditions of the artistic craftsmanship to the academic tradition based on controlled study, with a focus on the development of intellectual skills and individual expression. Artistic disciplines are not stable systems of knowledge and skills; they continuously reform and redefine themselves on the basis of changing social, ethical and artistic values. The dynamic nature of this cultural practice is inevitably reflected in the methods, procedures, disciplines and fields of the study. The acquisition of knowledge, skills and competencies is accomplished via the processes of research, creation, reflection and evaluation.

Given that the subject of artistic sciences is the creative activity of men, the beginnings of which go a long way back to the past, and the development of contemporary art is neither delimited nor predictable, the study of art is characterized by special demands, since it is based on many specific fields and disciplines (history, sociology, psychology, etc.).

Students of all levels are therefore encouraged to gain historical knowledge and awareness of a broader context, with an emphasis on qualified interpretation and analytical and critical comparison of already completed forms and expressions of contemporary art. During the doctoral study, these competencies should be increased and completed with the capability of personal insight into the field, an overlap into other scientific fields and a wider range of artistic disciplines in the international context.

## GENERAL PROFILE OF GRADUATES

Graduates, equipped with adequate knowledge, skills and competencies, work in artistic bodies and institutions (orchestras, theatres, television, film industry, art schools, etc.), many of them work as freelance artists. Already during the studies, the artistic output of the students is regularly evaluated in the form of public presentations. Among the main competencies is the ability to cooperate and come to an agreement in the creative process.

Graduates of the fine arts find work in a number of cultural institutions (galleries, museums, etc.), participate in the dramaturgy of artistic bodies, often teach or work in the media (newspapers, television, radio) as promoters, interpreters or critical evaluators of art. All the aforementioned occupations expect and require a broad and deep knowledge, communication skills and the sense of extreme responsibility at the professional and ethical level.

Bachelor's study programme	Master's study programme	Doctoral study programme
PROFESSIONAL KNOWLEDGE		
Study programme graduates		
<p>they demonstrate broad knowledge in the given artistic field and its history, including knowledge of the methods and traditions in the field;</p> <p>they are well acquainted with the basic primary and secondary scientific literature;</p> <p>they are equipped with their own knowledge of the key artworks in the field;</p> <p>they understand the primary options, conditions and methods for the use of theories, concepts and procedures in relation to the artistic output in the field;</p> <p>they understand and have mastered the technologies in the given field;</p> <p>they have mastered the basic administrative skills, enabling them to successfully pursue professional activity.</p>	<p>they have broad and deep knowledge of the concepts and methods in relation to artistic methods and a critical understanding of these concepts and methods;</p> <p>through in-depth study at the level of the current state of knowledge in the field, they are well prepared to use and develop ideas, attitudes and creative activities in an original way;</p> <p>they realize the possibilities of creative and theoretical overlaps into other fields;</p> <p>they have mastered the basic issue of copyright and its use.</p>	<p>they demonstrate a deep and systematic knowledge of specialized approaches and methods, including the synthesis of knowledge, interdisciplinary overlap and evaluation of outputs, and they understand them;</p> <p>they demonstrate the knowledge of a wide range of related interdisciplinary elements, enabling them to cooperate with people from various cultural backgrounds in an effective manner;</p> <p>they develop complex knowledge and understanding in relation to the research and</p>

# EDUCATION DESCRIPTORS

# EDUCATION DESCRIPTORS

Bachelor's study programme	Master's study programme	Doctoral study programme
	Study programme graduates	
<p>based on a specific given task, they use creative methods to solve practical problems in the field while applying specialist knowledge and the basic methods;</p> <p>they are able to create an original work of a smaller scale, or in the case of interpretation fields, master and interpret the basic repertoire of the field at the professional level;</p> <p>they know how to find and organize relevant information and elaborate on a given topic in writing and transfer the topic into an artistic expression, using the specified method;</p> <p>they independently search and select inspiration sources for creative activities based on the realization of their own possibilities and abilities;</p> <p>they present the artistic performance of their own or of the whole team in public;</p> <p>they make effective use of the common professional vocabulary;</p>	<p>they are able to independently define a complex practical or theoretical problem and solve it in a creative manner, using selected theories, concepts and methods of the field, including critical reflection;</p> <p>they use the basic artistic methods of the field in a manner that brings new inspirational ideas;</p> <p>they can create an original work of an undeniable artistic quality that can be presented in public and shows unique traits; in the interpretation fields, they have mastered the repertoire of all style periods, and use interpretation techniques and means of expression in a way adequate to the given work;</p> <p>they are able to elaborate on a given topic in writing and subsequently transfer the topic into practice via an artistic performance at the professional level using an independently selected method;</p> <p>they present an original artistic performance of their own or of the whole team in public, even at an international forum.</p>	<p>they can conceive, design and implement advanced research and artistic methods and enrich the field with original research;</p> <p>they demonstrate the ability to pursue their own scientific and artistic activities, including self-reflection;</p> <p>they can create an original work that enriches contemporary art in the national and international context; in interpretation fields, they are able to interpret original works in an innovative way and present it on a highly-skilled, internationally acceptable level;</p> <p>they can create a theoretical work which contributes to the expansion of knowledge through its own research or creative act, and publish or present this work in public.</p>

Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates		
<p>they demonstrate knowledge of the relevant field of art on the Czech and global scale;</p> <p>they demonstrate the knowledge of the basic theories and critical and analytical methods of interpretation and evaluation of art;</p> <p>they are well acquainted with the basic range and typology of the sources of the studied field;</p> <p>they show an understanding of the possibilities, conditions and use of the theories, concepts and methods of the investigation of art;</p> <p>they formulate arguments and show</p>	<p>they demonstrate a deep understanding at the level of the current state of knowledge in the general and special disciplines of the history, theory and criticism of art and aesthetics, enabling them to use and develop ideas in an original way;</p> <p>they are well acquainted with the basic trends and tendencies of contemporary live art of the studied field;</p> <p>they demonstrate a deep knowledge of the basic range and typology of sources with regard to the specifics of the given primary fields;</p> <p>they demonstrate knowledge of the research methods in the area of their study</p>	<p>they demonstrate a deep and broad knowledge of the history and the current events of the given artistic field, with an overlap into other areas that enables original and systematic comparisons;</p> <p>they demonstrate a complex methodological knowledge enabling them to enter the international discourse based on their own</p>

## PROFESSIONAL KNOWLEDGE



# EDUCATION DESCRIPTORS

Bachelor's study programme	Master's study programme	Doctoral study programme
<p>based on a specific given task, they are able to use suitable research methods to solve practical problems in the field of history, theory, aesthetics and art criticism while applying specialist knowledge and the basic methods;</p> <p>they know how to find and organize relevant information and elaborate on a given topic in writing, using the specified method.</p>	<p>Study programme graduates</p> <p>they are able to independently define a complex practical or theoretical problem and solve it in a creative manner, using selected theories, concepts and methods of the respective artistic focus, including a critical reflection;</p> <p>they are able to elaborate on a given topic in writing, using an independently selected method;</p> <p>they can use the basic research methods in the given field of fine arts in a manner that enables them to acquire new, original knowledge;</p>	<p>they can conceive, design and implement advanced research methods and enrich the given artistic field with original research; they demonstrate the capacity for independent scientific work, including self-reflection;</p> <p>they are able to create an extensive work which, using its own research, contributes to an extension of the boundaries of knowledge; they are subsequently able to publish or publicly present this work in an international context.</p>

## CHARACTERISTIC OCCUPATIONS AND RELEVANT REGULATED OCCUPATIONS

Graduates, equipped with adequate knowledge, skills and competencies, work in artistic bodies and institutions (orchestras, theatres, television, film industry, art schools, etc.), many of them work as freelance artists.

Graduates of the fine arts find work in a number of cultural institutions (galleries, museums, etc.), participate in the dramaturgy of artistic bodies, often teach or work in the media (newspapers, television, radio) as promoters, interpreters or critical evaluators of art.

## RELATIONS TO OTHER SUBJECT AREAS

An integral part of the study of every artistic field is informed insight not only into all other kinds of art, but also into a wide range of fields in their own right, e.g.

- philosophical sciences and religious studies (e.g. including aesthetics),
- anthropology (e.g. including ethnography),
- psychology
- sociology.

Art creates artefacts with a dominant aesthetic function, and it also affects many other fields, thus forming a whole area of contemporary culture and lifestyle.

Art sciences theoretically reflect and compare all artistic fields and their overlaps into other scientific disciplines.

## 2.6 PHILOSOPHICAL SCIENCES AND RELIGIOUS STUDIES

### A BRIEF DESCRIPTION OF THE CHARACTER, THEMATIC SCOPE AND HISTORY OF THE FIELD

Philosophy is a systematic reflection of the human situation in the world, acting individually and as a reflection of the basics of other fields. Especially in the first respect, philosophy is probably the oldest human intellectual activity; only in its framework did the basic concepts such as intelligence, soul, idea, culture, truth, reality, good, existence or beauty acquire a concrete content. In the context of humanities, both forms of philosophy exist through their internal uniformity and possible specific interconnection. The field is inherently based on an existential heterogeneity of approaches, the plurality of traditions and the constant development of life, since it tries to address a number of current problems and issues that in many cases fall within the competence of various “special” sciences. Unlike the traditional scientific disciplines, philosophy lacks a defined region of existence, which could be examined via a specific method or set of methods: in the focus of its theoretical interest there is the entity of existence (being), and this is why philosophy is characterized by the ability to pose questions, think critically, reflect, find new concepts or redefine the existing concepts so that it is possible to grasp the observed phenomena through them, interpret, criticize and creatively reinterpret classical texts.

**The aim of philosophy** is to educate man, who is capable of:

- a non-reductive approach to the examined matters and their thematization in broad contexts;
- a qualified consideration of the dimension of the “possibility assumptions” of each investigation;
- finding new, innovative solutions to problems;
- formulating compelling arguments both in favour of and against the given philosophical problem using philosophical terminology in a critical way;
- leading a fair debate grounded in rational arguments, even on social topics;
- a conceptually accurate, cultivated and comprehensible oral and written expression;
- reflecting their own cultural, social, historical, religious and spiritual anchorage, including its restrictions and limits; in a positive way, confronting different traditions and appreciating them in their difference.

### PRIMARY FIELDS

The primary fields in the area of philosophical sciences and religious studies are the following:

1. philosophy;
2. religious studies.

### DEFINITION OF OBJECTIVES

The objectives of education in the field of philosophical sciences and religious studies are mainly the

following:

- knowledge of the history of philosophy in an organic connection with the knowledge of its current forms;
- the ability to deal with the issue of methodology as such;
- the ability to solve complex problems that require a combination of several professional perspectives and discourses;
- the ability to think and express complex and controversial issues in an accurate way;
- the understanding of an unconventional or culturally different way of thinking or argumentation.

## GENERAL PROFILE OF GRADUATES

A graduate of philosophy is an expert acquainted with the basic contemporary knowledge of philosophy and, on its basis, is also acquainted with the basic issues of the European ecclesiastic tradition and with the current general human problems. Graduates are capable of accurate thinking and expressing complex and controversial problems, creative interpretation of philosophical and other texts, conceptually accurate, cultivated and comprehensible written expression; in discussion, they are able to find and legitimately use rational arguments, reflect on the cultural, social and spiritual foundation of their own tradition, and, on this basis, to understand other traditions.

# EDUCATION DESCRIPTORS

PROFESSIONAL KNOWLEDGE		
Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates		
they reproduce the basic knowledge, and show an understanding based on the elementary philosophical and religious texts; at an elementary level, they understand the possibilities, conditions and use of the theories and concepts in relation to the research methods in the field;	they demonstrate a deep understanding at the level of the current state of knowledge in the field, enabling them to use and develop ideas in an original way (in the case of religious studies also an orientation in the field methodology); they have a broad and deep knowledge of the concepts and theories and their context in relation to the research methods, and understand them.	they have complex and systematic knowledge and demonstrate an understanding in relation to the research methods in the field at the international level; in the framework of philosophy, they reflect on and discuss the philosophical foundations of scientific fields; in the framework of religious studies, they demonstrate a systematic understanding and mastering of the methodology, with overlaps into related fields (philosophy, history, sociology, anthropology, psychology, politics, etc.).

Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates		
<p>based on a specific given task, they apply adequate research methods to the solution of the basic problems in the field, while also applying the acquired specialist knowledge; in the case of religious studies also with the application of the acquired specialist knowledge and basic methods;</p> <p>they can find and classify relevant information and elaborate on the given philosophical topic in writing; in the case of religious studies, they can elaborate on the set topic in writing using the predetermined method;</p>	<p>they define and independently delimit a complex practical or theoretical problem and address it in a creative manner, using selected theories, concepts and methods in the field, including a critical reflection (in the case of religious studies using the selected theories, concepts and methods in the field including a critical reflection);</p> <p>they independently and suitably choose a complex philosophical or religious topic which they are able to elaborate on in writing (in this case using an independently selected method);</p> <p>they make use of the basic research methods in the discipline in such a manner as to obtain new and original information;</p> <p>they interpret and evaluate knowledge and independently address complex social,</p>	<p>they conceive, design and implement advanced research methods and enrich the field with original research;</p> <p>they are able to create an extensive original scientific work with a high level of argumentation and material coherence which contributes to an extension of the boundaries of knowledge through original research; this work is also fit for publication;</p> <p>they demonstrate an ability to pursue their own scientific activity including self-reflection and contribute to the development of the field in an innovative way.</p>

## PROFESSIONAL SKILLS

# PHILOSOPHICAL SCIENCES AND





## 2.7 HISTORY

### A BRIEF DESCRIPTION OF THE CHARACTER, THEMATIC SCOPE AND HISTORY OF THE FIELD

The field of history is among the broadly opened areas of human knowledge; at the moment, it covers a wide range of distinctly profiled fields based on the common core of history, but which are seen today as independent scientific disciplines. They are generally characterized by their own objective and subject of research, thematic scope, a wide range of used methods and methodological approaches, of which some are general and often common to the whole area of history, and some are specific to the concrete scientific fields or even their specializations. All disciplines included in history, however, have a basic objective in common - the study of the history of the human population based on the knowledge of the cultural and temporal variability of social phenomena and processes. Their common goal is to search, preserve, process and interpret information on the past, and to search the mutual relations between various historical facts, phenomena and processes. The central elements of historical awareness are considered to be the concepts of time, continuity, change and duration.

The history of historical research is in the broad sense identical to the history of mankind, because the need to record and reflect on one's own history, or one's own actions, can be considered as one of the natural characteristics of human society. In a narrow sense, the origins of historical research and its mediation may be associated with Greek antiquity (Herodotus, Thucydides), and the developmental stages of this initial historical research can be found in the period of Roman antiquity (Livy, Tacitus), the Middle Ages (annals and chronicles) and the Renaissance (Biondo, Machiavelli). In the modern sense, the historical research, respectively its origins, can be set within the period of the Enlightenment (Gibson) and especially the mid-19th century, when the foundations of modern history in the context of the formation of the other humanities were laid (Thierry, Thiers, Guizot, Ranke, Palacký, etc.). The objective of old traditional historiography was above all to record and mediate the political history of a state or society; in the modern period, the historical research was focused on historical analysis, interpretation and (synthetic) processing based on a developing heuristic, methodological and historically philosophical apparatus. The contemporary (postmodern) phase is characterized by an interdisciplinary and transdisciplinary approach using methods grounded in other scientific disciplines or a change in perception (the state and nation are no longer perceived as the exclusive or elementary subjects of historical research). History is thus characterized, among other things, by a methodological plurality and connection of the national, regional and general context.

In addition to research, an integral part of history is their role in the subject area. Education in the field of history is known for its plurality and differentiation of educational methods and approaches, the definition of educational fields and courses, the relation between the theoretical and practical disciplines, as well as the relation between traditional higher education (lectures, seminars) and practical forms (excursions, working with primary source materials in historical buildings and institutions, reconstruction of the observed phenomena), or for participation in research (e.g. archive research, archaeological excavation). Like the topics and methods of research, the forms of teaching and education in history also experience constant development and transformation.

THE AIM OF THE HISTORICAL DISCIPLINES IS TO EDUCATE SOMEONE WHO IS ABLE

TO:

navigate the facts, phenomena and processes of the past, perceive temporal and cultural variability of social phenomena, and in this way to understand the human past;  
participate in the search, storage, processing and interpretation of information about the past;  
carry out independent research in the field of history, and through it at a given level of education bring new information;  
subject findings and historical data to critical analysis, adequately interpret them and place them in a broad context;  
communicate findings in the form of scientific publications to the professional community (monographs, articles, reviews, scientific communications and presentations, etc.), and through popularization publications (non-fiction publications, public lectures, appearances in the media, school instruction) also to the general public;  
assist in the processing of expertise usable in practical control social activities (politics, economics, criminology, etc.).

## PRIMARY FIELDS

The primary fields in the area of history are:

history;  
auxiliary historical sciences and archival science;  
history of art;  
archaeology;  
ethnology.

Defining the primary fields in history reflects their establishment, historic development and institutional basis in Central Europe and the Czech Republic. It is therefore primarily historical and does not have prescriptive character. Based on the focus or internal structure, individual primary fields are variously extensive and are characterized by different traditions that are conditioned by the specific “schools” and methodological trends. Some of the areas traditionally perceived as part of the historical sciences can also be seen in the context of other scientific fields (e.g. art history, ethnology), but some fields traditionally perceived as part of other fields of science are, in the specific context, methodologically closer to the field of history (history of law, historical anthropology, historical geography, etc.). In particular, the present period is characterized by the emergence of a number of marginal fields and fields cutting across the usual categorization (e.g. museology). These facts are subject to a relatively rapid transformation and development governed by the studied objects, methods and approaches.

## DEFINITION OF OBJECTIVES

The objectives of education in the field of history are as follows:

obtaining knowledge and understanding of the facts, phenomena and processes in the field of history, taking into account the specifics of the particular primary fields;  
mastery of the techniques, methods and methodology in the individual fields of history and the capability of their independent and critical use in statements about human history;  
acquisition of the ability to interpret source materials and secondary texts in the field of history and their respective fields;

acquisition of the ability to independently identify and critically interpret the key historical or artistic and socio-cultural phenomena, and reflect their mutual relations;  
acquisition of the ability to also perceive historical facts, phenomena and processes in the field of history in the context of the research results of other related and unrelated disciplines;  
acquisition of the ability to use specialist knowledge, skills and competencies acquired through education in history in the application of research and its application and popularization in other widely open areas of employment.

## GENERAL PROFILE OF GRADUATES

A graduate of the historical fields is thoroughly educated in the field of historical heuristics, methodologies, techniques and methods of historical research in the field of auxiliary historical sciences, in basic historical factography, in areas directly related to historical research (historical/source and living languages, philosophy, anthropology, semiotics, etc.). They are equipped with the ability to find, classify, interpret, and make available historical sources and secondary allegations of human history, adequately justify their interpretations with arguments, create analytical and synthetic works in their field.

They are able to:

- understand the facts, phenomena and processes of human history;
- define a comprehensive practical or theoretical problem in the field of history and solve it creatively,
- find and organize relevant information;
- critically interpret source texts identified within history and put them in the proper context;
- critically evaluate secondary statements about the past and ground their interpretations in a proper argumentative apparatus;
- use basic research and methodological approaches in the field of history and other related areas in a manner allowing them to acquire new, original information and demonstrate the ability to criticize and interpret sources and interpretations of historical phenomena;
- respect the ethical dimension of scientific knowledge in the field of history.

# EDUCATION DESCRIPTORS

PROFESSIONAL KNOWLEDGE		
Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates		
<p>they demonstrate knowledge of the facts, phenomena and processes in the field of history or historical sciences, taking into account the specificities of the individual primary fields (especially the knowledge of auxiliary historical sciences, the history of administration and archival science);</p> <p>they demonstrate the knowledge of the history from prehistory to modern age, examined by means of archaeological methods;</p> <p>they demonstrate the knowledge of the Czech, European and non-European art from antiquity to the present, the knowledge of folk culture in historical development;</p> <p>they demonstrate basic knowledge of selected source texts and source material, including its typology, ways of search and preservation;</p> <p>they demonstrate a basic knowledge of relevant research results in the field of history, with regard to the specifics of the given primary fields;</p> <p>they demonstrate knowledge of the basic method of professional work in the field of history ("historical craft"), with regard to the specifics of the given primary fields (e.g. in the case of auxiliary historical sciences and</p>	<p>they demonstrate knowledge of the facts, phenomena and processes in the field of history with an emphasis on the understanding of the theoretical and methodological conditionality of factography, especially in the field of a master's specialization with regard to the specifics of the given primary fields;</p> <p>they demonstrate basic knowledge of source texts and source material including its typology, ways of search and preservation, with regard to the master's specialization;</p> <p>they demonstrate solid knowledge of current research results, especially in the area of their master's specialization;</p> <p>they demonstrate deep knowledge of the technique of writing papers in the field of history ("historical craft") primarily in the field of their master's specialization and with regard to the specifics of concrete primary fields;</p> <p>they demonstrate a general knowledge of the spectrum and typology of sources, especially with regard to their master's specialization and with regard to the specifics of concrete primary fields;</p> <p>they demonstrate knowledge of methodological approaches, issues and concepts in the field of history with regard to the specifics</p>	<p>they demonstrate deep knowledge of facts, phenomena and processes in the field of history with an emphasis on the ways in which facticity is constructed, with a focus on a specific doctoral specialization and overlap into related fields; they also demonstrate knowledge acquired through their own scientific research with regard to the specifics of concrete primary fields;</p> <p>they demonstrate a detailed knowledge of source texts (source material) and the Czech and foreign scientific literature (selected according to the needs of the given doctoral study and the specific needs of the primary fields), with an emphasis on the understanding of its theoretical and methodological aspect;</p> <p>they demonstrate deep knowledge of the current research results with a focus on the given doctoral specialization;</p> <p>they demonstrate deep knowledge of the technique of writing papers in the field of history ("historical craft"), with regard to the specifics of concrete primary fields and especially with regard to the doctoral specialization;</p> <p>they demonstrate a complex knowledge</p>

Bachelor's study programme	Master's study programme	Doctoral study programme
<p>archival science, they know how to work with various archives; in the case of ethnology, they know the methods and techniques of ethnological field research);</p> <p>they demonstrate knowledge of the basic spectrum and typology of sources with regard to the specifics of the given primary fields (the knowledge of written and oral sources, editions, material culture manifestations, visual and artistic sources);</p> <p>they demonstrate basic knowledge of the methodological approaches of history and their most important specialized components, taking into account the specifics of particular primary fields (e.g. in archaeology, knowledge of field excavation techniques and theoretical methodologies; in art history, knowledge of the theory and history of art);</p> <p>they demonstrate the knowledge of departments and institutions storing sources of information about the history (archives, museums, galleries, photo libraries, private collections), and the basic research institutions in the field of history (university departments, the Academy of Sciences, departments for the preservation of historical</p>	<p>of the given primary fields;</p> <p>they demonstrate a practical knowledge of departments and institutions preserving the sources of information on history, including selected departments abroad and their collections;</p> <p>they demonstrate an understanding of the possibilities, conditions and use of theories, concepts and methods in relation to the research processes in history and their specializations, and the knowledge of historiography, philosophy of history, theory, trends and schools of research, taking into account the specificities of particular primary fields;</p> <p>they demonstrate knowledge of the structure of the historical text, its genre and formal requirements, taking into account the Master's specialization and the rules customary in the specific field of history.</p>	<p>of the spectrum and typology of sources, especially with regard to their doctoral specialization and with regard to the specifics of concrete primary fields;</p> <p>they demonstrate a deep knowledge of methodological approaches, issues and concepts in the field of history, with regard to the specifics of the given primary fields;</p> <p>they demonstrate practical knowledge of departments and institutions preserving the sources of information on history, including selected departments abroad and their collections, with a special emphasis on the studied topic;</p> <p>they demonstrate an understanding of the possibilities, conditions and use of theories, concepts and methods in relation to the research processes in history and their specializations, taking into account the specificities of particular primary fields;</p> <p>they are well acquainted with historiography and philosophy;</p> <p>they demonstrate a complex knowledge of the structure of a historical text, its genres and formal aspects.</p>

## PROFESSIONAL KNOWLEDGE

# EDUCATION DESCRIPTORS

PROFESSIONAL KNOWLEDGE		
Bachelor's study programme	Master's study programme	Doctoral study programme
<p>monuments);</p> <p>they demonstrate an understanding of the possibilities, conditions and use of theories, concepts and methods in relation to the research processes in history, taking into account the specificities of particular primary fields;</p> <p>they demonstrate a basic knowledge of the structure of historical text, its genre and formal requirements, with an emphasis on practice in a particular field.</p>	Study programme graduates	

Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates		
<p>they are able to explain the basic outlines of the historical conditionality and variability of social phenomena;</p> <p>they are able to find and organize relevant information, and based on a specified minimum length and methodological, formal and content assignment, elaborate on a given topic in writing;</p> <p>based on a limited number of sources and available literature, they are able to independently identify and critically interpret the key historical or artistic and socio-cultural phenomena, and reflect their mutual relations;</p> <p>they know how to use the specified methods in the field of history, taking into account the specifics of concrete primary fields, in a basic manner that enables them to acquire new original information and demonstrate an elementary level of the capability of criticism and the interpretation of sources and historical phenomena;</p> <p>based on an independently formulated hypothesis, they can use adequate research methods to solve practical problems in the field of history and apply specialist knowledge and basic methods with regard to the</p>	<p>they are able to explain the historical conditionality and variability of social phenomena in an adequate manner;</p> <p>they are able to find and organize relevant information, and, based on a specified length and formal and content assignment, independently elaborate on a given topic in writing;</p> <p>based on an independently defined and studied topic and relevant sources and literature, they can critically interpret the acquired information in the field of history and put it into the proper context;</p> <p>they can use independently selected methods in the field of history;</p> <p>they are able to independently define a complex practical or theoretical problem in the field of history and solve it in a creative manner using selected theories, concepts and methods of the field, including critical reflection, with regard to the specifics of concrete primary fields;</p> <p>they are able to use research approaches in the field of history and other related areas in a manner allowing them to acquire new original information and demonstrate the</p>	<p>they are able to explain the historical conditionality and variability of social phenomena in an adequate manner;</p> <p>they can independently work with information in the field of history (or related fields), classify and evaluate this information, define topics for individual issues and problems in the field; they are able to demonstrate their skills in their dissertation thesis;</p> <p>they can demonstrate the capability of independent scientific work in the field of history, including the capability of scientific self-reflection;</p> <p>they know how to implement a comprehensive selection of methods from the field of history and can appropriately apply and creatively develop them;</p> <p>they can create a large work that, based on research, contributes to expanding the frontiers of knowledge in the field of history, and this work (generally following an opposition procedure) can be published, taking into account the particularities of specific primary fields;</p> <p>they can independently define, conceive, design and implement advanced research methods in the field of history and related</p>



# EDUCATION DESCRIPTORS

PROFESSIONAL SKILLS		
Bachelor's study programme	Master's study programme	Doctoral study programme
specifics of concrete primary fields; they know how to use the basic research methods in the field of history in a basic manner that enables them to acquire new original information and demonstrate an elementary level of the capability of criticism and the interpretation of sources and historical phenomena.	Study programme graduates ability to criticize and interpret sources and explain historical phenomena.	boundary areas and enhance the field through original research.

# HISTORY

## 2.8 PHILOLOGY

### A BRIEF DESCRIPTION OF THE CHARACTER, THEMATIC SCOPE AND HISTORY OF THE FIELD

The word philology is derived from the Greek words *philos* (love) and *logos* (word). It was first described by Plato as “the love for words and the literary and scientific study, learning”. Although this term has acquired a number of other meanings, its initial meaning more or less reflects the essence of contemporary philology.

The history of philological research started in the Hellenistic period of the history of Greek literature (323-30 BC). The aim of the antique philologists was above all to establish the correct wording of literary texts, on which the examination of all the linguistic aspects together with the examination of literary works written in this language was based. This horizon of philological research has been maintained up to the present (only the emphasis has shifted: the editing of texts has become just one of the individual philological disciplines), of course using the relevant means of modern theories. Philology thus continues to be a combination of various linguistic and literary research within one language or linguistic branch. In the framework of linguistic research, it mainly uses the knowledge of phonetics, phonology, morphology, syntax, semantics and other special linguistic disciplines.

The aim of the philological disciplines is to educate an individual who is capable of:

- a dignified oral and written expression in their mother tongue and the respective foreign language;
- the use of the given language as a means of communication and expression;
- thinking about language and literature and analyzing them at a general level;
- understanding the basic characteristics of the culture related to the given language;
- critical thinking;
- thinking and acting in accordance with standard ethical rules.

### PRIMARY FIELDS

The primary fields in the area of philology are:

1. the mother tongue;
2. foreign languages (classical, modern);
3. literary science;
4. linguistics;
5. translation;
6. library science.

### DEFINITION OF OBJECTIVES

The objectives of education in the field of philology are as follows:

- a thorough knowledge of the respective cardinal linguistic disciplines (phonetics, phonology,

morphology, syntax, semantics and other linguistic disciplines) and the ability to use them actively;  
practical use of the respective language in written and oral form (translation);  
a very good orientation in the respective literature, history and culture;  
the basics of literary historical and literary theoretical work applied not only to texts in the respective language.

#### GENERAL PROFILE OF GRADUATES

Graduates of philological fields are thoroughly educated in the respective cardinal linguistic and literary scientific disciplines and have broad knowledge of the respective literature, historiography and socio-cultural sciences related to the given language. They are equipped with knowledge of the basic principles of translation and a correct interpretation of the original text. Philological education forms a suitable combination with pedagogical education.

# EDUCATION DESCRIPTORS

Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates		
<p>they demonstrate knowledge of the cardinal disciplines of the respective philology (phonetics, phonology, morphology, syntax, semantics) or other linguistic disciplines and their methodological approaches, based on a study of the basic scientific literature;</p> <p>they demonstrate practical knowledge of the given language (with the final level of the foreign language of at least C1);</p> <p>they demonstrate broad<sup>1</sup> knowledge of the respective literature, based on self-study and analysis of the basic penum of the given literature (sources) as well as on a study of secondary literature;</p> <p>they demonstrate an understanding of the possibilities, conditions and use of the theories, concepts and methods in relation to the research methods in the respective philology;</p> <p>they demonstrate basic cultural and historical knowledge of the environment in which the language of the respective philology is commonly spoken;</p> <p>they demonstrate basic knowledge of Latin/ an adequate language for philologists.</p>	<p>they demonstrate knowledge of special disciplines of the respective philology (especially diachronically oriented disciplines such as historical development, historical grammar, the history of old literature) and their methodological approaches;</p> <p>they demonstrate a specialization in one of the disciplines of the respective philology;</p> <p>they demonstrate deep practical knowledge of the given language (with the final level of the foreign language of C2);</p> <p>they demonstrate deep knowledge of the respective literature, based on their own detailed study and analysis of the chosen segments of the given literature, as well as on a wide study of the respective secondary literature;</p> <p>they demonstrate complex knowledge at the level of the current state of knowledge in the respective philology, enabling them to use and develop ideas in an original way.</p>	<p>they demonstrate a systematic understanding of the methodology of the selected philological discipline and its mastering, with an overlap into related fields;</p> <p>they have complex knowledge and demonstrate an understanding in relation to the research methods in the respective philological discipline at the international level;</p> <p>they demonstrate knowledge of professional and academic language at the level of B2.</p>

## PROFESSIONAL KNOWLEDGE

- 1 Broad knowledge is considered to be knowledge which encompasses the whole range of the respective literature without the need to have a detailed knowledge of special issues.
- 2 Deep knowledge is considered to be knowledge which includes the subtlest nuances of the respective literature.

Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates		
<p>based on a specific given task, they are able to use some research methods to solve practical problems in the respective philology (analysis of specific linguistic or literary phenomena, their interpretation), while using specialist knowledge and basic methods;</p> <p>they know how to analyze a literary text (language communication) using the basic field terminology;</p> <p>they know how to find and organize relevant information and elaborate on a given topic in writing using the specified method;</p> <p>they know how to read a scientific text on philology (linguistics, literary studies);</p> <p>they know how to work with basic field-specific philology terms (linguistics, literary</p>	<p>they are able to independently define a complex practical or theoretical problem and solve it in a creative manner, using selected theories, concepts and methods of the respective philological discipline including a critical reflection;</p> <p>they can use the basic research methods in the given philology in a manner that enables them to acquire new original information;</p> <p>they are able to elaborate on a given topic in writing, using an independently selected method;</p> <p>they are able to assess the linguistic and literary history in the basic interdisciplinary,</p>	<p>they can conceive, design and implement advanced research methods and enrich the given philology with original research;</p> <p>they can demonstrate the ability to pursue their own scientific activities, including self-reflection;</p> <p>they are able to create a large-scale work which contributes to expanding the frontiers of knowledge through its own research, and publish this work or present it in public;</p> <p>they are able to lead a professional debate at a higher discipline level.</p>

## PROFESSIONAL SKILLS

# PHILOLOGY

Professional knowledge	<p>they demonstrate knowledge of the cardinal disciplines of the respective philology (phonetics, phonology, morphology, syntax, semantics) or other linguistic disciplines and their methodological approaches, based on a study of the basic scientific literature;</p> <p>they demonstrate practical knowledge of the given language (with the final level of the foreign language of at least C1);</p> <p>they demonstrate broad<sup>1</sup> knowledge of the respective literature, based on self-study and analysis of the basic pensum of the given literature (sources) as well as on a study of secondary literature;</p> <p>they demonstrate an understanding of the possibilities, conditions and use of the theories, concepts and methods in relation to the research methods in the respective philology;</p> <p>they demonstrate basic cultural and historical knowledge of the environment in which the language of the respective philology is commonly spoken;</p> <p>they demonstrate basic knowledge of Latin/an adequate language for philologists.</p>	<p>they demonstrate knowledge of the cardinal disciplines of the respective philology (phonetics, phonology, morphology, syntax, semantics) or other linguistic disciplines and their methodological approaches, based on a study of the basic scientific literature;</p> <p>they demonstrate practical knowledge of the given language (with the final level of the foreign language of at least C1);</p> <p>they demonstrate broad<sup>1</sup> knowledge of the respective literature, based on self-study and analysis of the basic pensum of the given literature (sources) as well as on a study of secondary literature;</p> <p>they demonstrate an understanding of the possibilities, conditions and use of the theories, concepts and methods in relation to the research methods in the respective philology;</p> <p>they demonstrate basic cultural and historical knowledge of the environment in which the language of the respective philology is commonly spoken;</p> <p>they demonstrate basic knowledge of Latin/an adequate language for philologists.</p>
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	Bachelor's study programme	Master's study programme
Professional skills	<p>based on a specific given task, they are able to use some research methods to solve practical problems in the respective philology (analysis of specific linguistic or literary phenomena, their interpretation), while using specialist knowledge and basic methods;</p> <p>they know how to analyze a literary text (language communication) using the basic field terminology;</p> <p>they know how to find and organize relevant information and elaborate on a given topic in writing using the specified method;</p> <p>they know how to read a scientific text on philology (linguistics, literary studies);</p> <p>they know how to work with basic field-specific philology terms (linguistics, literary studies).</p>	<p>Study programme graduates</p> <p>they are able to independently define a complex practical or theoretical problem and solve it in a creative manner, using selected theories, concepts and methods of the respective philological discipline including a critical reflection;</p> <p>they can use the basic research methods in the given philology in a manner that enables them to acquire new original information;</p> <p>they are able to elaborate on a given topic in writing, using an independently selected method;</p> <p>they are able to assess the linguistic and literary history in the basic interdisciplinary, culturological and media contexts.</p>



## 2.9 ANTHROPOLOGY

they demonstrate a systematic understanding of the methodology of the selected philological discipline and its mastering, with an overlap into related fields;

they have complex knowledge and demonstrate an understanding of the selected philological discipline at the international level;

they demonstrate knowledge of professional and academic language at the level of B2.

### A BRIEF DESCRIPTION OF THE CHARACTER, THEMATIC SCOPE AND HISTORY OF THE FIELD

Anthropology in today's conception of a set of human sciences originated in the second half of the 19th century in Great Britain and the United States as an integral broad-based science linking biological, social and cultural approaches to man (with a relation to ethnology, ethnography, linguistics and archaeology). Philosophical and historical anthropology originated in the early 20th century. The subject of anthropology is man, both in terms of anatomy and physiology and human cultures and societies. Anthropology – unlike, for example, sociology – does not examine cultures and societies as quantifiable units but rather looks at them in detail and examines them in the way they are perceived by their members, if possible. This is the core of ethnomethodology and specific methods of qualitative research. Until the mid-20th century, anthropology above all noticed the differences between human groups (including racial differences); in recent times, it has begun to place more emphasis on what all human cultures have in common.

In the 20th century and especially in the U.S., a canon of anthropological sciences originated; this canon covers biological and cultural anthropology, sociolinguistics and archaeology. Although there are many different scientific schools in the field of anthropology, this overall layout has been spreading through Europe since the last third of the 20th century, reaching the Czech Republic after 1989. At the same time, the main focus turned from preliterate (primitive) societies towards modern, industrial and post-industrial societies, which anthropology also examines through the eyes of their members with regard to their own experience and understanding. The issues of contemporary social and cultural anthropology include the issue of minorities, migration, adaptation and assimilation, intercultural conflicts and coexistence in large cities and agglomerations, social pathology and the development of institutions.

### Doctoral study programme

The singularity of education in anthropology is given by the need to study what is different and common to people all over the world in an integral way. Anthropology is a borderline field between natural sciences and humanities. This fact underlies the thematic content of the study programmes, supporting the development of critical awareness and understanding of human cultural and/or biological diversity arising from the socio-cultural, evolutionary and adaptive perspective. Anthropology also provides a framework for new modern issues within humanities.

they can demonstrate the ability to pursue their own scientific activities, including self-reflection;

they are able to create a large-scale work

which contributes to expanding the frontiers of knowledge through its own research and publish an analytical (complex and comparative) evaluation of social, cultural and biological diversity of people;

they are able to lead a professional debate on cultural, philosophical and historical anthropology with biological higher discipline level anthropology;

the implementation of field research using relevant anthropological methods and techniques;  
the formulation of their opinion and an independent, critical and reflective approach to the given problem while respecting the ethical dimension;  
understanding relationships between the primary fields and also the overlaps into individual anthropological and interdisciplinary fields.

### PRIMARY FIELDS

The primary fields in the area of anthropology are:

1. biological anthropology;
2. social anthropology;
3. cultural anthropology;
4. philosophical anthropology;
5. historical anthropology.

Biological anthropology as a scientific discipline deals with the biological variability of human populations in time and space, while social anthropology looks at man through society, social system and social structure. The subject of cultural anthropology is culture which encompasses all specific human non-genetic phenomena contained in artefacts, socio-cultural regulatives and cultural ideas shared and transmitted by the members of a particular society. Philosophical anthropology examines man as such, seeks the essence, meaning and perspective in the world; historical anthropology aims at an interpretation of the history of foreign cultures from the perspective of the members of the studied culture.

## DEFINITION OF OBJECTIVES

The objectives of education in the field of anthropology are as follows:

- understand social, cultural, philosophical and historical anthropology as a comparative study of human societies;
- understand biological anthropology as a study of past and contemporary man in terms of evolution and adaptation;
- be able to assess the importance of the empirical field and to use specific methods of field research;
- know the theory and history of anthropology, especially the British, French and American;
- know the respective methodologies and be able to apply them to a specific problem;
- have the ability to recognize, evaluate and use various theoretical approaches in the field and be aware of the links to other fields, such as sociology, linguistic and feminist theories and natural sciences;
- have the ability to evaluate and interpret knowledge and independently solve complex social, scientific, and ethical issues within domestic and global, social and political affairs.

## GENERAL PROFILE OF GRADUATES

Graduates of this study programme are able to assess the relationship between human life and major social phenomena such as various developmental strategies or religious ideologies. In the present era of the “global” world, they can identify local differences in the understanding and interpretation of phenomena. They can reconstruct the ways of social organization of nations which differ from the Western forms and are able to explain that customs that, in the Western point of view, seem unusual are not irrational but allow for the preservation and reproduction of the population. Graduates are professionals well acquainted with the basic contemporary theoretical knowledge of anthropology and other fields of natural sciences and humanities. They are capable of a cultivated oral and written expression. They demonstrate knowledge of the methods of qualitative and quantitative research of cultures, societies and population, the interpretative methods of field research and the study of different types of source (empirical) material, the basics of biological anthropology and the process of philosophical

Bachelor's study programme	Master's study programme	Doctoral study programme
<div>PROFESSIONAL KNOWLEDGE</div>		
<p>they know the basic developmental and chronological division of the global and Czech anthropology;</p> <p>they describe the theories, concepts and methods of biological, social, cultural, philosophical and historical anthropology;</p> <p>they understand the ways in which anthropology differs from the sociological approach to the man;</p> <p>they demonstrate basic knowledge of the</p>	<p>they know the basic developmental and chronological division of the global and Czech anthropology and are able to put it in a general context;</p> <p>they have a broad and deep knowledge of the current state of knowledge in terms of the exploration of man as regards biology, human cultures and societies;</p> <p>they analyze the knowledge of anthropology at the level of the current state of knowledge in terms of the exploration of man as regards biology, society and culture;</p> <p>they interpret the concept of anthropology as an integral, broadly conceived science linking the biological, social and cultural approach to the man;</p> <p>they know the methodology of biological, social, cultural, philosophical and historical anthropology;</p> <p>they demonstrate knowledge of the</p>	<p>they know the basic developmental and chronological division of the global and Czech anthropology and are able to place it in context with other fields;</p> <p>they are able to discuss the issues of the contemporary biological, social and cultural anthropology, including the current problems of modern society and intercultural conflicts, such as the issues of multicultural society, the anthropology of society, gender studies, etc.;</p> <p>they have mastered the methodology of biological, social, cultural and historical anthropology and the processes of philosophical analysis of human nature, with overlaps into other fields;</p> <p>they are able to discuss the methodology in relation to research methods in anthropology at the international level;</p> <p>they define a complex practical or theoretical problem and solve it in a creative manner, using selected theories, concepts and qualitative and quantitative methods of anthropology including a critical reflection.</p>
<div>Study programme graduates</div>		

# EDUCATION DESCRIPTORS

# EDUCATION DESCRIPTORS

Bachelor's study programme	Master's study programme	Doctoral study programme
	Study programme graduates	
<p>they know how to find and organize relevant information and elaborate on a given topic in writing, using the specified method of applied anthropology;</p> <p>based on a specific given task, they can use adequate research methods to solve practical problems in the field of anthropology while applying specialist knowledge and the basic methods;</p> <p>they are capable of a cultivated oral and written expression;</p> <p>at an elementary level, they are able to interpret an individual scientific problem and adequately argue in favour of or against it;</p> <p>they are able to implement a previously specified project of field research;</p> <p>they master the basics of the field research ethics;</p> <p>in a qualified expression, they apply the basic terminology of anthropology both in the mother tongue and in a foreign language.</p>	<p>they define a complex practical or theoretical problem and formulate the specified topic in writing using an independently chosen method;</p> <p>they identify the current social issues by linking the biological and socio-cultural approaches;</p> <p>they are capable of a cultivated oral and written expression;</p> <p>they interpret a complex scientific problem and adequately argue in discussions;</p> <p>they are able to prepare a field research project and formulate research questions or hypotheses;</p> <p>they can assess the reliability and credibility and accuracy of the field research process;</p> <p>they apply the field research ethics and are aware of the ethical dimension of scientific knowledge;</p> <p>they are able to examine society and cultures in detail using specific methods of qualitative research;</p> <p>in a qualified expression, they formulate basic scientific hypotheses and approaches both in the mother tongue and in a foreign language.</p>	<p>they solve an independently selected topic in a creative manner, using selected theories, concepts and qualitative and quantitative methods of anthropology including a critical reflection;</p> <p>they demonstrate the capability of their own scientific activity including self-reflection, and enrich the field of anthropology with original research;</p> <p>they are capable of a cultivated oral and written expression;</p> <p>they interpret analyses and syntheses and argue within the current scientific debate at an advanced level;</p> <p>in an innovative manner, they implement their own field research project, formulate research questions and hypotheses;</p> <p>they have mastered the basic research methods in anthropology in such a manner as to obtain new and original information;</p> <p>they assess the field research ethics of other researchers and determine the ethical dimension of scientific knowledge;</p> <p>they are able to create a large-scale work which contributes to expanding the frontiers of knowledge through its own research, and</p>

Professional skills	<p>they know how to find and organize relevant information and elaborate on a given topic in writing, using the specified method of applied anthropology;</p> <p>based on a specific given task, they can use adequate research methods to solve practical problems in the field of anthropology while applying specialist knowledge and the basic methods;</p> <p>they are capable of a cultivated oral and written expression;</p> <p>at an elementary level, they are able to interpret an individual scientific problem and adequately argue in favour of or against it;</p> <p>they are able to implement a previously specified project of field research;</p> <p>they master the basics of the field research ethics;</p> <p>in a qualified expression, they apply the basic terminology of anthropology both in the mother tongue and in a foreign language.</p>	<p>they define a complex practical or theoretical problem and formulate the specified topic in writing using an independently chosen method;</p> <p>they identify the current social issues by linking the biological and socio-cultural approaches;</p> <p>they are capable of a cultivated oral and written expression;</p> <p>they interpret a complex scientific problem and adequately argue in discussions;</p> <p>they are able to prepare a field research project and formulate research questions or hypotheses;</p> <p>they can assess the reliability and credibility and accuracy of the field research process;</p> <p>they apply the field research ethics and are aware of the ethical dimension of scientific knowledge;</p> <p>they are able to examine society and cultures in detail using specific methods of qualitative research;</p> <p>in a qualified expression, they formulate basic scientific hypotheses and approaches both in the mother tongue and in a foreign language.</p>
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## 2.10 THEOLOGY

### A BRIEF DESCRIPTION OF THE CHARACTER, THEMATIC SCOPE AND HISTORY OF THE FIELD

Theology, as a reflection of the sources, essence and expressions of faith, cultivated in relation to the Church and subjecting the Church community to a methodical self-criticism, has accompanied Christianity for the whole period of its existence, during which theology has acquired many various forms. In addition to its biblical foundations, it is based today on the classical systems of antiquity (patrology), the Middle Ages (scholasticism) and the Modern period (reformation); at the same time, theology deals with the impulses of the modern philosophical concepts and the challenges of life in contemporary society. The aim of the theological disciplines is to educate an individual who is capable of:

- a reliable interpretation of written sources;
- a consistent reflection of Christian faith;
- an orientation in the plural interpretations of the world and ambiguous situations of human coexistence.

### PRIMARY FIELDS

The primary fields in the area of theology are:

- biblical theology;
- historical theology;
- systematic theology;
- practical theology.

### DEFINITION OF OBJECTIVES

The objectives of education in the field of theology are as follows:

- learning the methodology of the exegesis of texts (namely biblical) in their original and contemporary context,
- knowledge of the wealth of the historical and contemporary forms of religious (especially Christian) thinking and life in their interactions with other cultural and civilization factors;
- an ability to think critically and constructively about the statements of Christian faith in dialogue with other philosophical concepts;
- theoretical foundations of the application of Christian faith in the ethical and pastoral practice.

### GENERAL PROFILE OF GRADUATES

Graduates of theology are acquainted with the current state of research on the Bible, the history of the Church, the Christian doctrine and the ethics and phenomenology of religion. They are accustomed to working with words. They have acquired at least the basic skills of the hermeneutic art, independent reflection and dialogue with the advocates of different schools of thought concept. Depending

Bachelor's study programme	Master's study programme	Doctoral study programme
PROFESSIONAL KNOWLEDGE		
Study programme graduates		
<p>they demonstrate a familiarity with biblical and other classical texts;</p> <p>they demonstrate the basic language skills needed to read these texts in their original wording with regard to the specifics of the individual fields;</p> <p>they demonstrate awareness of the subject, methodological approaches and scientific literature of the individual theological disciplines;</p> <p>they demonstrate awareness of the wealth of the forms of Christian and more generally religious thinking and life;</p> <p>they demonstrate an understanding of the possibilities, conditions and use of the</p>	<p>they demonstrate an ability to interpret biblical and other texts methodically and with understanding;</p> <p>they demonstrate the necessary language skills to read these texts in their original wording;</p> <p>they demonstrate extensive knowledge of the methodological approaches, scientific literature and factography of all the key theological disciplines;</p> <p>they demonstrate awareness of the complex contexts of these disciplines;</p> <p>they demonstrate knowledge of various forms of Christian and more generally religious thinking and life in a confessional and ecumenical perspective;</p> <p>they demonstrate an understanding of the</p>	<p>they demonstrate a systematic understanding and knowledge of the methodology and a deeper insight into the content of the selected theological discipline with an overlap into related fields;</p> <p>they demonstrate an increase in the knowledge of factography in the area of the chosen specialization through their own scientific research;</p> <p>they demonstrate an extension of the knowledge of the Czech and foreign scientific literature with a focus on a specific doctoral specialization;</p> <p>they demonstrate a complex orientation in theology as a scientific discipline at the</p>

# EDUCATION DESCRIPTORS



# EDUCATION DESCRIPTORS

Bachelor's study programme	Master's study programme	Doctoral study programme
<p>they know how to work with biblical and theological texts;</p> <p>they know how to use the basics of classical languages;</p> <p>based on a specific given task, they can use adequate research methods to solve practical problems in the field while applying specialist knowledge and the basic methods;</p> <p>they know how to find and classify relevant information and elaborate on a set topic in writing, using the specified method, to an extent that enables them to acquire new, original information, and demonstrate a capability of criticism and interpretation of sources and phenomena at an elementary level.</p>	<p>Study programme graduates</p> <p>they can creatively think through the benefits of Christianity and its values for society based on the work with reasonably interpreted theological sources;</p> <p>they are able to independently define a complex practical or theoretical problem and solve it in a creative manner, using selected theories, concepts and methods of the field including a critical reflection;</p> <p>they can elaborate on a scientific topic in writing using an independently selected method, critically interpret the obtained information and put it into the correct context;</p> <p>they can make use of the basic research methods in the discipline in such a manner as to obtain new knowledge.</p>	<p>they are able to pursue an independent creative activity in the field of theology (conceive, design and implement advanced research methods and subject them to self-reflection);</p> <p>they are able to create an extensive work that contributes to an extension of theological knowledge through its own research.</p>

<b>Professional knowledge</b>	<p>they demonstrate a familiarity with biblical and other classical texts;</p> <p>they demonstrate the basic language skills needed to read these texts in their original wording with regard to the specifics of the individual fields;</p> <p>they demonstrate awareness of the subject, methodological approaches and scientific literature of the individual theological disciplines;</p> <p>they demonstrate awareness of the wealth of the forms of Christian and more generally religious thinking and life;</p> <p>they demonstrate an understanding of the possibilities, conditions and use of the theories, concepts and methods in relation to the research methods in the field.</p>	<p>they demonstrate an ability to interpret biblical and other texts methodically and with understanding;</p> <p>they demonstrate the necessary language skills to read these texts in their original wording;</p> <p>they demonstrate extensive knowledge of the methodological approaches, scientific literature and factography of all the key theological disciplines;</p> <p>they demonstrate awareness of the complex nature of texts of these disciplines;</p> <p>they demonstrate knowledge of various forms of Christian and more generally religious thinking and life in a confessional and ecumenic perspective;</p> <p>they demonstrate an understanding of the concepts of theological knowledge at the level of the current state, enabling them to independently and develop acquired ideas.</p>
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## 2.11 ECONOMICS

### A BRIEF DESCRIPTION OF THE CHARACTER, THEMATIC SCOPE AND HISTORY OF THE FIELD

The education subject of Economics is the phenomenon of the creation and distribution of wealth in the broadest sense of the word, both at the level of individual subjects, i.e. corporations, households, individuals etc., and at the aggregated level (i.e. municipalities, regions, state units, etc.).

Historically, economic thinking and education is as old as mankind itself. The development of trade at the time of the discovery of new continents, and the consequent enrichment of society, contributed to the definition and institutionalization of economics. However, it is necessary to mention some of the important works that were written before the actual establishment of the economic science. For example, texts written by the Chinese general Sun Tzu 2,500 years ago, dealing with the art of war, are still quoted in publications aimed at management or strategy. Nor is it possible to forget the work of the Italian politician, diplomat, writer, historian and military theorist, a contemporary of Leonardo da Vinci and Michelangelo - Niccolò Machiavelli. His *The Prince* (Il Principe, 1532) is particularly known for its section in which it advises rulers how to retain power.

Contemporary economic fields have their origins in the development of trade and until the early 20th century were perceived as purely practical or professional disciplines. The emergence of economics as an independent scientific discipline is usually associated with the 17th and 18th century. The father of modern economics is considered to be one of the key representatives of the classical liberal school of political economy, Adam Smith, whose fundamental work, *An Inquiry into the Nature and Causes of the Wealth of Nations* (1776), discusses the nature and origin of the wealth of nations and, among other things, emphasizes the importance of division of labour for productivity.

The economic science was then formed as a non-specialized system of economic knowledge. Economic fields at universities were then taught under the name “political economy,” which emphasizes the orientation at the state or lower administrative units. The separation of independent economic disciplines accelerated especially from the second half of the 19th century, when the major work of economic synthesis, *Principles of Political Economy*, was written by English philosopher, economist and politician, John Stuart Mill (1848). Economic fields were then focused on the economics of the state or exclusively on trade.

A theoretical or mathematical grasp of economic thinking in the modern sense of the word is associated with several economic schools of the early 20th century, of which the most well-known is called the Cambridge School, represented by Alfred Marshall (*Principles of Economics*, 1890). The foundations of modern marginalist economic theory were laid and the name “economics” replaced “political economy”.

Disciplines related to the theory of management developed during the first half of the 20th century. The so-called scientific management was founded by an American mechanical engineer, Frederick Winslow Taylor, who captured his ideas and experience with the technocratic management methods in his work, *The Principles of Scientific Management* (1911). The emergence of integrated managerial concepts is associated with the founding of Harvard Business School (1909) and mainly with the opening of the field masters in business administration (1920), which was already taught at the time in the form of case study analyses. Among other significant personalities in the field of management was a French mining engineer, Henri Fayol, who defined 14 principles of management in his *Administration industrielle et générale* (1916). Considerable influence on the development of management

was also shared by “practitioners” of the automotive industry such as Henry Ford and Alfred Pritchard Sloan, Jr. (General Motors).

Peter Ferdinand Drucker is considered the founder of management in the contemporary sense of the word. Among his best works is *Concept of the Corporation*, written in 1945. Peter Ferdinand Drucker greatly influenced the field of management until his death in 2005. Until the end of the 20th century, education in management was divided functionally, generally into the management of human resources, operational management, strategic management, marketing management, financial management and managerial information systems. Although this structure still prevails, processes and their mutual relations are receiving more and more attention. Today, management is seen as a professional field based on many disciplines (e.g. economics, sociology, psychology, anthropology, biology, etc.). The form of education should be adapted to this and develop the students’ skills and value attitudes. Currently, there are two important associations that ensure the quality of education in management and also grant universities very prestigious and generally recognized accreditations. These are AACSB and EFMD. AACSB (The Association to Advance Collegiate Schools of Business International) is an American organization founded in 1916 and which has been granting accreditations since 1919. Today it is very active and also grants accreditations to schools outside America. EFMD (The European Foundation for Management Development) is an organization with a similar function. It was founded in 1972 and is based in Brussels. Although it was originally focused on Europe, today it is active all over the world.

The scientific field of economics has been specialized since the 1950s; financial economics, for example, focuses on financial flows in economics. Harry Markowitz, an American economist, significantly contributed to this development; in his *Portfolio Selection* (1952), he laid the foundations of the modern theory of the portfolio. Among other personalities are the American economists John Lintner, William Forsyth Sharpe and Jack Treynor, and the Norwegian economist Jan Mossin; independently of one another, they elaborated Harry Markowitz’ original ideas into a comprehensive theory of capital asset pricing in 1960s. Also noteworthy are Franco Modigliani and Merton Miller, who greatly influenced the development of the use of principles of arbitration in financial theory; among other things, they demonstrated that the capital structure, under certain conditions, should not affect the value of the company (The Cost of Capital, Corporation Finance and the Theory of Investment, 1958). The principles of arbitration were further used in the early 1970s in a key contribution of American economists Fischer Black and Myron Scholes, who laid the foundations for the valuation of financial derivatives (The Pricing of Options and Corporate Liabilities, 1973). Financial economics, which underlies financial fields, is known for a great use of the mathematical apparatus, especially for stochastic modelling. Among the important professional organizations in the field of finance which cooperate with universities is the CFA Institute. This organization awards the title CFA, which is recognized in the investment community, to subjects passing a difficult exam.

Further profiling within economic fields occurred in the field of accounting. Even though the first evidence of various accounting systems appeared in Mesopotamia around 3500 BC, the founder of the field is considered to be an Italian mathematician, Luca Pacioli, who described the basics of double-entry bookkeeping in his *Summa de arithmetica, geometria, proportioni et proportionalità* (1494). The text deals not only with accounting itself but also with accounting ethics and cost accounting. Accounting as a profession began to develop intensely in Scotland in the first half of the 19th century, although still as a part of legal fields. In 1854, Queen Victoria codified the founding of the Institute of Accountants, whose members are then given the right to use the title “Chartered Accountant,” or “CA” in abbreviated form. Gradually, the association expanded and at the end of the century operated in almost all English-speaking countries. Among the globally recognized educational systems in the field of accounting today are ACCA (Association of Chartered Certified Accountants), AIA (Association of International Accountants) and CPA Australia. As a professional field, accounting has become part of education at business schools. As a scientific discipline, it was only established in 1960s.

Among other important milestones is the American Accounting Association, renamed the Accounting Education Change Commission in 1989, which reacts to the extensive scientific development in the field and to the vague graduate profile of the accounting fields. IAAER (The International Association for Education and Research) was founded in 1984 with the goal of integrating all accounting-oriented academics worldwide and developing internationally recognized accounting standards.

## PRIMARY FIELDS

Economics as such is the basis for all economically oriented fields, which have been described in the historical context above. These directions or profiles differ to a certain extent, both in the ways of scientific research and the methods of teaching, and currently are among the key economic fields taught at university faculties. In various modifications, they appear under the following names:

1. economics and economic policy;
2. finance;
3. accounting;
4. business and management.

Teaching at the economical faculties may be focused both on scientific knowledge and research and on professional employment. While education in the first concept educates future scientists and researchers, the second concept, typical of so-called business schools, places an emphasis on the employment of graduates. Finance, economics and economic policy are generally taught with an emphasis on scientific knowledge, and are thus based on economic or financial theory, which is empirically tested using the mathematical or statistical apparatus. The last two fields are professionally oriented, even though this does not imply that there are no theories or models. These fields are closely related to practical employment and associated with the terms rigor and relevance.

The field *Economics and Economic Policy* is primarily based on economics as a scientific discipline. It is a field that generally deals with the factors affecting wealth and well-being in the broadest sense, and which, based on such findings, are recommended by the implementation of various economic policies. Study of this field lies in the development of knowledge and skills necessary to solve the current macro- or microeconomic problems. A critical and open approach to these issues in many cases requires a formal modelling of economic relations and empirical testing of the set hypotheses using mathematical and statistical methods.

*Finance*, another relatively independent field, generally deals with the functioning of financial markets and the tools of financial markets. This field of study is to develop a student's knowledge and skills required to solve the current financial problems in the area of commercial or investment banking, corporate and public finance, and this field requires, in many cases, mathematical, or stochastic modelling and empirical testing of hypotheses. The Finance field is closely related to the field of Accounting because in many cases it uses its concepts and terminology.

The Accounting field deals with the ways of portraying economic reality and the manner in which these ways relate to individual economic entities and the environment in which these entities operate. To a significant degree, the field may be affected by the accounting and tax concepts governed by the respective legislation. Nevertheless, the field requires the knowledge and skills related to the application of international accounting standards, including the related tax aspects. The Accounting field is significantly related to the *Finance* field especially in that it generally defines the context and terminology of many financial variables.

The *Business and Management* field is primarily focused on the development of the knowledge and

skills necessary for the management of various types of organizational units (businesses and their parts, but also non-profit and governmental organizations, etc.). The study of this field requires not only skills of formal critical thinking (as substantiated by quantitative or qualitative analysis), which is characteristic of the concept of economic reasoning, but also the ability to apply the resulting considerations into management practice. Great emphasis is therefore placed on communication and organizational skills and value attitudes of graduates.

## DEFINITION OF OBJECTIVES

The overall objective of this training is to educate professionals with a broad overview of economics who will be able to occupy key positions requiring business education in the private and public spheres. Although many graduates begin their careers in private sector companies, graduates of course find employment in the public or private non-profit sector as well. The general objective of the *Economics and Economic Policy* field is to educate professionals who can work as economists in the public and private sector. The field *Finance* prefers professionals who understand the financial flows both at an aggregated level and at the level of individual economic entities (e.g. the state and its organizational units, commercial and investment banks, businesses and non-profit organizations). The *Accounting* field primarily trains graduates for work in financial and managerial accounting (for individuals, businesses, non-profit organizations and other entities), and also in the field of control, taxation and financial statements auditing. The *Business and Management* field is focused on training professionals who will be able to lead various types of organizational units in different phases of their life cycles, usually within enterprises but also in non-profit organizations.

## GENERAL PROFILE OF GRADUATES

It is important to mention that the description of the fields in this paper represents a minimum standard of the graduate profile. Various modifications or extensions may (and should) therefore take place. In the case of the bachelor's degree, it generally applies that one-third of the curriculum represents a common basis, one-third is a field profile and one-third is the individual specialization according to the focus of the given university. Typically, the graduate may develop their skills in other optional courses to increase their knowledge in a sector (tourism, agriculture, etc.) or combine more fields or subject areas (finance/accounting; finance/economics; mathematics or statistics/economics or finance, etc.). Analogously, the elective nature of one-third of the curriculum can be seen in master's programmes as well, if the university decides to supplement or expand the given field.

# EDUCATION DESCRIPTORS

PROFESSIONAL KNOWLEDGE		
Common descriptors for the bachelor's study programme	Common descriptors for the master's study programme	Common descriptors for the doctoral study programme
Study programme graduates		
<p>they define the basic concepts of linear algebra and mathematical analysis;</p> <p>they characterize the basic mathematical and statistical and probabilistic methods for the analysis of economic data;</p> <p>they characterize the basic economic categories and principles in terms of the current microeconomic and macroeconomic theory;</p> <p>they explain the structural elements of market economy and their interaction;</p> <p>they describe the legislative framework of the functioning of economic entities, including the tax framework;</p> <p>they describe ways of accounting for economic data of economic entities;</p> <p>they explain the use of information technologies to address economic and managerial problems.</p>	<p>they characterize in detail the key economic categories, mechanisms and problems;</p> <p>they critically compare the views of standard economic schools on key economic categories and mechanisms and evaluate their application to the current economic and political problems;</p> <p>they characterize advanced methods of quantitative and qualitative analysis of economic data;</p> <p>they explain the current principles of investment and financial decision-making in relation to the social responsibility of decision makers.</p>	<p>they systematically and comprehensively compare the contemporary economic concepts and theories;</p> <p>they systematically and comprehensively compare the contemporary concepts and theories of the study subfield;</p> <p>they identify the possibilities of research funding and implementation;</p> <p>they systematically and comprehensively compare the procedures and methods of qualitative and quantitative research.</p>



Common descriptors for the bachelor's study programme	Common descriptors for the master's study programme	Common descriptors for the doctoral study programme
Study programme graduates		
<p>they search, sort, classify, and interpret economic data and information; during the interpretation they identify the explicit and implicit assumptions;</p> <p>they apply basic research methods in solving practical and theoretical economic problems;</p> <p>they can collaborate with other team members with a relatively clearly defined objective;</p> <p>they actively present their own views or opinions of the team;</p> <p>they use the appropriate software support for organizational, presentation and analytical work.</p>	<p>they independently search, organize, analyze and critically interpret economic data and information from various perspectives, including the incorporation of theoretical and methodological, ideological, value or other bases;</p> <p>they creatively solve theoretical and practical economic problems in interdisciplinary contexts;</p> <p>they apply advanced scientific methods and tools to solving practical and theoretical economic problems in order to obtain new original information.</p> <p>they know how to lead a team that has a defined function;</p>	<p>they can independently design and implement basic quantitative and qualitative research;</p> <p>they independently develop concepts and theories of a sub-discipline of the study;</p> <p>they publish in periodicals respected by the professional community;</p> <p>they are a contributing member of an international research team.</p>

## PROFESSIONAL SKILLS

# ECONOMICS

THE SUBJECT OF ECONOMICS AND ECONOMIC POLICY		
	Bachelor's study programme	Master's study programme
	Study programme graduates	
PROFESSIONAL KNOWLEDGE	<p>they explain the basic standard micro- and macroeconomic theory and characterize the selected alternative approaches;</p> <p>they explain the basic approaches to economic policy and their possible impacts;</p> <p>they explain the role of the state in the economics, including the systems and the management of public budgets and the principles of their functioning;</p>	<p>they explain advanced standard micro- and macroeconomic theories and critically evaluate them in comparison with selected alternative approaches;</p> <p>they critically evaluate approaches to economic policy and their possible economic impacts;</p> <p>they critically evaluate the operation of markets and the roles of the state and state administration, including self-administration and systems and controlling the public budget;</p> <p>they explain advanced mathematical and</p>
PROFESSIONAL SKILLS	<p>they evaluate the strengths and weaknesses of the basic standard economic micro- and macro-concepts;</p> <p>they evaluate the pros and cons of the choice of a particular economic policy;</p> <p>they organize and interpret basic economic data;</p> <p>they use the basic mathematical-statistical apparatus to model, analyze and</p>	<p>they evaluate the strengths and weaknesses of advanced economic micro- and macro-concepts and selected alternative approaches;</p> <p>they conduct interdisciplinary evaluations of the pros and cons of policy options, including proposals for alternative scenarios;</p> <p>they use extensive mathematical-statistical apparatus to model, analyze, interpret and present economic phenomena.</p>

THE SUBJECT OF FINANCE		
	Bachelor's study programme	Master's study programme
	Study programme graduates	
PROFESSIONAL KNOWLEDGE	<p>they explain the functioning of the financial system, including the roles and functions of individual financial institutions, corporations and the central bank;</p> <p>they explain the behaviour of monetary variables and the transmission mechanism of monetary policy implementation;</p> <p>they illustrate the structure of the balance of commercial banks and make clear the link with the central bank's balance sheet;</p> <p>they describe the system of public budgets and the principles of their operation, including the structure of the revenue and expenditure side;</p> <p>they classify products that are provided by financial institutions, and evaluate their use for financial institutions as well as from the perspective of the client;</p> <p>they illustrate the main market failures in the financial sector and possible solutions through regulation;</p> <p>they illustrate the financial structure of a business (companies, banks, or organizational units of the state), the</p>	<p>they analyze the functioning of international financial systems, including the possibilities of their regulation and supervision;</p> <p>they compare the transmission mechanisms of monetary policy and identify the possibility of their failure;</p> <p>they explain the theoretical and practical aspects of fiscal policy, including the causes for and impacts of a fiscal unbalance;</p> <p>they explain the nature of financial risks and the approach to their measurement, control and regulation;</p> <p>they explain the theory of portfolio and the resulting optimization models and models of risk management from a theoretical and empirical point of view;</p> <p>they illustrate the principles of financial management and analyze the impact of the macroeconomic environment on investment decisions;</p> <p>they describe and compare the intermediate statistical and analytical and prognostic methods.</p>
PROFESSIONAL SKILLS	<p>they evaluate the impacts of monetary and fiscal policy on the financial stability of the given economy;</p> <p>in the given context, they evaluate the individual systems in foreign exchange rates, including their advantages and disadvantages from the perspective of open economics;</p> <p>they perform basic financial analysis of a business (companies, banks, or organizational units of the state);</p> <p>they apply fundamental and technical analysis to analyze the development of economic variables (price, currency and equity rates);</p>	<p>they evaluate the central bank decisions in terms of financial and monetary stability;</p> <p>they propose a suitable way of using financial derivatives to hedge against risk;</p> <p>they compare investment instruments in terms of risk, return and liquidity;</p> <p>they can use quantitative and qualitative tools in the decision-making process as regards international forms of investment;</p> <p>they apply the methods of statistical and econometric analysis to financial data.</p>

THE SUBJECT OF ACCOUNTING		
	Bachelor's study programme	Master's study programme
	Study programme graduates	
PROFESSIONAL KNOWLEDGE	<p>they explain the general principles of accounting treatment in different accounting systems;</p> <p>they identify adequate managerial accounting information required for business management;</p> <p>they explain the links of Czech Accounting Legislation to the tax system and social and health insurance;</p> <p>they describe and explain the principles of defining, measuring and reporting the status and changes in assets, liabilities and equity, expenses, revenues and profits as</p>	<p>they compare different systems of financial reporting (Czech Accounting Legislation, IAS/IFRS, U.S. GAAP);</p> <p>they define the decision-making tasks that are solved by the corporate management and the solution to which is based on accounting information;</p> <p>they identify managerial accounting information needed in the process of corporate decision making;</p> <p>they define the principles of preparing consolidated financial statements of interrelated subjects and interpret their explanatory</p>
PROFESSIONAL SKILLS	<p>they evaluate the content of financial statements and management reports as outputs of financial and managerial accounting;</p> <p>they analyze the financial performance, financial position and the company's ability to produce and allocate financial resources, and suggest appropriate measures for their improvement;</p> <p>they determine the tax liability for all types of taxes in accordance with Czech legislation, the amount of assets and liabilities arising from social security and health insurance.</p>	<p>they evaluate the economic reality captured in different systems of financial reporting (Czech Accounting Legislation, IAS/IFRS, U.S. GAAP) in terms of the impact on the true and fair view of the accounting entity;</p> <p>they comprehensively assess the financial situation of a company based on information from the accounting records maintained in accordance with Czech legislation and in accordance with IAS/IFRS;</p> <p>they integrate the accounting system with the requirements of tax laws and laws on social insurance, including rules of</p>

THE SUBJECT OF BUSINESS AND MANAGEMENT		
	Bachelor's study programme	Master's study programme
	Study programme graduates	
PROFESSIONAL KNOWLEDGE	<p>they describe the essence of the existence of organizational units and explain the basic processes that take place within them (organizing, managing, financing, company management) including related cultural or social context;</p> <p>they identify and describe all the major components around organizational units, their dynamics and influence on strategy and management;</p> <p>they explain the basic default frameworks, theories, models and methods of managing organizational units in all phases of their life cycle;</p> <p>they describe various forms of input into business activities and their characteristics;</p> <p>they identify the basic principles of creating, maintaining and developing</p>	<p>they explain all the important processes in organizational units, their mutual relations, dynamics and sustainability;</p> <p>they enumerate and explain the methods and tools for strategic situational analysis of the organizational unit;</p> <p>they enumerate and explain standard and selected alternative theories, models and methods of managing organizational units (including the aspects of leadership and business approach);</p> <p>they identify the frameworks of behaviour of organizational units leading to social responsibility.</p>
PROFESSIONAL SKILLS	<p>they evaluate marketing, financial, personnel and logistics business plans according to established criteria;</p> <p>they are able to prepare and present a business plan;</p> <p>they search, analyze and interpret economic data from various perspectives relevant to the organizational unit.</p>	<p>they compare and, in mutual links, evaluate the strategies of organizational units and their reflection in the areas of marketing, finance, investing activities, human resources, logistics, organizational architecture and production activities;</p> <p>they independently propose goals and processes of quantitative and qualitative research for the support of business decisions;</p> <p>they handle the management of their</p>

## RELATIONS TO OTHER SUBJECT AREAS

### CHARACTERISTIC OCCUPATIONS AND RELEVANT REGULATED OCCUPATIONS

Graduates of economic fields can find employment in a number of economic positions that require economic education. However, higher education in the field of economics usually does not include practice in the Czech Republic, which is necessary for the full employment of the graduate. Graduates can only hold positions for which they are training after a certain time and when they gain enough experience.

Graduates of the **bachelor's programmes** are capable of independent professional work as assistants under supervision in various functional parts of private and public institutions, most often in lower and middle management. Examples are assistant, administration officer, businessman - dealer, market analyst, account manager, financial analyst, economic officer, assistant accountant, government official, businessman, grant assistant, financial and insurance advisor, etc.

Graduates of the **master's programmes** are able to hold specialized positions according to the studied field, both in middle and top management. These are, for example: manager, project manager, brand manager, risk manager, management consultant, worker in human resources, financial specialist, accounting methodist, financial accountant, tax and financial advisor, expert or appraiser, banker, financial manager, administration officer, internal auditor, etc.

The related regulated professions include audit services, tax advisory, insolvency administrators, investment brokers, property valuation, actuaries and insurance agents.

## RELATIONS TO OTHER SUBJECT AREAS

As has been mentioned several times, economic fields are based on many other disciplines. These generally are: psychology, anthropology, law, sociology, mathematics and statistics, informatics or biology and ecology.

## 2.12 LAW

### A BRIEF DESCRIPTION OF THE HISTORY, CHARACTER AND THEMATIC SCOPE

Education in the field of law is one of the oldest in the Czech Republic. Its beginnings are connected with the foundation of Charles University in Prague in the 14th century.

Legal education is traditionally conceived as universal (the original law was both Roman and canon).

In modern times, according to the situation after 1920, there were three pillars of legal education: historical-legal, judicial and political. The profiling fields of the applicable national law were civil material law and civil procedural law, commercial law and criminal law (the second pillar), and constitutional law and administrative law (the third pillar). The education also included international law. The basis for the study was represented by the fields of Roman law (in the case of private law), canon law (in the case of public law) and the history of law. The study of economics formed a substantial part. Despite subsequent deformations, the university study of law remained in the single-subject form until recently.

In mid-1950s, the so-called postgraduate training (later scientific education), provided not only by universities, became an upgrade of university education; within law, there were nine fields from 1977. At the beginning of 1990s, postgraduate (now doctoral) study, offered in parallel for some time, was added to this education. Vertical differentiation was intensified by a modification to the bachelor's study in the Higher Education Act, as amended.

Horizontal differentiation of the field occurred in the second half of 1990s, practically only after the adoption of the amendment. This happened among other things due to subaltern regulatory instruments such as statistical classifications (ISCED, KKOV, formerly JKOV). In the group of Law, Legal and Public Administration, this concerned the primary fields of Theoretical Legal Sciences, Law and Legal Science, Legal Specialization and Security and Legal Studies. The original design was based on the fact that the first of these primary fields would be reserved for doctoral studies, the second one for the master's degree, the third one for the bachelor's degree and the fourth one for the bachelor's and follow-up master's studies. In 2004, the first field took the form of both the bachelor's and master's study, the second field of the bachelor's and doctoral study, and the fourth field of the doctoral study. In 2005, the third field took the form of the follow-up master's and doctoral study. Some of the resulting possibilities, however, have not been implemented yet, and it seems unlikely they ever will.

One look at the structure of the primary field of education No. 68 and especially at the list of accredited study programmes inevitably leads to a critical reflection:

The very name, Law, Legal and Public Administration, is problematic.

It is also questionable why the fields Law and Legal Science and Theoretical Legal Sciences should be distinguished, especially when in the framework of the latter, study programmes classified according to the field of positive law are accredited in the doctoral study (the introduction of these fields into an independent bachelor's study and obtaining the so-called professional bachelor's degree is virtually unimaginable).

Foreign experience with the division of the traditional master's study of law is incongruous and seemingly mostly negative.

In addition to the field of Legal Specialization, there are other fields (Security and Legal Studies, Public Administration, Protection and Security of Organizations, Security and Legal Activity), the inclusion of which into the given area is justified only if they are equivalent



to Legal Specialization (otherwise public administration should instead be considered as a type of service; in the case of security studies, these might, with a certain degree of caution, be connected with some military fields).

Based on the overview above of the latest development in the fields of education in law, it may generally be said that there are two parallel directions. The first direction is based on a complex study of law, its theory and all legal disciplines, including a broad socio-scientific, historical and economic basis (in practice, these are the master's study programmes Law and Legal Science and doctoral study programmes Theoretical Legal Sciences). The second direction especially includes certain segments of law in the form of selected legal disciplines and provides students with knowledge applicable in certain (individual and specialized) areas of legal work (in practice, these are above all the bachelor's study programmes Legal Specialization, Public Administration and Security and Legal Studies, and the respective follow-up master's study programmes). It may be concluded that the current state of the area is confusing, has many overlaps and requires reform. At the same time, however, it seems appropriate to preserve both directions.

## FUNCTION

The function of the area is to provide knowledge of

- the system of law (legal principles, concepts, rules);
- the theoretical foundations of law (jurisprudence);
- the formulation, interpretation and implementation of law;
- legal ethics and professional responsibility;
- the broader philosophical, historical, sociological, political and economic context of law.

## PRIMARY FIELDS

It has been proposed to reform and simplify the current state (see the primary field of education No. 68). The existing accredited study programmes, provided they meet the requirements imposed on the field of "Law," will be included in the new structure within this area; in all other cases, they will be included in a different area.

The primary fields will be:

1. **Law and Legal Science** - a field that will cover a deeper study of the theoretical foundations of law and the study of all domestic legal sectors, interdisciplinary links, the European law and the international law. The share of legal courses will be at least 2/3. It is assumed that it will take the form of an undivided master's study and doctoral study. The bachelor's study (aimed at obtaining the so-called academic, not professional bachelor's degree) and follow-up master's study is subject to discussion.
2. **Individual Legal Studies** - a field that will cover the study of the theoretical foundations of law and a deeper study of the domestic legal sector, including the links to European and international law, necessary for the respective specialization. The share of legal courses will be at least 1/2. It is assumed that it will take the form of a tertiary vocational study, bachelor's study and follow-up master's study. Doctoral study is subject to discussion.

The objectives of education in the field of law are:

- the acquisition of a systematic knowledge of relevant legal concepts, principles and rules of the national, European and international laws and their relations;
- mastery of the theoretical foundations of law (jurisprudence);
- understanding of regulatory and other functions which legal institutes try to perform systematically, understanding of the values and processes forming the foundations of legal institutes, and the acquisition of knowledge of legal solutions in foreign legal systems;
- understanding of the ethical aspects and dilemmas of legal practice, as well as the individual and social responsibility of the legal profession and the internalization of relevant valuable attitudes;
- the acquisition of an ability to identify a legal problem and the relevant legal standards, distinguish between the legally relevant and legally irrelevant;
- the acquisition of an ability to formulate a legal argument and counter-argument, their analysis and critical evaluation and ability to present different perspectives on the same legal issue;
- the acquisition of the capability of coherent, well-organized, structured and logical legal argumentation as well as a rational justification of a specific legal position;
- the acquisition of the capability of legal analysis and critical assessment of law;
- mastery of the work with scientific and professional sources and information legal systems, and mastery of legal research methods, strategies and ethics;
- the acquisition of an ability to collect and evaluate documents for legal decisions and other actions;
- the acquisition of the capability of team work;
- mastery of legal writing and an effective and precise oral and written expression in the mother tongue as well as a foreign language.

## GENERAL PROFILE OF GRADUATES

Graduates of the primary field Law and Legal Science will have an active knowledge of the theoretical foundations of law, the domestic legal sector, interdisciplinary links and the European and international law.

Graduates of the primary field Individual Legal Studies will have an active knowledge of the theoretical foundations and a complete and deep knowledge of the legal disciplines needed for their respective specializations, again at all the levels.

As regards skills, graduates will be able to (depending on whether their field will be Law and Legal Science or Individual Legal Studies within law, or within the respective legal disciplines):

- work on a team;
- assess their professional performance and the level and scope of their own expertise;
- independently reflect and effectively solve legal issues;
- perceive legal issues within the current multi-level legal reality (the national, European and international law), including broader social and especially economic and political contexts;
- assess the legal status and behaviour of entities;
- suggest ways to resolve legal situations, critically evaluate possible legal and non-legal solutions;
- reasonably decide between legal alternatives;
- apply legal means to protect the rights;
- perform legal analysis and legal arguments;
- perform the legal profession ethically and responsibly.

# EDUCATION DESCRIPTORS

PROFESSIONAL KNOWLEDGE		
Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates		
<p>they demonstrate knowledge of the theoretical foundations of law;</p> <p>they demonstrate knowledge of the system of law including the basic methods of formulation, interpretation and implementation of law;</p> <p>they demonstrate specialist and detailed knowledge of legal institutes, principles and rules of the legal field, or specialized legal fields, including selected interdisciplinary contexts and relations to the European and international law;</p> <p>they demonstrate specialist and detailed knowledge and understanding of the subject and scope of the complementary (non-legal) specialized dimension;</p> <p>they demonstrate knowledge of the concepts, theories and methods of the complementary (non-legal) fields;</p> <p>they demonstrate knowledge of the methods necessary for the performance of professional legal and other activities within their specialization;</p> <p>they demonstrate an overview of the theories underlying these methods and the means of putting them into practice;</p>	<p>they demonstrate basic knowledge and understanding of the theory of law;</p> <p>they demonstrate the basic knowledge and understanding of the system of law including the concepts, theories and methods of its formulation, interpretation and implementation;</p> <p>they demonstrate broad knowledge of legal institutes, principles and rules of the legal field, or specialized legal fields, including selected interdisciplinary contexts and relations to the European and international law;</p> <p>they demonstrate broad knowledge and understanding of the subject and scope of the complementary (non-legal) specialized dimension;</p> <p>they demonstrate broad knowledge of the concepts, theories and methods of the complementary (non-legal) related fields;</p> <p>they demonstrate knowledge of the methods needed for an independent performance of professional legal and other activities within the given specialization, including legal research methods;</p> <p>they have an overview of the possibilities of an interdisciplinary approach;</p>	<p>they demonstrate deep and systematic knowledge and understanding of the theory of law;</p> <p>they demonstrate deep and systematic knowledge of the system of law including the concepts, theories and methods of its formulation, interpretation and implementation;</p> <p>they demonstrate deep and systematic knowledge of legal institutes, principles and rules in the field of their doctoral specialization, including deep knowledge and understanding of legal solutions in foreign legal systems;</p> <p>in the field of their doctoral specialization, they demonstrate deep understanding of the regulatory and other functions of legal institutes, as well as the values and processes underlying legal institutes in a broader social context;</p> <p>they demonstrate deep and systematic knowledge and understanding of the developmental tendencies of law in the field of their doctoral specialization;</p> <p>they demonstrate deep and systematic knowledge and understanding of the historical, sociological, psychological, political and economic context of law in the field of</p>

Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates		
	<p>they demonstrate an understanding of the possibilities, conditions and limitations of the use of the theories and methods of legal and complementary related fields in practice;</p> <p>they demonstrate an understanding of the</p>	<p>their doctoral specialization;</p> <p>they demonstrate broad, deep and systematic knowledge and understanding of professional theoretical debates in the field of their doctoral specialization at the national and international level;</p> <p>they demonstrate an understanding of the system of scholarly and scientific disciplines, the position of law within this system and research problems at the intersection of disciplines;</p>

# EDUCATION DESCRIPTORS

PROFESSIONAL SKILLS		
Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates		
<p>they are able to draw on specialist knowledge in order to deal with routine legal and other problems in the discipline when presented with a specific task;</p> <p>in the field of their specialization and based on a detailed specification, they can manage legal paperwork, prepare and formulate simple legal documents, submit common documents to the public authorities, act as representatives during standard proceedings with such authorities, acquire, collect and evaluate documents and prepare formulation proposals of standard decisions and other acts of public authorities;</p> <p>they are able to find and use legislation and other information necessary for solving the defined problem in the field of their specialization;</p> <p>under supervision, they are able to adapt to a change to legislation in the field of their specialization;</p> <p>in the field of their specialization, they are able to work with specialist tools and legal information systems;</p> <p>they are able to perform the legal profession ethically and responsibly;</p>	<p>they are able to draw on specialist knowledge in order to deal with legal and other problems in the discipline independently when presented with a specific task;</p> <p>in the field of their specialization and based on a general specification, they can manage legal paperwork, prepare and formulate standard legal documents, submit common documents to the public authorities, act as representatives during standard proceedings with such authorities, acquire, collect and evaluate documents and prepare formulation proposals of standard decisions and other acts of public authorities;</p> <p>they are able to find, classify and interpret legislation and other information necessary for solving the defined practical problem in the field of their specialization;</p> <p>they can use some legal research and other specialist methods to the extent necessary for solving legal and other practical problems in the field of their specialization;</p> <p>in the field of their specialization, they can analyze, interpret and apply legal standards;</p> <p>in the field of their specialization, they can formulate and analyze legal arguments and counter-arguments;</p>	<p>they are able to design and use advanced legal research methods enabling an extension of knowledge in the field of law;</p> <p>they can develop and evaluate theories and methods in the field of their doctoral specialization including an analysis and assessment of interdisciplinary links;</p> <p>they can create new ideas extending the knowledge and understanding of law;</p> <p>they are capable of an advanced legal analysis of the latest and most complex legal issues;</p> <p>they know how to use practical data and process them in a creative way;</p> <p>they are able to do original legal research of publishable quality;</p> <p>they can creatively use and develop legal expression both orally and in writing.</p>

Bachelor's study programme	Master's study programme	Doctoral study programme
	<p>Study programme graduates</p> <p>using methodological guidance, they are able to adapt to a change in legislation in the field of their specialization;</p> <p>they know how to work with professional sources in the field of their specialization;</p> <p>they are capable of legal expression in the Czech language, both orally and in writing;</p> <p>they are able to perform the legal profession</p>	

PROFESSIONAL SKILLS

<p><b>Professional</b></p>	<p>they demonstrate knowledge of the theoretical foundations of law; they demonstrate knowledge of the system of law including the basic methods of formulation, interpretation and implementation of law; they demonstrate specialist and detailed knowledge of legal institutes, principles and rules of the legal field, or specialized legal fields, including selected interdisciplinary contexts and relations to the European and international law; they demonstrate specialist and detailed knowledge and understanding of the subject and scope of the complementary (non-legal) specialized dimension; they demonstrate knowledge of the concepts, theories and methods of the complementary (non-legal) fields; they demonstrate knowledge of the methods necessary for the performance of professional legal and other activities within their specialization; they demonstrate an overview of the theories underlying these methods and the means of putting them into practice; they demonstrate an understanding of the ethical aspects of the legal practice.</p>	<p>they demonstrate basic knowledge and understanding of the theory of law; they demonstrate the basic knowledge and understanding of the system of law including the concepts, theories and methods of its formulation, interpretation and implementation; they demonstrate broad knowledge of legal institutes, principles and rules of the legal field, or specialized legal fields, including selected interdisciplinary contexts and relations to the European and international law; they demonstrate broad knowledge and understanding of the subject and scope of the complementary (non-legal) specialized dimension; they demonstrate broad knowledge of the concepts, theories and methods of the complementary (non-legal) related fields; they demonstrate knowledge of the methods needed for an independent performance of professional legal and other activities within the given specialization, including legal research methods; they have an overview of the possibilities of an interdisciplinary approach; they demonstrate an understanding of the possibilities, conditions and limitations of the use of the theories and methods of legal and complementary related fields in practice; they demonstrate an understanding of the ethical aspects of legal practice and individual and social responsibility within the legal profession.</p>
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□□□	Bachelor's study programme	Master's study programme



<p>they demonstrate deep and systematic knowledge and understanding of the theory of law including the principles and methods of its formulation, interpretation and implementation;</p> <p>they demonstrate deep and systematic knowledge and understanding of legal institutes, principles and rules of their doctoral specialization, including knowledge and understanding of legal systems;</p> <p>in the field of their doctoral specialization they demonstrate deep understanding of the functions and other functions of legal institutes, values and processes underlying legal institutes and broader social context;</p> <p>they demonstrate deep and systematic knowledge and understanding of the development of law in the field of their doctoral specialization;</p> <p>they demonstrate deep and systematic knowledge and understanding of the historical, psychological, political and economic aspects of law in the field of their doctoral specialization;</p> <p>they demonstrate broad, deep and systematic knowledge and understanding of professional debates in the field of their doctoral specialization at the national and international level;</p> <p>they demonstrate an understanding of the ethical aspects of scientific and research work;</p>	<p>they are able to draw on specialist knowledge in order to deal with routine legal and other problems in the discipline, when presented with a specific task;</p> <p>in the field of their specialization and based on a general specification, they can manage legal paperwork, prepare and formulate standard legal documents, submit common documents to the public authorities, act as representatives during standard proceedings with such authorities, acquire, collect and evaluate documents and prepare formulation proposals of standard decisions and other acts of public authorities;</p> <p>they are able to find and use legislative and other information necessary for solving the defined problem in the field of their specialization;</p> <p>in the field of their specialization, they are able to adapt to a change in legislation in the field of their specialization;</p> <p>in the field of their specialization, they can work with specialist tools and legal information systems;</p> <p>they are able to perform the legal profession ethically and responsibly;</p>	<p>they are able to draw on specialist knowledge in order to deal with legal and other problems in the discipline independently when presented with a specific task;</p> <p>in the field of their specialization and based on a general specification, they can manage legal paperwork, prepare and formulate standard legal documents, submit common documents to the public authorities, act as representatives during standard proceedings with such authorities, acquire, collect and evaluate documents and prepare formulation proposals of standard decisions and other acts of public authorities;</p> <p>they are able to find, classify and interpret legislation and other information necessary for solving the defined practical problem in the field of their specialization;</p> <p>they can use some legal research and other specialist methods to the extent necessary for solving legal and other practical problems in the field of their specialization;</p> <p>in the field of their specialization, they can analyze, interpret and apply legal standards;</p> <p>in the field of their specialization, they can formulate and analyze legal arguments and counter-arguments;</p> <p>using methodological guidance, they are able to adapt to a change in legislation in the field of their specialization;</p> <p>they know how to work with professional sources in the field of their specialization;</p> <p>they are capable of legal expression in the Czech language, both orally and in writing;</p> <p>they are able to perform the legal profession ethically and responsibly;</p>
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**Professional skills**

<b>Doctoral study programme</b>
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## 2.13 SOCIAL WORK

### A BRIEF DESCRIPTION OF THE HISTORY, CHARACTER AND THEMATIC SCOPE

The concept of social work is ambiguous. There are several concepts of social work: (1) practical work - specific social intervention; (2) social work as an occupation - qualifications for the profession, the ethical code of the profession; (3) social work as a scientific field - theoretical foundations, science, research; (4) social work as a subject area – academic discipline, study field.

While the origins of social work in the sense of a practical activity (assistance) may be dated to the period of ancient Egypt, the first schools of social work as educational institutions were not established in Europe until the early 20th century. The development of education in the area of social work has a different character in countries where it has been continuous from the Czech Republic, where it was significantly affected by a deliberate abolition of higher education in the field of social work in 1950s. Social work became an undesirable discipline; in accordance with the contemporary ideology, it was assumed that all social problems such as poverty, unemployment, prostitution, crime and violence were temporary and would disappear with the elimination of class distinctions. For the following forty years, the systematic development and professionalization of social work were suspended.

Social work as a practical activity partially continued, however, because violence, crime, neglect, etc. did not disappear. Specific development took place in the case of social work with the mentally ill. To a certain extent, socio-scientific research work continued as well, but was done by graduates of other fields, especially psychology, sociology and pedagogy. A number of workers were classified as social workers, but they often lacked adequate education and, with a few exceptions, their activities were essentially administrative.

After 1989, teaching and research in the field of social work returned to universities. The first half of the 1990s was significantly affected by the suspension of systematic university education, and was characterized, among other things, by a rapid and spontaneous development of study fields focused on social work, accredited under various study programmes. These programmes generally corresponded with the basic field of the faculty or university institution, first as an interesting complement to the already established elementary programme. The study of social work was thus offered in combination with psychology, sociology, pedagogy, economics, law, medicine or theology. The quality of this “complementary” varied. In addition, single-subject programmes of social work occasionally emerged, and these were of a fairly good quality. In the early 1990s, therefore, there were social and family schools (secondary education), social and legal academies, or other educational institutions (post-secondary education), and departments of social work and other departments, for example departments of social pedagogy or social medicine (tertiary education), which offered a partial or full tuition in the field of social work. However, this situation was not sustainable in the long run.

An important event for the consolidation of education in social work in the Czech Republic was, among other things, the establishment of the professional Association of Educators in Social Work (ASVSP) in 1994, the aim of which was to increase the quality of education in the field of social work in the Czech Republic. As early as 1992, a minimum standard of education in social work was formulated in the Czech Republic in cooperation between Czech and foreign experts; this standard is continuously developing in accordance with the development of the scientific base and practice of social work.<sup>1</sup> The minimum standard later became the foundation for the formulation of specific re-

<sup>1</sup> An updated version of the minimum standard of ASVSP is available at <http://www.asvsp.org/standardy.php> (as of 2010-12-30). The standard is currently binding only for educational subjects that are members of ASVSP.

quirements by the Accreditation Commission within the Accreditation Application Evaluation Criteria (as regards an extension of accreditations) in the case of the bachelor's and master's programmes of social work.<sup>2</sup>

## THE CURRENT STATE OF THE SUBJECT AREA

The subject area Social Work has a strong interdisciplinary character. The function of social work is, however, clearly defined: it is an effort to solve problems of people in difficult life situations at a professional level. Social work clients are homeless people, people with disabilities, abused women, men or children, the unemployed, refugees, drug addicts or the so-called socially maladjusted. Difficult life situations in terms of social work are always conceived in the context of a concrete social reality. A specific feature is that the institutional performance of social work is generally carried out in relation to the political order, which distinguishes social work distinctly from the other so-called helping professions.

The historical legacy of the time when social work was seen merely as “social benefits or the taking of children by social workers” and a field where higher education was “irrelevant” is still to a certain extent reflected in the way the general public perceives social work. The idea of a highly qualified profession of social worker is gradually permeating Czech society. This has been aided by the passing of two legal standards legalizing tertiary education in social work and emphasizing its importance. The first is the act on the recognition of professional qualifications and the position of the social worker in the European labour market (regulated profession) of 2004<sup>3</sup>, and the second is the act on social services of 2006, which partially regulates the qualification requirements for the profession of social worker.<sup>4</sup>

Despite the undoubtedly positive overall development, the area of social work education still lacks qualified teachers with primary higher education in social work due to the history of the field. The demands on teachers of social work are shaped by the fact that social work as a study field requires a very close, demanding and time-consuming connection of theoretical education and practice. There are not enough teachers of social work who have sufficient theoretical knowledge and, at the same time, the necessary professional experience acquired in the practice of social work.

The current content of higher education in the field of social work is still to a large extent shaped by the fact that it is established at other departments with a primary focus on sociology, pedagogy, theology, etc. Today there is a considerable diversity of university study fields accredited under disparate subject areas, such as: social sciences (code 67), philosophy, theology (code 61), medicine, pharmaceutical sciences (53), pedagogy, educational studies and social care (75), psychological fields (77) and physical education and sports (74). At the level of secondary and tertiary vocational education, the fields of social work or their parts are also taught at various types of schools. To a certain extent, this situation indicates that although the field of social work has its own theoretical and methodological foundations, it is an interdisciplinary field with flexible overlaps into various practical areas. However, this situation may partially be understood as an expression of the current coherence of the system of education in social work with an impact on different quality and qualification level of these

<sup>2</sup> See <http://www.msmt.cz/vzdelavani/specificke-pozadavky-pro-akreditaci-oboru-z-oblasti-socialni-prace> (as of 2010-12-30)

<sup>3</sup> Act No. 18/2004 Coll. on the recognition of professional qualification and other competencies of citizens of the European Union Member States, and on amendments to certain acts (Act on the Recognition of Professional Qualification), as amended

<sup>4</sup> Act No. 108/2006 Coll. on social services, as amended. Education in social work is regulated in Sections 1 (2) and 110; however, it is a professional competence especially in the field of social services or, under special legislation, assistance in material need, socio-legal protection of children, and work in schools and school facilities, medical facilities, prisons, detention centres for foreigners and asylum facilities. Social work as a scientific and study field and as a practical activity, however, covers a wider range of social services outside the framework of the Act on Social Services.

graduates.

A complication when defining the subject area lies in a confusion of the concepts of “social work” and “social care” or “social services,” which are not equivalent; the same applies to the concepts of “social services” and “social work services”. Insufficient knowledge of the differences between these concepts causes difficulties in communication in the subject area itself and in the labour market.

## CHARACTERISTICS OF THE SUBJECT AREA

Social work, in all its concepts (see II.), is primarily focused on man in terms of support / assistance in the difficult life situations of individuals and groups at the micro-, meso- and macro-levels. It has a strong multidisciplinary character, while having its own theoretical and methodological foundations. An essential feature of social work is its definition as a profession based on the principle of human rights and social justice; this is why education in this field places an emphasis on the ethical principles and the value system including the protection of human rights. In this context, the study must be combined with professional practice under supervision.

## THE THEMATIC SCOPE OF THE SUBJECT AREA

The subject area currently includes 12 basic thematic units (see the Minimum Standard of Education in Social Work by ASVSP)<sup>5</sup>, which are deepened, developed and expanded at the respective levels of education. They are the following areas: philosophy and ethics, sociology, psychology, the theory and methods of social work, professional practice, professional practice supervision, the methods and techniques of socio-scientific research, law, social policy, social pathology, ethnic minorities, health and sickness. For more details see Section V. - fields of education.

## FUNCTION

### **The subject of learning in the subject area:**

problem situations in the social functioning of people (individuals or groups),  
methods of dealing with them at the micro-, meso-, macro level.

### **The objective of learning in the subject area** focuses on:

identification of difficult life situations of individuals and groups in the context of their environment;  
identification and analysis of the possible solutions to these situations;  
ways to provide support and assistance to clients in coping with difficult life situations, including assistance on self-help;  
identification and development of the personal equipment of a social worker for the provision of social work interventions.

## PRIMARY FIELDS

theory and methods of social work;  
sociology;

law  
social policy;  
psychology  
social pathology;  
ethics;  
professional practice and supervision.

## DEFINITION OF THE OBJECTIVES OF EDUCATION

**The primary objective** of education in social work is to provide graduates with a theoretical and practical basis needed for an active work/cooperation with individuals/groups when dealing with difficult life situations, and for involvement in their solution, especially through:

- a) the application of critical thinking in social work;
- b) the implementation of specifically focused interventions conducted in accordance with the professional standards of social work;
- c) an emphasis on the value orientation of the performance of the profession focused on the protection/promotion of human rights and social justice (the ethical principles of the profession).

**The framework objectives** are primarily focused on providing a coherent system of knowledge that makes it possible to:

- d) understand the client's situation in the general context of their life and/or understand the situation of groups in the general social context;
- e) increase the clients' competencies leading to a qualitative change in their lives;
- f) improve the conditions for their own professional and personal development (as one of the tools for working with clients in difficult life situations);
- g) effectively integrate theoretical learning with professional practice and supervision.

The common theoretical, methodological, philosophical and value foundation of the study or educational programmes of social work is based on:

- h) the professional ethical code of social work;<sup>6</sup>
- i) the content of the Minimum Standard of Education in Social Work by ASVSP;
- j) requirements of the practice.

The basic system of knowledge necessary for a qualified performance of social work includes the following **subject areas**:

1. **Philosophy and ethics** - introduces students to philosophical thinking with the objective of a deeper understanding of the relationship between man and the world and the relationship between people, including an understanding of the character of social work and its social dimension. Ethical issues focus on the application of general issues to ethical problems typical of social work, and on the reflection of one's own values and attitudes in comparison with the values of the professional framework of social work.
2. **Sociology** - an introduction to the theory of sociology provides an overview of the development of sociological thinking and social philosophy in order to understand the social factors of problems and their solutions, as well as the social conditions of the profession of social work.
3. **Psychology** - covers the basics of general psychology and personality psychology, developmental

6 See [http://www.akluby.cz/cz/o-nas\\_mezinarodni-eticky-kodex-socialni-prace.php](http://www.akluby.cz/cz/o-nas_mezinarodni-eticky-kodex-socialni-prace.php) (as of 2009-12-27)

psychology, psychology of health and psychopathology, including the issues of the cognitive equipment of the human psyche, human emotionality, motivational factors of personality development, personality typology, etc. An emphasis is placed on the social factors affecting the human psyche and an understanding of the nature of social interaction. The main objective is to enable people to get to know themselves and others via social interaction and to be able to use this experience in the performance of social work.

**4. Theory and methods of social work.** A comprehensive study of the theories and methods of social work is the primary axis of this subject area. The study contains an overview of the development of social work and the main trends affecting the development of social work, an overview of the key theories of social work as starting points for working with clients, and methods used in social work interventions, the issue of the legitimacy of social work, etc. The issues are also important for the identification of students with the profession of social work. This thematic unit is directly linked to the professional practice, which includes a reflection of the theories and methods when working with clients.

**5. Professional practice** - supports the development of professional competencies needed for the performance of social work in the respective types of institutions and organizations, leads to a reflection of practical experience and self-reflection.

**6. Professional practice supervision.** Those without adequate education cannot perform social work. Within the education, students are thoroughly prepared for working with clients, and during the professional practice they are accompanied by teachers or supervisors who assist them in situations which the students experience. This accompaniment is meant to protect both the student and the client (in case the student's intervention is inexperienced). Supervision is seen as one of the most important aspects of the professionalization of social workers.

**7. Methods and techniques of socio-scientific research** - they include the principles of qualitative and quantitative approach to studying social reality including research techniques, the basics of empirical research, statistical data processing including the principles of the second-degree classification. The practical part includes the preparation and implementation of a research project.

**8. Law** - an introduction into the legal theory and practice is one of the pillars of education in social work enabling the student to understand the legislative and institutional contexts of social work. It covers an overview of public and private law and the law of the EU. The interpretation of public law focuses on constitutional, administrative and criminal law, the interpretation of private law focuses on civil, family and labour law. A special place is taken by the issue of social security law.

**9. Social policy** - a thematic unit creating the conditions for the professional resolution of dilemmas and situations that arise from the participation of the social worker and their clients in the system of social policy. The objective is to acquire the ability to apply the knowledge to the interpretation of the position of the social worker and their employer organization in the system of social work services and in society, to the interpretation of the clients' situations, and to the interpretation of the conditions for satisfying people's needs and implementing the social rights of citizens.

**10. Social pathology** - one of the elementary components of the professional training of social workers. Relates to social phenomena, behaviour and actions that disturb and threaten the social functioning of individuals, groups and society.

**11. Ethnic minorities** - key attention is paid to the concept of cultural relativism, relations between specific cultures of various groups, the distinction among the authoritarian, paternalistic and partner concepts of these relations and the adequate techniques of intervention in the minorities' situations. The objective is to strengthen the capability of reflection of the relation between the majority population and ethnic or other minorities without social myths and prejudices, through ethnological, historical, sociological, psychological, cultural, comparative and other knowledge.



12. **Health and sickness** - the objective is to gain a basic overview of the knowledge in the field of anatomy, physiology, pathophysiology and information on health including the development of physical and mental illnesses, physical disabilities, principles and possibilities of the prevention and treatment of selected diseases with an emphasis on the impact on the social area. An important part is creating conditions for an effective delivery of laic first aid. Another integral part is the clarification of the position of the social worker within the system of health care and understanding the links between the issue of social work and medicine.

## GENERAL PROFILE OF GRADUATES

Social work interventions range from the level of psychosocial processes to the field of social policy, planning and development. They include counselling, individual social work, group work, work with the family and efforts to help people obtain services and community resources. Interventions also include organization management, community work and participating in social and political events, the aim of which is to influence social policy and the economic development of society.

### **Graduates of the subject area social work are trained to perform in particular:**

- k) screening activities and social surveys;
- l) social agenda in social service facilities, especially in facilities of social care and social prevention services including social counselling;
- m) analytical, methodological and conceptual work in the social field;
- n) individual, group and community social work;
- o) the use of research results or pursuing research activity.

### **Graduates from the subject area social work can find jobs as:**

social workers in the ministries of labour and social affairs, justice, interior, health, education, etc., at the local, regional, national and international level,  
 social workers in public administration institutions, non-governmental organizations, including religious facilities, in private institutions in the areas mainly related to employment services, social and legal protection of children, support and assistance to people with disabilities, social work in health care, in the activities of the probation and mediation Service, the Police of the Czech Republic, the Prison Service of the Czech Republic, migration policy, development and implementation of social policy programmes, etc.;  
 according to the level of education as executives in middle or senior management in organizations of social work services and organizations coordinating social work services;  
 according to the level of education as researchers and analytical staff in social institutions;  
 according to the level of education as teachers of high schools, tertiary vocational schools and universities, with a focus on social issues.



# EDUCATION DESCRIPTORS

PROFESSIONAL KNOWLEDGE			
Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
<p>they demonstrate knowledge and understanding of the aims and importance of social work in terms of society and clients; they demonstrate knowledge of relevant issues and concepts - the theory and methods of social work, social policy, law, psychology, the theory of social deviance, philosophy and ethics, sociology, the theory of ethnic minorities, the theory of health and sickness, in terms of fulfilling the objectives of social work; they demonstrate an understanding of these issues (the issues and concepts of the fields and disciplines above are listed in the Accreditation Requirements for the Study of Social Work at Tertiary Vocational Schools and in the Minimum Standard of Education in Social Work by ASVSP);</p> <p>they demonstrate knowledge of the ethical theories and principles relevant to social work, understand them and are able to</p>	<p>they demonstrate an understanding of the objective and importance of social work in terms of society and clients, and an understanding of the similarities and differences between social work and other helping fields which they are able to justify; they demonstrate knowledge of the application of relevant issues and concepts of the theory and methods of social work, social policy, law, psychology, the theory of social deviance, philosophy and ethics, sociology, the theory of ethnic minorities, the theory of health and sickness, in terms of fulfilling the objectives of social work; they demonstrate an understanding of these issues (the issues and concepts of the fields and disciplines above are listed in the Accreditation Requirements for the Bachelor's Study of Social Work and in the Minimum Standard of Education in Social Work by ASVSP); they demonstrate knowledge</p>	<p>they recognize and reflect specific views and reactions of social work on complex phenomena that are the subject of interdisciplinary collaboration (for example, they recognize that a client with a psychiatric diagnosis, whose integration into the community is the goal of an interdisciplinary team, needs help with engaging in new interactions, and alerts the team, etc.); they demonstrate a comprehensive understanding of the way of applying general concepts of social work to the context of selected specialization or according to the school profile (for example social work with clients of a specific target population, application of selected methods to social work with clients, social work management, education of social workers, research in social work); they demonstrate a comprehensive understanding of the theoretical basis of the application</p>	<p>they have a deep understanding of theories, concepts, approaches and methods that are in the international community of social workers and in related fields considered relevant for determining the cognitive and application objective of a dissertation thesis; they are acquainted with the development of the intellectual context of theories, concepts, approaches and methods relevant for determining the cognitive and application objective of a dissertation thesis; they have a deep understanding of the results of empirical learning relevant in terms of theories, concepts, approaches and methods relevant for determining the cognitive and application objective of a dissertation thesis; they follow and know the current state of knowledge in the field of their dissertation thesis</p>

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
<p>use them with the help of their supervisor;</p> <p>they demonstrate knowledge of general concepts, theoretical approaches and methods of social work with clients (for example the general concepts of life situation, social functioning, client and social environment etc.; e.g. the theoretical approaches such as psychodynamic, cognitive-behavioural, task-oriented, existential and humanistic, radical and anti-oppressive, systemic, ecological, psychosocial, based on the theory of communication and systemic, based on the theory of roles, case social work, group social work, community social work etc.; e.g. the methods of crisis intervention, designing and implementing systemic changes, etc.);</p> <p>they demonstrate knowledge of the theoretical approaches and methods of social work when</p>	<p>of the application of the ethical theories and principles relevant to social work, and understand it; they demonstrate knowledge of the application of general concepts, theoretical approaches and methods of social work with clients and understand it (for example the general concepts of life situation, social functioning, client and social environment, etc.; e.g. the theoretical approaches such as psychodynamic, cognitive-behavioural, task-oriented, existential and humanistic, radical and anti-oppressive, systemic, ecological, psychosocial, based on the theory of communication and systemic, based on the theory of roles, case social work, group social work, community social work etc.; e.g. the methods of crisis intervention, designing and implementing systemic changes, etc.);</p> <p>they demonstrate knowledge of the theoretical approaches and</p>	<p>of knowledge acquired through studying the selected specialization or according to the school profile (for example specialization or profiling of social work with clients of a specific target population, the application of selected methods to social work with clients, social work management, research in social work, the education of social workers);</p> <p>they demonstrate an understanding of ethical theories and principles relevant to social work, including the manner in which they are applied in the reflection of social workers' activities;</p> <p>they demonstrate a complex understanding of the theoretical approaches and methods of social work with the client which are relevant in terms of the chosen specialization or school profile, including the ways of their application (for example the theories, approaches or methods</p>	<p>presented in monographs and journals (including foreign); they are generally acquainted with the key issues of the current knowledge in the field of social work presented in monographs and journals (including foreign);</p> <p>they are acquainted with the theoretical concepts of other fields, the application of which to social work is considered by the international community of social workers relevant for the contemporary development of theories, concepts, approaches and methods of social work;</p> <p>they have a deep understanding of the theoretical concepts and empirical knowledge of other fields that are applicable to determining the cognitive and application objective of a dissertation thesis.</p>

## PROFESSIONAL KNOWLEDGE

# SOCIAL WORK

# EDUCATION DESCRIPTORS

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
conceiving and implementing help interventions into the specific clients' (individuals, groups or communities) lives; they can use this knowledge based on a completed practice under supervision.	<p>methods of social work when conceiving and implementing help interventions in the specific clients' (individuals, groups or communities) lives; they can use this knowledge based on a completed practice under supervision;</p> <p>they demonstrate an understanding of the adequacy or inadequacy of the use of individual theoretical approaches and methods of social work when conceiving and implementing a help intervention into the life situation of a specific client - individual, group or community - and the ability to justify the appropriateness of the use.</p>	<p>of the formulation of the policy of social services, management or education and research in social work);</p> <p>they recognize the differences between the theoretical approaches and methods of social work relevant to the chosen specialization or school profile and other theoretical approaches and methods of social work (e.g. the differences and similarities in the anti-oppressive, psychodynamic, ecological and existential approaches);</p> <p>they recognize and interpret the possibilities and limitations of the application of theoretical approaches and methods of social work relevant in terms of the chosen specialization or school profile (for example the suitability of the anti-oppressive approach when overcoming barriers of interaction arising from the prejudices of social environment, and the inadequacy of the same approach for solving</p>	

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
		<p>problems in interaction arising from a lack of self-acceptance on the client's part);</p> <p>they recognize and interpret the need to adapt theories, approaches and methods borrowed from other disciplines to the tasks of social work with clients or tasks in the field of providing the conditions for social work with clients (e.g. the need to adapt hypotheses of the psychodynamic approach in such a way that the social worker does not</p>	
PROFESSIONAL KNOWLEDGE			

# SOCIAL WORK

# EDUCATION DESCRIPTORS

PROFESSIONAL SKILLS			
Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
they can find and, with the help of their supervisor, interpret information needed to assess an adverse life situation of a client (individual, group or community) and to implement a helping intervention adequate to the client's situation; under supervision and in order to collect such information, they are able to devise a relevant research task and use the outputs of its implementation.	they are able to identify circumstances that raise difficulties in client interactions with entities in the client's social environment at the micro-, meso- and macro-level within a life situation of the specific client (individual, group or community); through interaction with subjects in the respective social environment, they can identify the links between the problems of a specific client (individual, group or community), the circumstances that led to the problems, and theoretical approaches and methods that can be used as an intervention;  they are able to recognize the needs of the client (individual, group or community) whose satisfaction is compromised by problems in interaction with entities in the client's environment;  based on an assessment of the adverse life situation of the	they independently apply the knowledge of national and foreign literature relevant to the tasks of the selected specialization or according to the school profile (for example specialization or profiling of social work with clients of a specific target population, application of selected methods to social work with clients, social work management, education of social workers, research in social work); they independently search, formulate and solve problems or assignments within the selected specialization or according to the school profile; based on an assessment of the client's life situation, they conceive, implement and evaluate a helping intervention adequate to the specific circumstances of the client's life;  they use the knowledge of the theories and methods of social work for an independent search, formulation and solution of	they can discuss the solved problem, research method and acquired knowledge in an extensive foreign-language reviewed text (article, chapter in an edited monograph, monograph); they can perform conceptual changes of theories, approaches and methods borrowed from other fields so that these can be used when solving tasks of social work or tasks in the field of providing conditions for working with clients;  they are able to identify emerging problems of known target populations or new emerging target populations and the specifics of their life situations;  they are able to perform conceptual changes of known theories, approaches and methods so that these can be used when solving emerging problems of known target populations or the problems of emerging target populations;

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
	<p>client (individual, group or community), they can conceive a helping intervention adequate to the life situation of the client;</p> <p>in cooperation with the client and other subjects, they are able to implement a helping intervention adequate to the client's life situation (individual, group or community);</p> <p>they are able to recognize the risk factors and ethical problems or dilemmas of social work with clients; they are able to solve them under supervision;</p> <p>they can systematically search and interpret information needed to assess an adverse life situation of a client (individual, group or community) and to implement a helping intervention adequate to the specific client's situation;</p> <p>they can use the results of socioscientific researches or</p>	<p>problems within the selected specialization or according to the school profile;</p> <p>they use and apply knowledge of other fields for an independent search, formulation and solution of problems or assignments within the selected specialization or according to the school profile;</p> <p>they can apply the experience with the search for, formulation on or solution of problems or assignments within the selected specialization or according to the school profile when</p> <p>searching, formulating and solving problems and assignments within different areas of social work (for example experience in the field of helping interventions in social work can be applied in the context of social work management; they can also use experience with a certain target population when working with a different population etc.);</p>	<p>they can critically reflect practical problems of social work in a way that leads to the formulation of relevant application and cognitive objectives of research (they for example define empirically identifiable problems of the application of a specific approach when working with clients, they formulate the need for reformulation or replacement of a given approach, they propose research objectives that can bring knowledge needed to innovate the approach);</p> <p>they can apply standard and advanced research methods to the methodology of investigation adequate to the solution of relevant cognitive and application research objectives in social work;</p> <p>they are able to carry out and organize original research which is a reaction to practical issues in the field and seeks new knowledge enabling to solve relevant application objectives;</p>

## PROFESSIONAL SKILLS

# EDUCATION DESCRIPTORS

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
	<p>concepts, methods and techniques of social research when acquiring and interpreting information on the clients' situations and in order to further develop their own professional skills;</p> <p>under supervision and in order to acquire knowledge needed to solve social tasks, they can</p>	<p>they demonstrate a comprehensive understanding of the selected theories, approaches and methods of social work when assessing the life situation and devising, implementing and evaluating a helping intervention adequate to the client's situation;</p> <p>they use a complex understanding of selected theories, approaches or methods to provide the conditions for social work with clients, if this is the subject of the selected specialization or the school profile (conditions for working with clients can be provided for example by the formulation of the policy of personal social services, management, education or research in social work);</p> <p>using the help of their supervisor, they can creatively solve ethical, professional, group or individual problems emerging in the process of solving the tasks of social work;</p>	<p>they can apply ethical theories and principles to solving ethical problems or dilemmas of creative work, or use the outcomes in the field of social work.</p>



Bachelor's study programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
	devise and carry out a research and apply the findings to practice.	<p>they understand the general principles, concepts and techniques of the methodology of social research and apply them to an independent solution of a research task in the context of using their own research results in practice;</p> <p>they can independently assign a complex research task to another expert with the objective of acquiring knowledge needed to solve their own task in social work;</p> <p>they can independently interpret the results of the research work done by another expert, adequately to their task in social work.</p>	

PROFESSIONAL SKILLS

# SOCIAL WORK

## CHARACTERISTIC OCCUPATIONS

**Social worker** - see Section 109 of the Act on social services; qualification requirements partly in Section 110 of the Act on social services.

**Social worker in health care** - a specific profession for social work in health care according to Section 10 of Act No. 96/2004 Coll., on non-medical health care occupations (interdisciplinary profession).

## RELEVANT REGULATED PROFESSIONS:

social worker;  
health and social worker;  
another healthcare professional.

## RELATIONS TO OTHER SUBJECT AREAS (INCLUDING BOUNDARY FIELDS)

sociology;  
psychology  
law  
general medicine and dentistry,  
health care;  
philosophical sciences and religious studies (e.g. ethics).

## 2.14 POLITICAL SCIENCES

### A BRIEF DESCRIPTION OF THE CHARACTER, THEMATIC SCOPE AND HISTORY OF THE FIELD

The history of political sciences goes way back to the past. Political institutions and political behaviour have been the subject of rational thinking at least since the time when states, i.e. political units, came into existence; states had the monopoly of legitimate coercion in the given territory, and in order to legitimize their political power, they used rational concepts such as common good, justice and right, so they could do without mythology and religion. The development of political knowledge from these beginnings to the present day has been neither straightforward nor continuous. It could be represented in the form of an ascending curve with several peaks. The actual beginning of political knowledge is undoubtedly connected with the development of Greek education. Certain progress was achieved in the Roman period and a more modest development could be observed in the Middle ages; the Renaissance and the Enlightenment then began a new era of political knowledge, which experienced a major boom in the 19th and especially the 20th century, in relation to the application of scientific standards to the area of political behaviour. The political science then acquired the distinct characteristics of a scientific profession. Thus conceived development of political knowledge has a cosmological dimension in the sense that it brings a deepening understanding of reality, namely political institutions and political behaviour, which acts with an entitlement to rational knowledge of real processes and at the same time provides the criteria to rationally evaluate these processes.

The development of political sciences in this concept experienced three peaks in the 20th century that deeply affected the professionalization of these sciences especially in the Anglo-Saxon area. In the United States, institutionalization was encouraged by empirical researches done by the so-called Chicago School (1920-1940), which strived for psychological and sociological interpretations of political processes. The second peak was the decade after the Second World War, when the so-called behavioral revolution took place and when the respective methods of empirical research on politics spread throughout the world. This change led to a methodological transformation of a number of political disciplines. Generally speaking, this research and educational area was professionalized. Research centres were established within universities, scientific communities were founded and reviewed scientific journals started to be published (in the United States, scientific communities and reviewed scientific journals existed as early as the beginning of the 20th century). A certain highlight of this attempt at the scientification of political knowledge was the recent application of deductive and mathematical methods as well as economic models of human behaviour, which are based on methodological individualism and the theory of rational choice. On the European continent, political knowledge of the modern age has gradually developed in a similar way especially at universities and to a great extent in connection with the development of the modern state and democracy, although often critically, as proven by the importance of the theory of elites, born from a critique of the classical concepts of democracy in the name of “realism” and “scientific” knowledge of politics. Especially after the Second World War, political sciences developed similarly in the above mentioned lines.

This Popperian optics of an increase in knowledge depending on the application of scientific research standards does not mean that the peculiarities of the individual political disciplines are blurred. There is a common attempt at rationality based on the rules of evidence (empirical) and deduction, but this criterion of rationality is not limited to researches which might be described as behavioral; it also applies to interpretive approaches which are rather based on historical and hermeneutic methods

used when investigating political behaviour in the past or developing political theory. Gabriel A. Almond in this respect speaks of a “progressive eclectic” view that sees the development of political knowledge as interdisciplinary and includes empirical case studies (historical and contemporary), systematic comparative researches, statistical analyses that lead to aggregated data, formal mathematical models of political behaviour and, last but not least, political philosophy.

Political sciences cover a wide range of knowledge and education. Their boundaries are indistinct and may be disputable. This field can generally be defined as an area of political institutions, their relations and outputs and the behaviour of political stakeholders in their framework. Politics is often divided into a field which is seen as an area of the individual (physical or corporate) stakeholders’ behaviour in an effort to influence political power and political decisions, and into the field of public policies, which is seen as a set of objectives and activities which, with the use of administration, is approved and implemented by the holder of political power - usually the state, but also various international organizations. Last but not least, it is an area defined by the behaviour of a specific political unit or community, which is usually the state. This includes the issues of constitutional arrangements, the legitimacy of political institutions, the nature of political regimes etc. This classification is however purely didactic and reflects neither the peculiarities of individual scientific disciplines, nor the division of this field as it is seen in education and teaching methods. It is preferable to consider politics in its broad sense, that is a general characteristics of knowledge and education in politics, both in the national and international framework, and then deal with specific disciplines that are concerned with politics in this broad sense. From this perspective, the main political issue is the relation between the government and society - in the national framework using the monopoly of political power or in the international framework where such a monopoly does not exist. Politics in terms of national government includes interactions of people, institutions and values, which enable one to understand the ways in which values are allocated and sources are distributed in society divided into several levels, from local and regional to national and global. The main question of political research is who gets what and when, how, where and why they get it; this question includes other questions relating to power, justice, order, conflict, legitimacy, responsibility, commitments, sovereignty, governance and decision making. Politics in the international context focuses on the regional and global framework, while the domestic issues are important as well. In the international context, however, there is no international or global government; nevertheless, with the development of international organizations the thesis of anarchy is no longer true, and the issue of knowledge and education is not only conflict and cooperative relations between states or inter-governmental organizations, but also the relations between non-governmental stakeholders, such as multinational corporations, non-governmental international organizations etc. The theory of international relations, like the study of politics in the national framework, includes philosophical, theoretical, institutional and material topics relating to governance at this transnational and global level.

The objective of education in the field of political sciences is the description and understanding of political actions, events and institutions with the help of general theories, models and generalizations, while these actions, events and institutions are also prescriptively reflected. Prescriptive political theory or political philosophy deals with a prescriptive study of political values in society and in the international context; it works historically and analytically. Empirical political theory focuses on the examination of general mechanisms and powers which govern the actual behaviour of individuals and institutions during mutual interactions when allocating values and sources at the domestic, regional and global level. Political analysis uses this theoretical perspective to explain historical events, the functioning of political institutions and political behaviour of the individual stakeholders. The objective of the theory of international relations is to understand and describe events, actions of stakeholders and behaviour of institutions in the international context, in an analogous theoretical manner.

For this purpose, the examination of politics and international relations uses a number of research strategies and methods. These may include textual analysis, historical research, the use of contemporary

media sources, discourse analysis, structured and unstructured interviews, group focus, public opinion surveys, statistical models, computer simulations etc. In the field of political sciences, there are many approaches to research that are interdisciplinarily linked, and individual approaches may even overlap, so certain issues may appear in various disciplinary contexts.

## PRIMARY FIELDS

Political philosophy and theory, methodology, political systems, party systems, electoral systems, international relations, security studies

## DEFINITION OF THE OBJECTIVES OF EDUCATION

The objectives of education in the field of political theory reflect the diversity of courses offered in this field, which are generally histories of political thinking, the theory of democracy, the methodology of politology, comparative politics; however, adequate political education may also be achieved within ethics, feminist studies, urban studies or the study of history and politics of individual countries. Comparative political science and political analysis are taught within a number of courses, such as comparative studies of political systems, electoral systems and party systems. Each course has its own specific objectives of education.

The theory of international relations focuses on the study of global politics, both in terms of systems and in terms of stakeholders. Political education also includes the historical development of international systems and structures of global power. In terms of stakeholders, political education focuses on states (or their political regimes), international organizations and other transnational stakeholders. Education in this field includes guidance on the approaches to the study of international relations, namely Realism, neo-Realism, neo-Liberalism, institutional theories, feminist studies etc. Adequate education may be achieved in courses devoted to foreign policy, international organizations, international history, peace studies, human rights etc.

Security studies include the national and international dimension of security, political extremism etc.

Political studies integrate the theoretical, comparative and historical perspective, as is common in broad area studies. The educational objectives thus always reflect the diversity of approaches. Objectives can also be divided according to the levels of analysis into the global, regional with varying degrees of cooperation and integration, and territorial in the form of culturally and historically constituted international bodies.

The educational objectives in the field of political sciences differ according to the level of offered education. At the **Bachelor's level**, students will:

Acquire basic knowledge of concepts, theories and methods used in political sciences when explaining political ideas, the behaviour of political institutions and stakeholders in the specified fields of political study.

Develop their capabilities of critical and independent thinking about political events, ideas and stakeholders.

Learn how to link the academic study of politics with practical issues of public interest and practical issues of public policies of the state, or transnational institutions.

Develop a number of cognitive and social skills that are relevant to their intellectual and personal development and future work.

At the **Master's level**, students will:

Learn to understand the nature and importance of politics in human behaviour.  
 Use concepts, theories and methods of individual political disciplines to analyze political ideas, stakeholders and practice.  
 Acquire knowledge of different political systems and the nature and distribution of power in these systems, as well as the social, economic, historical and cultural context in which these systems operate.  
 Be able to evaluate different interpretations of political events and matters in the world.  
 Learn how to evaluate the strategies of stakeholders in the political process.

Acquire general intellectual skills.

Know how to collect, organize and apply data and information from various relevant primary and secondary sources.  
 Learn how to identify, formulate, investigate and analyze problems and propose and defend solutions.  
 Learn to argue rationally and formulate critical judgements using relevant information.  
 Be able to reflect on their learning methods and learn the methodological principles of further self-education.

## GENERAL PROFILE OF GRADUATES

### **In the field of political sciences, at the Bachelor's level, graduates:**

Using basic knowledge, they are able to critically apply the knowledge of the nature and significance of politics and political behaviour in the national framework and international context, including defining the boundaries of politics.  
 Have the basic knowledge of various approaches to the study of politics and international relations; in analysis and argumentation, they use key concepts, theories and methods applied in the field of political sciences, and are able to assess the strengths and weaknesses of such approaches.  
 Are able to use basic concepts, theories and methods of individual political fields during elementary analysis of political ideas, institutions and behaviour, and are able to assess and evaluate different interpretations of political matters and events.

### **At the Master's level, graduates:**

Using knowledge of the field, they are able to critically apply the knowledge of the nature and significance of politics and political behaviour in the national framework and international context, including defining the boundaries of politics.  
 Have a deep knowledge of various approaches to the study of politics and international relations; in analysis and argumentation, they use key concepts, theories and methods applied in the field of political sciences, and are able to assess the strengths and weaknesses of such approaches.  
 Are able to objectively analyze political phenomena, including the role of ideas, during the study of the structure and operation of various political systems, including the international, while taking into account the role of social, economic and cultural context and other factors that influence political change.  
 Are able to independently use concepts, theories and methods of individual political fields during analysis of political ideas, institutions and behaviour, and are able to critically assess and evaluate different interpretations of political matters and events.

### **Among the intellectual skills, Master's graduates:**

Can describe, evaluate and use various approaches to collect, analyze and present certain

Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates		
<p>they express the content of the subject of political sciences,</p> <p>they describe the evolution of the history of political philosophy,</p> <p>they discuss the basic features of modern ideologies and socio-political doctrines,</p> <p>they explain the theory of political parties and their systems,</p> <p>they explain the theory of the political system, international relations, democracy and non-democracy,</p> <p>they enumerate the methods of social sciences,</p> <p>they classify the political and party systems in selected European countries into particular typologies,</p> <p>they express the terms of research in the field of political science,</p> <p>they describe the development of political</p>	<p>they summarize the main trends in the development of political philosophy and political theory in the 20th century,</p> <p>they analyze the characteristics of the socio-political changes in the world and in the doctrines of the Czech Republic in the 20th century,</p> <p>they characterize the major changes in the approach to the research of political stakeholders,</p> <p>they summarize the development of the Czech politics after 1989,</p> <p>they compare the theory of democracy and non-democracy in the history of European thinking from antiquity to the present,</p> <p>they compare the relevant theories of political parties and interest groups,</p> <p>they analyze the effect of electoral systems on party systems,</p> <p>they compare the paradigmatic perspectives in the international political economy,</p> <p>they analyze the suitability of different research methods in the field of political</p>	<p>they assess the current state of the field via continuous monitoring of monographs and journals,</p> <p>they summarize the current state of research in a particular area of research in political sciences,</p> <p>they examine new theoretical and methodological approaches in political sciences,</p> <p>they argue in favour of the adequacy of the methods of political sciences to address a specific problem,</p> <p>they assess the current state of the field via continuous monitoring of monographs and journals,</p> <p>they summarize the current state of research in a particular area of research in political sciences,</p> <p>they examine new theoretical and methodological approaches in political sciences,</p> <p>they argue in favour of the adequacy of the methods of political sciences to address a specific problem,</p> <p>they assess the position of political sciences in the system of sciences,</p> <p>they assess the need for the use of methods</p>

PROFESSIONAL KNOWLEDGE



# EDUCATION DESCRIPTORS

Bachelor's study programme	Master's study programme	Doctoral study programme
	Study programme graduates	
<p>they apply the theories and methods to address a more comprehensive task in the field of social sciences,</p> <p>they apply differences while working with sources and literature,</p> <p>they have mastered the skills needed to write a professional essay on a set political topic,</p> <p>they use the knowledge of qualitative or quantitative methods for solving the given task.</p>	<p>they suggest a research topic in the field of political sciences leading to new knowledge,</p> <p>they formulate a research hypothesis grounded in theory,</p> <p>they suggest a research plan to test the hypothesis,</p> <p>they question the alternative procedures to test the hypothesis,</p> <p>they compare the methods applicable to research and choose the best of them,</p> <p>they prepare a larger scholarly text on political science.</p>	<p>they organize an original research in the field of political science for the purpose of an expansion of knowledge in the field,</p> <p>they formulate the principles of research inspired by the state of knowledge at the international level,</p> <p>they revise the existing theories of political sciences,</p> <p>they prepare a scholarly text on political science of a monographic character.</p>

political information.

Are independently able to identify and analyze problems relating to human political behaviour and the nature of political institutions, and are able to rationally defend their solutions.

Are able to formulate rational arguments, synthesize relevant information and arrive at reasonable judgements of human behaviour in political environment.

## 2.15 MEDIA STUDIES

### A BRIEF DESCRIPTION OF THE CHARACTER, THEMATIC SCOPE AND HISTORY OF THE FIELD

In literature, an interest in the study of mass media is traditionally - almost ritually - associated with J. A. Comenius (Labyrinth of the World, School of Pansophy, and a requirement to use newspapers in teaching); however, the establishment of media as an independent discipline is significantly more recent and is associated with historiography (R. E. Prutz, in the early 20th century Ludwig Salomon) and sociology (Max Weber's requirement to establish a study programme for journalists). In the interwar period of the 20th century, especially with the development of cinema and later broadcasting, the empirically oriented theory of mass communication began to form within sociology (P. F. Lazarsfeld and others); at the same time, the requirement for the study of media as an independent socioscientific discipline emerged in Germany (Zeitungswissenschaft). In parallel to these developments, the issue of media was reflected in the then forming social theory and criticism (Frankfurt School) and the normatively oriented empirical research (Payne Fund study) and commercially oriented research (again, P. F. Lazarsfeld). After the Second World War, with the mass boom of television, the efforts to establish an independent study field of media strengthened and a number of study programmes came to existence, as well as many research teams. In 1960s, it was apparent that the study of media (still quite inconsistent) was a respected and autonomous discipline at a number of major world universities. It became an accepted academic background for the university training of prospective journalists, often as a part of a broader basis of other fields. In 1960s and 1970s, the field experienced an "ethnographic turn" and expanded into everyday life and popular culture (Birmingham School), as well as political communication (GUMG etc.); at the same time, it absorbed the methodological inspiration of other fields (especially linguistics and literary science, but also critical political economics). With an increase in awareness and interest in the role of mass media, applied media studies began to massively develop, primarily in the form of media education (Medienerziehung), media pedagogy and media criticism. Since mid-1990s, the issue of the effects of digitization and internetization of communication and communication/social networks in general has penetrated the study of mass media, and the field has thus expanded in order to cover such media as well (new media studies), and also their interaction with political affairs, consumption, everyday life etc. At the same time, the field has maintained an interest in an immanent development of media as a system, social institution, economic activity and constitutional cultural expression, and has been developing the study of the history of media, critical analysis of media production etc. In the Czech environment, until the end of the 19th century, only occasional mentions about media (newspapers) appeared (J. E. Wocel), or dictionaries reflecting the growing importance of print, and bibliographies (Dlabač, J. Rank). At the turn of the 19th and 20th century, a requirement for a continuous media study began to be formed (T. G. Masaryk, E. Beneš, K. Hoch); in the interwar period, a professional field inspired by Germany to a large degree started to emerge (the name of "newspaper science" was proposed), and found an organizational platform with the Liberal School of Political Sciences (1928) and thematic magazines (first *Duch novin*, later *Tisk a politika*). The movement was strongly oriented at sociology (A. I. Bláha, E. Chalupný) and history, but it also covers other fields including national economics (K. Hoch). However, this promising beginning was stopped by war, and the Protectorate established an independent field of *Zeitungswissenschaft* at Charles University, which was completely subordinate to the situation in Nazi Germany. Despite a few attempts (K. Zieris) at resuming the interwar tradition after the Second World War, these efforts were unsuccessful. The period between 1950s and 1980s was heavily ideologized and a professional interest in media was primarily focused on the purposefully created field *theory of journalism* (although empirical research continued,

especially at ministries); therefore, the field had to be built from scratch after 1989 - mainly under the name *Media Studies*, inspired by the British and Scandinavian tradition. In the nomenclature of study fields, it is most frequently included in *Media and Communication Studies*; in the index of fields, RIV, it is identified with the field *Literature, Mass Media, Audio-Vision*.

Media studies are developed as a multidisciplinary field covering social and political history of media, the development of the social theory of media and methods of empirical research in the background of the theories of social communication, sociology, social psychology, linguistics and semiotics on one hand, and general history, politology, economics, aesthetics etc. on the other. The subject of interest in the narrowest sense is journalism and its “network” derivatives; in a broader sense, it is media production as a whole, or popular culture. The result of this broadly conceived subject of interest is a rather different approach to the concept of media studies as a study discipline; although the basic matrix (vertically: institution, content, users, influence; horizontally: diachronic and synchronic perspective) has stayed the same, the individual departments maintain and develop their own focus of interest (the history of media, network media, television studies, popular culture etc.). Media studies are often associated with the training of prospective journalists (Prague, Brno, Olomouc) and a form a kind of an academic framework. This means that in the Czech Republic, media studies remain separated from some important field inspirations (e.g. literary science), and at the same time become the subject of interest of other fields (historiography, cultural studies, literary science). In an applied form, media studies are also taught at elementary and grammar schools because the curricular reform (a shift to Framework Educational Programmes) included the field *Media Education* in the compulsory part of educational programmes.

Media studies as a subject area primarily focuses on the role of media (and mediated communication in general) in the lives of individuals and society, and on an analysis of communication processes that are conditioned or modified by the existence of media - and thus also on public communication and the relation between media and other social institutions. The subject of interest is above all mass media (periodicals, radio and television) and network media (especially if they participate in the form and course of public communication) and collectively “media communication” in all its forms. A key dimension of education is the development of critical thinking which includes media and media communication in the complex of thinking about society and the man, an ability to see media and media communication as a historical category, revealing the latent functions of media communication and the indistinct consequences of its existence and its historical changes. Emphasis is therefore placed on a broad multidisciplinary training, the development of critical self-reflection (critical science has a strong presence within media studies) and the search for a balance between scientific neutrality and social criticism. An important dimension of education remains the preparation for the performance of the media profession (which is itself a very internally diverse area) or for another application (teaching, analytical work, etc.). It is thus necessary to combine theoretical study with practice.

As has already been said, the trans- and multidisciplinary nature of media studies allows for a very different approach to education, whether in terms of the selected thematic focus or structure. In general terms, there is a consensus that education in the field of media studies covers a broad basis of humanities and social science (especially the social and cultural history and theoretical sociology, but also e.g. philosophy, economics, social psychology, linguistics or semiotics, political geography etc.), **the interpretation of the social and political history of media**, an overview of the development of **the social theory of media** and **the methodology/methodologies of media research**. This basis is generally complemented with a variety of specialized critically and analytically oriented courses, specified according to the individual media or communication technologies (print, television, “new” media etc.) and with a set of professionally oriented courses (journalism, advertising, photography, marketing, management etc.). The concept of the courses may vary at individual departments according to their focus and members, while maintaining the basics. In the Czech practice, there is a tendency towards sociological media studies (Faculty of Social Studies in Brno, Faculty of

Arts in Olomouc) and historical media studies (Faculty of Social Sciences in Prague), or a focus on multimedia (Faculty of Humanities in Prague). Media studies are usually associated with the training of prospective journalists (Brno, Olomouc, Prague), and the development of applied media studies entails the training of future teachers (University of West Bohemia, University of South Bohemia etc.).

The subject of learning at the most general level is the interaction of media and media communication with various spheres of social life. More specifically, the subject of learning is mass and network media and (public) communication, the existence and form of which are conditioned, supported or modified by these media; further their owners, producers and users, and social processes that take place in the interaction between media and their users; social behaviour at all levels from society to individual stakeholders, which is conditioned by the existence of or related to media. Media are seen as a system which has been shaped by the historical development (modernization), specific historical and regional conditions and other intervening variables (economics, culture, political system etc.).

Knowledge in the field of media studies focuses on:

- identification and analysis of the role of media in society and in the lives of individuals and problems related to them,
- analysis of the possible solutions to these problems,
- monitoring of the evolution of media and society,
- analysis of the media policy and the solution of institutional problems associated with media,
- the resulting ideas and suggestions for the development of media studies and the search for new methodologies.

## PRIMARY FIELDS

- social, political and cultural history of the media (including the history of technology and content),
- history of the social theory/social theories of media and media communication,
- the current theory of mass media communication,
- research methods and techniques of media,
- history of media studies and media communication,
- media systems, media law, media policy,
- psychology / social psychology / social communication,
- general history and the history of culture,
- sociology,
- politology / political communication,
- economics,
- philosophy,
- linguistics,
- semiotics,
- political geography,
- professional practice.

## DEFINITION OF THE OBJECTIVES OF EDUCATION

**The basic objective** of education in media studies is to provide graduates with theoretical and practical foundations for 1. thinking about media and media communication and 2. active work in media

and related practical spheres, based on

- the development of theoretical and critical thinking, an ability to thematize problems relating to the existence of media and pose relevant questions for their deeper examination, abilities in the area of acquiring, processing and evaluating empirical data on the performance of media,
- experience in the field of application of knowledge acquired in different fields (demographic surveys, public opinion surveys, statistical data etc.).

**The framework objectives** of this field are primarily focused on providing a system of knowledge and skills that allows to:

- understand the role of media in the given contemporary context and in relation to the value orientation of society, media legislation and life expectations,
- be able to model interventions into the media system and its (co)regulation,
- improve the conditions for professional and personal development of the graduate, including linking theoretical education with practice,
- understand the ethical context of the performance of media.

A mediologist should have the qualifications for:

- the interpretation of the role of media and media communication in the given social, political and cultural context,
- an adequate definition of relevant problems or research topics, heuristically fruitful hypotheses and preparation of research projects,
- the collection of high-quality data and their versatile analysis and generalization of results,
- the interpretation of individual phenomena in the dynamical development of media systems, a responsible assessment of the validity and reliability of the acquired information and possibilities of generalization,
- continuous enrichment of their own knowledge and formulating suggestions for the development of media science (mediology) as a scientific discipline.

The basic system of knowledge needed for qualified professional work in various fields of media communication is included in the following **fields of education**:

**Social and political history of the media (and the history of technology and content), general history and the history of culture:**

- the basic concept of the establishment and development of the media from the early modern period to the present,
- the basic idea of the changing patterns of the relationship between the media, the political system and society,
- political, social, cultural and technical history of media
- the basic idea of the history of the modern age and the history of the present,
- introduction to the history of everyday life.

**History of the social theory/social theories of media and media communication:**

- the basic idea of the development of thinking about media and communication,
- the roots and sources of the different approaches and theories,
- the basic understanding of the key works concerning the thinking about media,
- an insight into the relationship between the contemporary cultural and intellectual climate and the thinking about media,
- history of media studies and media communication.

**The current theory of mass media communication:**

social media theory (the concept of the current solutions to the relationship between media and society),  
the theory and influence of network media,  
media communication as a type of social communication.

**Research methods and techniques of media:**

mastery of the basic quantitative and qualitative methods of media research,  
techniques of empirical media research,  
preparation and management of research projects.

**Media systems, media law, media policy:**

an insight into the historically conditioned models of the relations between media and the political system,  
comparative analysis of media systems,  
comparative analysis of media law and policies.

**Psychology / social psychology / social communication:**

the foundations of general psychology and personality psychology, introduction to the cognitive equipment of the human psyche and human emotionality,  
understanding of the social factors that affect the human psyche and the nature of social interaction.

**Sociology:**

interpretation of all the basic concepts and categories,  
the roots and sources of the different approaches and theories,  
basic knowledge of the classical works of sociology.

**Linguistics, semiotics:**

basic knowledge of the code and character,  
introduction to the relationship between language and thought, language and society, and language and culture,  
the basics of argumentation,  
the basics of discourse analysis,  
introduction to the main trends of linguistic thinking,  
introduction to the classical works of semiotics and rhetoric.

**Politology / political communication:**

interpretation of all the basic concepts and categories,  
the roots and sources of the different approaches and theories.

**Economics:**

interpretation of all the basic concepts and categories,  
the roots and sources of the different approaches and theories,  
basic orientation in the classical works of economical thinking.

**Philosophy:**

the foundations of philosophical thinking that enable a deeper understanding of the nature of the relation between the man and the world and the relation of the man to themselves,  
insight into the foundations of individual paradigms and the description of the categories on which methodology is based,  
basic knowledge of the history of philosophy.



## GENERAL PROFILE OF GRADUATES

**The Bachelor's programme** is designed with regard to (a) the practical needs of graduates in terms of work, (b) the preparation for further study. Graduates are expected to find jobs in the commercial and non-commercial media research, and in the field of media market and the use of media. They can also work for media as such (journalist, middle management), or in advertising, public relations and media consultancy. The training emphasizes the ability of the graduate to acquire and evaluate empirical data, critically evaluate their contextual interpretation, perform the analysis of specific problems and present practical recommendations as regards solutions. The preparation for further study is primarily focused on the development of critical thinking and deepening of the historical and socioscientific background.

**The Master's programme** complements these basics with further methods of analysis and a deeper insight into the thinking about media. There is also a training for leading independent research projects analyzing fundamental media communication phenomena, and for qualified expert or creative scientific activity. Within some departments, it is possible to intensify the training for teaching, in the field of both primary and secondary education (media education) or tertiary education (universities and socioscientific fields). Graduates of media studies can deal with scientific and research tasks, as well as educational and organizational and managerial tasks, directly in media organizations or organizations that communicate with or are partners to media (from advertising agencies to NGOs). They are prepared to work as middle or senior managers in media. They can also work in research departments, editorial and dramaturgical fields or creative activities.

**The doctoral programme** is designed with regard to the needs of basic research in the field of media and communication. An integral part is the training for independent formulation of scientific tasks and a creative assembly of proper methodology, and the training for leading research teams and participating in the international scientific operation in the field. Graduates are expected to master, independently use and originally create conceptual approaches to solving their own issues of theoretical or historical nature.

# EDUCATION DESCRIPTORS

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
<p>they demonstrate basic knowledge of the key thematic areas: social and political history of the global and Czech media, the theory of social communication, media systems, media legislation, e.g. knowledge of the periodization of the development of human communication with an emphasis on media communication, significant personalities of world and Czech journalism (various publishers etc.);</p> <p>they demonstrate a related relevant knowledge of the general and Czech history, social theories, political systems, constitutional arrangement of the Czech Republic, the Czech language, cultural history and social psychology, e.g. the knowledge of the periodization and the main eras of the history of Czech literature (film, visual arts), the knowledge of the Czech political system;</p> <p>they demonstrate a knowledge</p>	<p>they demonstrate a broad and interrelated knowledge of the key thematic areas: social and political history of the global and Czech media, the theory of social communication, media systems, media legislation;</p> <p>they demonstrate related relevant knowledge of the basics of philosophical thinking, the general and Czech history, social theories, political systems and the Czech language, and the theory of language culture;</p> <p>they are acquainted with other socioeconomic disciplines and humanities (especially psychology, sociology, political economy and logic), while they should have a thorough knowledge of at least one of the fields (a combination of a "media" field with another field is preferred);</p> <p>they demonstrate a thorough knowledge of the basic literature on the field of media studies</p>	<p>they demonstrate a broad, deep, systematic and interrelated knowledge of the key thematic areas: social and political history of the global and Czech media, the theory of social communication, the history of the study of media and communication (including the knowledge of traditions and paradigms which constitute media as a study field and determine its internal differentiation), in comparative perspective media systems, media legislation, media policy;</p> <p>they demonstrate a comprehensive knowledge of the basic and current literature in the field, including an overview of journal production;</p> <p>they demonstrate related relevant knowledge of the current issues of philosophical thinking, the general and Czech history, social theories, cultural history and the current historiographic, sociological, linguistic and</p>	<p>they demonstrate a deep specialist and systematic knowledge of the concepts and theories that are at the forefront of knowledge in the field at the international level;</p> <p>they demonstrate a thorough knowledge of the current state of the field, obtained by continuous monitoring of the monograph and journal production;</p> <p>they demonstrate a knowledge of the thought processes, methods and methodological tools in the research of media and communication;</p> <p>they are well acquainted with the debates on methodological problems of the historical and/or theoretical study of media;</p> <p>they demonstrate an understanding of media research in an interdisciplinary context;</p> <p>they demonstrate an understanding of the system of sciences and the position of media and communication studies in the</p>

PROFESSIONAL KNOWLEDGE

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
<p>of the concepts on which the practices of relevant professions are based, and the ways in which they are applied in practice, e.g. the knowledge of the basic principles of the professional and ethical codes (journalism, advertising etc.);</p> <p>they demonstrate a knowledge of the practices required for the performance of independent professional activities in a narrow sphere of specialized occupations (e.g. regional reporter, worker in an advertising or media agency);</p> <p>they demonstrate a knowledge of the basic methods of acquisition and evaluation of data used in the given profession, e.g.</p>	<p>and, in its framework, of the key concepts and theories relating to the interpretation and criticism of the chosen career orientation;</p> <p>they demonstrate an understanding of the meaning and validity (including limitations) of data used in the given professions;</p> <p>they demonstrate a basic knowledge of approaches in the fields that dealt or deal with media (especially media studies, sociology, literary science, linguistics and history);</p> <p>they demonstrate an understanding of the role of media in individual stages of modern history, and the function of individual media professions in the given sociopolitical context;</p> <p>they demonstrate an</p>	<p>political issues;</p> <p>they demonstrate an understanding of the role of media in individual stages of the development of modern society and the history of the study of media;</p> <p>they demonstrate a thorough knowledge of the methods of analysis and interpretation of media contents, the effects and roles and behaviour of the audience of mass and network media;</p> <p>they demonstrate a knowledge of approaches to the interpretation of the socioculturally conditioned significance of media communication; they for example</p>	<p>system, and research problems of interdisciplinary nature.</p>

## PROFESSIONAL KNOWLEDGE

# MEDIA STUDIES

# EDUCATION DESCRIPTORS

## PROFESSIONAL SKILLS

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
<p>based on an assignment, they independently solve an individual task typical of the media profession for which they are training (journalist, a worker in advertising or marketing etc.); this task must be done correctly and at an adequate linguistic, cultural and aesthetic level; correctly and efficiently, they use the technical equipment and software that is standard in the given profession;</p> <p>they search and verify information needed to solve the specified</p>	<p>based on a general assignment, they process a complex task typical of the media profession for which they are training, at an adequate level (including the needed linguistic, aesthetic and cultural level), independently and in a team;</p> <p>they search, select and classify relevant information to solve the specified practical task typical of the media profession for which they are training;</p> <p>based on the acquired knowledge, they critically evaluate the result of their work or their team's;</p> <p>they use relevant terminology and, based on scientific literature, write a paper on a specified task from the field of media and communication, and present it through adequate means, e.g. seminar paper on a selected topic from the history of media;</p> <p>to a sufficient extent, they apply some of the basic research</p>	<p>using the acquired knowledge, they contribute to the identification and suggestion of a solution to a theoretical or analytical problem in the field of media and communication, using also adequate concepts, theories, tools and methods; they for example participate in the preparation of research grant projects dealing with media;</p> <p>they elaborate on a given issue from the field of media in the form of an extensive Czech professional text; they for example write an article or research report for a journal;</p> <p>with a critical insight, they use the terminology of the field and are acquainted with the terminology in a foreign language; they can for example do a commented translation of a short professional text into Czech, or proofread a text using the respective literature and terminology;</p> <p>they popularize the specified</p>	<p>they design, plan, organize and implement advanced or original research methods used during the study of media and communication, e.g. they prepare an original research grant project (long-term or team);</p> <p>they recognize nation- and culture-specific features of approaches to the study of media and communication;</p> <p>they use the terminology of fields dealing with the study of media in different languages;</p> <p>they continuously monitor and evaluate new research methods of their discipline and other disciplines, and adequately apply them in a creative way or modify them so they can be used in the field of media and communication;</p> <p>in a creative manner, they improve theories, concepts and methods within their specialization (or their research topic) and, at the same time, include</p>

Bachelor's study programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
	<p>methods used for analysis and interpretation of the behaviour of media and audience to solving a professional task on media and communication; e.g. they interpret the changes in the ratings of television programmes.</p>	<p>individual concept or phenomenon in the field of media and communication, for example, write a magazine article for the general public on the specified topic; they apply basic research methods used when studying media and communication with the objective to acquire new original information, and they plan and organize the process of a research that is to be done in a team or individually.</p>	<p>them in the existing framework of the field, e.g. they can write a research report, article or monograph chapter and submit it for review; they evaluate the practices of other authors in terms of relevance of the proposed procedures, developed methodologies, selected literature on the topic, e.g. in the form of opposing Bachelor's and Master's theses, participating in review proceedings as reviewers etc.; they are able to process the specified topic on media and communication in a didactic way and present it in class, for example in the role of teachers leading a seminar.</p>

## PROFESSIONAL SKILLS

## CHARACTERISTIC OCCUPATIONS AND RELEVANT REGULATED OCCUPATIONS

university teacher, researcher,  
journalist, media reviewer,  
creative worker and analyst in media and advertising agencies,  
worker in media management, public relations, media consultancy,  
teacher in the field of media education.

## RELATIONS TO OTHER SUBJECT AREAS

sociology,  
history,  
philosophical sciences and religious studies,  
philology,  
anthropology,  
political sciences,  
psychology,  
educational studies and pedagogy for non-teachers.

## 2.16 SOCIOLOGY

### A BRIEF DESCRIPTION OF THE CHARACTER, THEMATIC SCOPE AND HISTORY OF THE FIELD

Sociology has a relatively long tradition in the Czech lands (T. G. Masaryk, B. Foustka, significant personalities of the interwar period – I. A. Bláha, L. Fischer, J. Král, E. Chalupný); however, the interruption of its development after 1948 caused that it had to be constituted anew in 1960s. Sociology is seen as a theoretical and empirical discipline strongly oriented at analytical work and interventions in social problems (socio-technical function). After 1989, the model of development based on a single paradigm and strong ideological assumptions was abandoned: today's sociology seems to be a multiparadigmatic discipline in line with the global context. In the field of theory, there is no leading school or comprehensive system; in the field of methodology, on the other hand, there are quantitative and qualitative methods that coexist side by side. There is a strong focus on empirical research and research-based applications of sociological knowledge in various spheres (organization and industry, social policy, regional development, social pathology researches, public opinion survey, market and media survey). The process of shaping individual disciplines and hybrid fields (gender studies, counseling applications, criminology etc.) continues. Nevertheless, sociology remains a relatively uniform and internally consistent field which does not include deeper specializations or internal differentiation.

As for the employability of graduates, significant changes are taking place. Prior to 1989, “table” jobs were created for sociologists (in companies, counseling centres, the army etc.), which is rather unusual today. However, there is a number of new opportunities in research agencies and at universities where sociology often underlies the study of other fields (law, economics, social work, social policy, some medical specializations, security studies etc.). Sociologists can also work in science and research. They are also employable in management (not only personnel) and consulting.

Sociology is developed in a pluralistic manner based on a shared principle of complementarity, and its final shape is perhaps surprisingly uniform. The same goes for the way of teaching; a certain basic matrix emerged without an explicit formulation of any standards. To a certain degree, there is the fact that the departments of sociology cooperated in the area of teaching sociology as early as the 1980s, and the transition to a two-level study model finally contributed to the unification of ideas. This is not altered by the fact that in addition to traditional centers (Prague, Brno), there are more universities teaching sociology in Olomouc and Plzeň. Sociology is also taught at high schools, as a part of the complex of social sciences. Frequently, it is also included in the common basis of tertiary vocational schools. At this level, however, it cannot be thought of as a specialized study. A traditionally strong emphasis is placed on the doctoral study of sociology because the training of a fully qualified professional is a long-term matter (as regards a considerable width of the field and the mastery of practical research experience).

Sociology as a subject area is primarily focused on the man in social relations, and on society and its systems and processes. It covers groups, communities and organizations and deals with phenomena at the micro-, meso- and macro- level. It has to handle a number of very complex categories (culture, social inequality, lifestyle). A key aspect is the development of critical thinking, an ability to see matters in context and from different perspectives, reveal their latent functions and unexpected results; that is why the education must develop self-reflection and a balance between scientific objectivity and social engagement. With regard to a direct work with people, emphasis must be placed on ethical principles and value aspects including the protection of human rights, the principles of humanism,



democracy and tolerance. There is the need to combine the study with practice; what is also important is the role of specific personal experience with various communities and cultural conditions. A sociologist should be able to choose their paradigm and methods, and on the other hand they must know how to evaluate and respect restrictions and limits arising from such a choice. They should master the rules of scientific and professional communication and acquire the basic sociological values.

There is a large consensus that the preparation in sociology covers a broader socio-scientific basis (e.g. philosophy of economics, psychology, logic, foundations of management), the interpretation of sociological theory and methodology supplemented by an offer of generally optional specialized courses on the basis of professional disciplines. The theoretical block includes not only the general theory but also the history of sociology and an overview of contemporary sociological theories. The methodological block, in addition to the core subjects (methods and techniques of data collection and analysis, research design), includes statistics and the use of computer technology for data processing. Besides quantitative methodology, qualitative methods are taught.

Social systems and their ongoing processes, social behaviour at the level of the individual stakeholder. Specific social problems in different spheres of social life, but also their deep theoretical reflections. Sociological learning focuses on

- an identification and analysis of social problems or individual research topics,
- an analysis of the possible solutions to these situations,
- the implementation and ways of providing support to clients in solving the given tasks,
- monitoring the development of society and its individual segments, evaluation of programmes and measures adopted, the resulting ideas and suggestions for the development of sociology, for the possibilities of generalization, for searching new methodologies.

## PRIMARY FIELDS

- General sociology (theory),
- History of sociology and contemporary sociological theory,
- Methods and techniques of sociological research,
- Statistics,
- Psychology and social psychology,
- Demography,
- Sociology of the way of life and lifestyle, sociology of age groups,
- Social deviance and social pathology,
- Management and sociology of organizations, sociology of work,
- Sociology of public opinion, media, market and advertising,
- Family sociology,
- Economic sociology, social policy,
- Social structure, stratification and inequality,
- Sociology of culture, social anthropology.

## DEFINITION OF THE OBJECTIVES OF EDUCATION

The basic objective of education in sociology is to provide graduates with the theoretical and practical basis for active work in the field and in other areas of practice, based on

- the development of theoretical and critical thinking, an ability to thematize social problems and pose relevant questions for their deeper examination,

abilities in the area of acquiring, processing and evaluating empirical data, experience in the application of knowledge and knowledge of the alternatives of intervention in relation to the operational and strategic dimensions of decision-making processes.

**The framework objectives** of this field are primarily focused on providing a system of knowledge and skills that allows to

- understand the situation of the client (employer, students) in a broader social context,
- support clients in achieving desirable changes,
- improve the conditions for professional and personal development of the graduate, including linking theoretical education with practice,
- understand the ethical context of research and work with people (e.g. the knowledge of the ESOMAR and SIMAR codes),
- communicate adequately, even in foreign languages.

Social systems and stakeholders in various fields or spheres of social life. This conduct does not always necessarily have the character of a social problem because sociological knowledge also pursues generally cultivating objectives, and leads to an understanding of the position of the individual in relation to society, and to respecting the historical frameworks and the context of negotiations. What is important is to strengthen the elements of rationality and freedom of action, to choose optimum development strategies (at the level of an individual, social group, organization, administrative unit or society as a whole (including transnational units).

A sociologist should have the qualifications for:

- an adequate definition of relevant problems or research topics, heuristically fruitful hypotheses and preparation of research projects,
- the collection of high-quality data and a deep and versatile analysis of their content,
- a responsible assessment of the validity and reliability of the acquired sociological information and possibilities of generalization,
- a search for recommendations, the implementation and ways of client support when solving specified tasks,
- evaluation of the adopted programmes and measures,
- a continuous enrichment of knowledge and the formulation of suggestions for the development of sociology as a science (including the aspects of the accumulation of knowledge, the possibility of generalization or searching for new methodologies).

The basic system of knowledge necessary for a qualified performance of social work includes the following **subject areas**:

#### **Philosophy and ethics:**

Introduces into philosophical thinking in a way that allows for a deeper understanding of the nature of the relationship between the man and the world, and man's relationship to man, thus touching also ethical, axiological aspects. It offers an insight into the foundations of individual paradigms and describes basic categories on which methodology is based. Provides a basic understanding of the history of philosophy and explains the conditions under which sociology comes to be.

#### **Psychology:**

The field as a whole covers the basics of general psychology and personality psychology, psychology of health and psychopathology, including the issues of the cognitive equipment of the human psyche, human emotionality, motivational factors of personality development, personality typology etc. There are important social factors influencing human mind and especially the understanding of the nature of social interaction within the issues of social psychology.

#### **Demography:**

Equips students with basic knowledge of the structure of society and the important developments. Teaches students how to actively work with data.

### **General sociology:**

Usually builds on Introduction to Sociology, interprets all the basic concepts and categories in the critical confrontation of the individual authors or directions. Constitutes the basic skeleton of the field, the basic framework of thinking. In some fields, however, it offers a number of specific sociological findings; therefore, it does not fulfill only the metatheoretical or general methodological function.

### **History of sociology:**

It also forms the backbone of the programme; its importance is due to the fact that in sociology there is always a clash of paradigms, and it is therefore necessary to know the root source of different approaches or theories. It offers a basic orientation in the works of the classics of sociology (Comte, Marx, Durkheim, Pareto, Weber, Simmel, Parsons), and usually is followed by the course of contemporary sociological theory, which includes the development period of the second half of the twentieth century.

### **Methods and techniques of sociological research:**

The thematic unit in the theoretical part deals with the principles of qualitative and quantitative approaches to studying social reality. It deals with a wide range of research techniques, basic phases of empirical research; it shows the methods of statistical data processing and the principles of hypothesis testing. It also participates in research design and implementation.

### **Statistics:**

Forms a compulsory part of the methodological training. It deals with the issue of surveys, one-dimensional description of the instruments, grading of higher levels and multivariate data analysis. It is connected with the course on the use of computers and data processing programs (SPSS, Stata). Emphasis is placed on testing hypotheses and exploration, on the acquisition of skills in analytical work, and of course on a deep understanding of the principles.

### **Professional practice:**

It supports the development of professional competencies needed for the performance of sociological work in the respective types of institutions and organizations, leads to a reflection of practical experience and self-reflection.

### **Sociology of the way of life and lifestyle:**

This course allows students to explore some topics of general sociology and discuss them in a new context - for example, the intersection of work and leisure, selected problems of sociology of culture, media and mass communication, sociology of age groups (youth, old age), sociology of fashion, tourism, etc.

### **Social pathology:**

The thematic unit of social pathology (social deviance) belongs in the offer of basic, though usually optional specialization or extension applications. It relates to social phenomena, behaviour and actions that disturb and threaten the social functioning of individuals, groups and society. It is based on an interpretation of the basic concepts and context and analysis of various theories of social deviance; the next section focuses on various forms of social deviance and social pathology. An alternative or complement to the block can be found in the research of social problems or social exclusion.

### **Management and sociology of organizations:**

In most programmes there are lectures in management theory, which can be further expanded to

specializations in the field of human resources, but also to specialist counseling (change management). In this block of instruction, there are to be included some basic topics related to work, job satisfaction and motivation, exploring the social climate or culture of the organization.

**Sociology of public opinion, media, market and advertising:**

In terms of graduate employment, it is a typical specialization which prepares students for future work in the agencies. It is based on the theoretical definition of the cornerstones (public opinion, but also marketing, advertising, public relations); in parallel, it demonstrates the typical methodologies of the analysis of individual themes or research assignments.

**Family sociology:**

It is usually taught as a separate course, the importance of which increases where sociology focuses on issues of social policy.

**Economic sociology:**

It also complements the focus in the areas of social policy. It analyzes the phenomena of employment, household income, housing, economic strategies of stakeholders.

**Sociology of culture:**

It usually receives the optional specialization status; combined with social anthropology, it can perform the function of a broader basis. It touches upon the issue of ethnic relations, subcultures, but can also focus on culture in the narrower sense of the word or on the manifestations of mass culture.

## GENERAL PROFILE OF GRADUATES

**The Bachelor's programme** is designed with regard to the practical needs of graduates, who are employable especially in the field of marketing research, public opinion survey and market survey, or in advertising agencies. In the corporate sector, graduates can work with human resources or public relations, in institutions of tripartism and collective bargaining. Graduates can also work in public administration, especially in areas where there is the need for a thorough knowledge of the broader context (labour office and employment policy, social policy). The training emphasizes the ability of the graduate to acquire and evaluate empirical data, perform the analysis of specific problems and present practical recommendations as regards solutions.

**The Master's programme** complements these basics with advanced methods of analysis and further specializations. There is also a training for leading independent research projects and for a highly qualified expert or creative scientific activity. At some departments, it is possible to intensify the teacher training. Graduates of sociology can work on scientific and research, educational and organizational and operational tasks. They can be employed in the business sphere as managers, teachers or advisors. They primarily work in social and territorial development (within businesses, municipal authorities, labour offices etc.) and in agencies for surveying public opinion and the market. They are prepared to work as middle managers in companies. They can work in mass media (research departments and editorial work). They can also be employed in the state apparatus and social and educational organizations.

In relation to the achieved level of education, graduates will be employable in particular as:

- executives at middle or senior management in organizations (manufacturing, governmental and non-profit),
- analytic researchers and workers in social institutions, at the Master's degree as highly qualified and specialized experts (such as organizational development, criminology, marketing),

# EDUCATION DESCRIPTORS

Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates		
<p>they demonstrate an understanding of the subject of sociology, its structure and functions, with the knowledge of the differences from other social sciences;</p> <p>they demonstrate a broad knowledge of the basic sociological concepts;</p> <p>they demonstrate a broad knowledge of the history of sociology and its contemporary developmental trends;</p> <p>they demonstrate a thorough knowledge of the basic literature on the field and, in its framework, of the key theories relating to the interpretation and criticism of the chosen career orientation;</p> <p>they have mastered the basic data collection methods, such as the quantitative type of research (survey), qualitative methods, the use of documents;</p> <p>they have mastered the basic methods of data analysis, such as statistical description, hypothesis testing, qualitative analysis;</p> <p>they demonstrate their ability of selection and critical evaluation;</p> <p>they demonstrate a broad knowledge of the general theory and partial sociological theories;</p> <p>they demonstrate an understanding and critical evaluation of the social conditioning of sociological knowledge;</p>	<p>they demonstrate a broad and deep knowledge and understanding of the sociological theories, concepts and methods corresponding to the current state of knowledge in the Czech Republic and abroad;</p> <p>they have an extensive and systematic knowledge of the sociological theory and selected sectoral disciplines;</p> <p>they demonstrate a comprehensive knowledge of the basic and current literature in the field, including an overview of specialized, mainly journal production;</p> <p>they demonstrate a knowledge of various trends and styles of thinking including a critical evaluation of their sources and methodological implications;</p> <p>they manage advanced data analysis methods for quantitative and qualitative research, such as tasks in the field of regression analysis, factor analysis, typologization procedures, modeling;</p> <p>they demonstrate an understanding of the assumptions, conditions and restrictions of the creation and use of sociological knowledge;</p> <p>they demonstrate a knowledge of the approaches of related disciplines, and the ability of interdisciplinary collaboration.</p>	<p>they demonstrate a deep understanding and systematic knowledge of the theories, concepts and methods that represent the current state of knowledge at the international level;</p> <p>they are well acquainted with the system of sciences and their institutions, including a knowledge of the international research networks;</p> <p>they demonstrate a deep and systematic knowledge and understanding of the area of study and of the scope of the field corresponding to the current state of knowledge;</p> <p>they are well acquainted with the system of sciences and their institutions, including a knowledge of the international research networks;</p> <p>they are able to propose and use advanced research methods in the discipline in such a way as to extend the existing knowledge in the discipline through original research;</p> <p>they are able to develop and evaluate the theories, concepts and methods of the field including the definition of new fields or research trends or their inclusion in a wider area;</p> <p>they demonstrate an understanding of the system of scholarly and scientific disciplines and research problems at the intersection of disciplines;</p>

Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates		
<p>they manage the scientific methodology and demonstrate an ability to generate new knowledge, for example, in addition to research projects, this can include a highly motivated professional expertise or advisory or evaluation projects</p> <p>they are able to elaborate the solved problem into the form of an extensive foreign-language scientific text (research reports, journal outputs, monograph chapters), for example regular publications, editorial work</p> <p>they are able to prepare a qualified research project aimed at obtaining a grant</p> <p>they can competently present the results of their research or expert activities in various forums</p> <p>they are able to develop and evaluate theories, concepts and methods in the discipline including the demarcation of disciplines or their extension into broader areas</p> <p>they know how to build active scientific contacts</p> <p>they are able to prepare and implement a long-term cycle of pedagogical activity</p> <p>they demonstrate a thorough knowledge of the current state of the field, obtained by</p>	<p>they manage to draw on specialist knowledge in order to work independently in delimiting, naming and, in a creative manner, devising a solution to a theoretical or practical problem in the discipline</p> <p>they can well present the results of their work in relation to different types of audiences</p> <p>they are able to independently solve complex problems based on an integration of theoretical and empirical methods of the discipline, such as studies aimed at solving specific social problems of regional or local nature, opinion polls, market surveys</p> <p>they are able to elaborate the solved task into an extensive scientific text</p> <p>they can acquire new original information, evaluate it and maintain it with regard to its future utilization using the latest technological procedures; in addition to such research studies, these may be justified counseling interventions or partial expert opinions</p> <p>they are able to formulate a research hypothesis grounded in theory and propose a research plan for its verification</p> <p>they demonstrate the ability to design</p>	<p>they manage the scientific methodology and demonstrate an ability to generate new knowledge, for example, in addition to research projects, this can include a highly motivated professional expertise or advisory or evaluation projects</p> <p>they are able to elaborate the solved problem into the form of an extensive foreign-language scientific text (research reports, journal outputs, monograph chapters), for example regular publications, editorial work</p> <p>they are able to prepare a qualified research project aimed at obtaining a grant</p> <p>they can competently present the results of their research or expert activities in various forums</p> <p>they know how to build active scientific contacts</p> <p>they are able to prepare and implement a long-term cycle of pedagogical activity</p> <p>they demonstrate a thorough knowledge of the current state of the field, obtained by continuous monitoring of the monograph and journal production</p>

## PROFESSIONAL SKILLS

# SOCIOLOGY



EDUCATION DESCRIPTORS

	Bachelor's study programme	
	Study programme graduates	
Professional skills	<p>they manage the scientific methodology and demonstrate an ability to generate new knowledge, for example, in addition to research projects, this can include a highly motivated professional expertise or advisory or evaluation projects</p> <p>they are able to elaborate the solved problem into the form of an extensive foreign-language scientific text (research reports, journal outputs, monograph chapters), for example regular publications, editorial work</p> <p>they are able to prepare a qualified research project aimed at obtaining a grant</p> <p>they can competently present the results of their research or expert activities in various forums</p> <p>they are able to develop and evaluate theories, concepts and methods in the discipline including the demarcation of disciplines or their extension into broader areas</p> <p>they know how to build active scientific contacts</p> <p>they are able to prepare and implement a long-term cycle of pedagogical activity</p> <p>they demonstrate a thorough knowledge of the current state of the field, obtained by continuous monitoring</p>	<p>they manage the ability to generate research project expertise or ad</p> <p>they are able to an extensive foreign-language journal outputs, publications, e</p> <p>they are able to obtaining a grant</p> <p>they can competently expert activities</p> <p>they know how</p> <p>they are able to pedagogical activities</p> <p>they demonstrate field, obtained journal products</p>



## 2.17 MATHEMATICS AND STATISTICS

### Doctoral study programme

#### A BRIEF DESCRIPTION OF THE CHARACTER, THEMATIC SCOPE AND HISTORY OF THE FIELD

Mathematics can be characterized as a field which deals with the description of quantitative and spatial relations, the creation of abstract entities and the search for laws among them. We see it primarily as a tool to describe certain phenomena or as an idealized model of real objects or systems.

The emergence of mathematics was primarily due to the need to solve practical problems, such as the measurement and division of land, civil engineering, or the identification of time. The history of mathematics dates back to prehistoric times, when the first abstract mathematical concepts - natural numbers - originated. As a science in the modern sense of the word, mathematics was established in ancient Greece. The principles of deductive construction of mathematical theory were formulated, and according to these principles, geometry was established.

The most famous book on such principles is Euclid's *Elements*. The next stage of the rapid development of mathematics was the early modern period, when Descartes established the foundations of analytical geometry. After that, thanks to the work of Newton, Leibniz, Euler, Gauss and other mathematicians, significant results were achieved in the field of analysis, primarily through laying the foundations of the differential and integral calculation. The calculation of probability developed throughout the 17th and 18th centuries. In the 19th century, modern algebra was formed in the works of Abel, Galois, Kronecker, Hilbert and other authors. Another important milestone in the history of mathematics was the turn of the 19th and 20th century, when the theory of sets was established and mathematical logic and mathematics were formalized and axiomatized. In the 20th century, mathematics was divided into dozens of relatively independent disciplines, and in the second half of the 20th century its development was strongly influenced by the development of computer technology.

The wide range and diversity of mathematics is considerable nowadays, as mathematics includes many very different fields that require appropriate specializations; among the basic mathematical disciplines are above all the following: algebra, geometry, discrete mathematics, mathematical analysis, numerical mathematics, probability and mathematical statistics, the theory of numbers, the theory of sets, and mathematical logic.

Mathematical fields are currently offered at 14 faculties of the Czech universities. At the Bachelor's level, the classical parts of mathematics, especially mathematical analysis and algebra, are represented in practically all the study plans. At the Master's level, a number of specializations can be studied, and their number and to a certain extent also content differ at various universities.

Mathematics is one of the basic tools used in a number of other subject areas. It is therefore taught not only in other scientific subject areas, but also within most technical and economic fields. Mathematics is of consequence in some social sciences as well.

The subject of the mathematical education generally is an acquisition of a tool and language which will enable one to describe phenomena, real objects, systems or laws, and model real-world situations. Mathematics thus plays a vital role in the process of education, and is used in virtually all areas of human life.

#### PRIMARY FIELDS

The most important component in the education of mathematics is an emphasis on the development of logical thinking and abstraction; the building blocks of mathematical education should usually cover at least the basic knowledge of these disciplines and fields: algebra, geometry, discrete mathematics, mathematical analysis, numerical mathematics, probability and mathematical statistics, econometrics, the theory of sets and mathematical logic, financial and actuarial mathematics, mathematical methods of information security, mathematical modeling and mathematical structures.

## DEFINITION OF THE OBJECTIVES OF EDUCATION

The aim of education in mathematics is particularly to train individuals who are able to creatively and logically approach problem solving. Specialized mathematical education at universities (above all at the faculties of mathematics and physics and natural sciences) is primarily directed at training scientists. However, due to the abilities of abstraction, logical reasoning and creative solutions to problems, a graduate of mathematics should be able to know and find application in such issues that are dealt with in financial institutions, insurance companies, institutions requiring data processing and analysis, public administration, etc.

## GENERAL PROFILE OF GRADUATES

Graduates of the **Bachelor's study programme** will acquire the general basic knowledge of the mathematical disciplines, they have a developed abstract thinking and an ability to approach the formulation and solution of problems in a creative way. They are ready to create the basic mathematical models of real phenomena and practical processes. They can work as associates of technicians, economists or other experts in solving specific problems.

Graduates of the **Master's study programme** will acquire a more extensive knowledge of the mathematical disciplines so that they are capable of an independent and complex solution of problems in the given field, including the design of a suitable mathematical model. They will successfully complete their thesis, the results of which will be fit to be published.

Graduates of the **doctoral study programme** are able to formulate new complex problems and find original solutions to them. They actively participate in research activities, and present their results at workshops and conferences, as well as in the international context, and publish them in respected scientific journals.

Bachelor's study programme	Master's study programme	Doctoral study programme
PROFESSIONAL KNOWLEDGE		
<p>they demonstrate the knowledge and understanding of the basic areas of mathematics (such as mathematical analysis, algebra, the theory of sets, discrete mathematics, numerical mathematics, mathematical statistics and probability, the theory of estimation and hypothesis testing, the theory of numbers, differential and integral calculation, ordinary differential equations, linear algebra, mathematical logic and the theory of sets, combinatorics, recurrence and algorithms, graphs, basic numerical methods);</p> <p>they demonstrate the knowledge of basic information and communication technologies;</p> <p>they demonstrate the knowledge of the basic principles of mathematical thinking and proof of techniques, such as propositional calculus, axiom, theorem, proof;</p> <p>they demonstrate the basic knowledge of the procedures and methods of scientific work;</p> <p>they demonstrate the acquisition of knowledge that enables a successful entry into the Master's study programme or is directed at the practical needs in the case of professionally-oriented Bachelor's degree;</p> <p>they demonstrate an understanding of the</p>	<p>Study programme graduates</p> <p>they demonstrate a broad knowledge and understanding of the key areas of mathematics;</p> <p>they demonstrate a deep knowledge in their field of specialization, such as mathematical analysis, algebra, numerical mathematics, mathematical statistics, probability, financial and actuarial mathematics;</p> <p>they demonstrate a deep knowledge and understanding of the theories, concepts and methods corresponding to the current state of knowledge in at least one of the mathematical disciplines;</p> <p>they demonstrate an understanding of the</p>	<p>they demonstrate a deep knowledge and understanding of the latest theories, concepts and methods in the given mathematical discipline at the international level;</p> <p>they demonstrate an ability to work under expert guidance on the research of problems at the frontiers of the current knowledge of mathematics and mathematical statistics;</p> <p>they demonstrate the ability to formulate a scientific work in the English or Czech language based on their own original results; for example, one of the conditions for a successful completion of the study is a publication of the results in a journal recognized by the professional community;</p> <p>they demonstrate an understanding of the system of scholarly and scientific disciplines and research problems at the intersection of disciplines;</p> <p>they demonstrate the ability of critical analysis, evaluation and formulation of new, complex ideas even in areas outside</p>

# EDUCATION DESCRIPTORS

# EDUCATION DESCRIPTORS

Bachelor's study programme	Master's study programme	Doctoral study programme
	Study programme graduates	
<p>they are able to use theoretical knowledge and standard methodology for solving a generally given problem;</p> <p>they can design and implement a simple computer application for practical problem solving in the field;</p> <p>they are able to work on relatively easy and independent positions or act as team members with separate responsibilities for specific tasks;</p> <p>they are able to collect and interpret relevant information and formulate conclusions;</p> <p>they know how to organize, prepare and present the obtained information in the written and oral form in the Czech language;</p> <p>they are able to obtain information from sources in the English language;</p> <p>under expert guidance, they are able to solve partial problems in the research work.</p>	<p>they are able to draw on specialist knowledge in order to work independently in delimiting, naming and, in a creative manner, solving technical problems in the given mathematical discipline;</p> <p>they can independently elaborate on a complex topic in the field, for example in the form of a seminar paper;</p> <p>they are able to work independently or as members of interdisciplinary teams with a responsibility for the given area of work;</p> <p>they are able to use the knowledge in other fields than mathematics, such as economics, natural science;</p> <p>they are able to deal in an independent and creative fashion with a complex problem through the use of the selected theories, concepts and methods in the discipline so that the results are fit to be published;</p> <p>they are able to use information from a variety of disciplines for the formulation of conclusions which they are able to clearly justify to the professional and general public;</p> <p>they can use the knowledge of selected methods and concepts together with an independent study of literature to solve the problems from other areas of mathematics than the</p>	<p>they are able to carry out an independent and original research that can be published in an international journal and goes beyond the current boundaries of knowledge in the field of mathematics;</p> <p>they are able to follow the latest scientific literature and develop their research based on the literature;</p> <p>they are able to critically evaluate the results of scientific work, including their own;</p> <p>they can develop new methods and use them to solve problems, they can also determine the strategy of solving a problem.</p>

## CHARACTERISTIC OCCUPATIONS AND RELEVANT REGULATED OCCUPATIONS

Qualified graduates of the subject area of mathematics can work in the field of research, e.g. at the Academy of Sciences of the Czech Republic, and as mathematics teachers at universities. Due to their ability of an abstract and creative solving of problems, the graduates should be able to work as analysts in the state administration, financial institutions, insurance companies, institutions that need to process and analyze data, programming companies, etc.

## RELATIONS TO OTHER SUBJECT AREAS

A number of abstract concepts created by mathematics serve to explain or better understand and describe the real-world concepts, and thus enable the specification and development of the concepts and ideas of the given field. Mathematics is thus a necessary basis for many areas not only within the natural sciences, but also within most technical and economic fields. Some mathematical disciplines, such as logic or mathematical statistics, can well be used in a number of social sciences, for example the law.

## 2.18 PHYSICS

### A BRIEF DESCRIPTION OF THE CHARACTER, THEMATIC SCOPE AND HISTORY OF THE FIELD

The definition of the concept of physics is difficult. The following definition (Wikipedia): “it is the general analysis of nature, conducted in order to understand how the world and universe behave” is general enough to be able to encompass the current physics, but in fact covers all natural sciences. An apposite definition may be found in the very title of Isaac Newton’s elementary work, “*Philosophiæ Naturalis Principia Mathematica*”, since it emphasizes the basic method of physics, that is a mathematical expression of the laws of nature. On the other hand, the attempt to define physics might be unnecessary because it is generally known what physics includes. The emphasis on the mathematical description is important in order to justify why physics or the physical sciences include some boundary disciplines or their parts (meteorology and climatology, biophysics, quantum chemistry).

Historically, the development of physics was closely related to that of mathematics, and a number of famous personalities appeared in the history of both mathematics and physics (Euler, Lagrange, Gauss...), with physics being the main source of inspiration to mathematics. In the 19th century, the physicists and the chemists together created the atomic theory. To a certain extent, the same goes for philosophy - a number of famous personalities in the history of “pure” philosophy, such as Kant, Bolzano or logical positivists, had a mathematical and physical education and wrote original works in physics or mathematics.

The curricula maintain the traditional division of physics into mechanics, optics, electromagnetism, atomic and molecular physics, physics of condensed substances, etc., even though it is not advisable to use such classifications in scientific research any longer. Astronomy has a specific position. Throughout the history of physics, the universe represented an important laboratory for testing physical hypotheses, which (to an even greater degree) applies to the today’s astrophysics or cosmology and the science of the universe as a whole.

In the Czech Republic, physics can be studied at a number of universities. The curricula are similar at the Bachelor’s level. At the Master’s level, physics can be studied in a number of fields and specializations, the number and to a certain extent also content of which differ at various universities.

However, physics is also the foundation or auxiliary science of a number of other subject areas. It is taught in most technical fields, either under the explicit name of “physics”, or as a part of technical courses, within chemistry etc. The boundaries of physics are, with regard to these other disciplines, rather blurred.

The subject of physical education is to provide a broad knowledge of both the traditional and modern parts of physics that can be utilized by the graduate either in scientific research or in practical applications. With respect to the historical role of physics and mathematics in general human knowledge, however, this type of education also has a philosophical aspect, which is sometimes implicitly emphasized in technical courses. In the structure of education, these aspects play an irreplaceable role, since the scientific and mathematical education is usually absent from the study of philosophy, despite its importance for the general theory of learning.

### PRIMARY FIELDS

The most important components of the subject area Physics are the following:

- mathematical basis, its wide range being comparable to that of a graduate of the field of mathematics, and its depth surpassing the knowledge of a graduate of technical fields;
- the basic knowledge of the main physical theories based on the classical and quantum description;
- training in practical laboratory skills and techniques of physical measurements;
- an ability to evaluate experimental data, which requires the knowledge of computers including the knowledge of the basics of programming and numerical solution of mathematical tasks.

Students of the programme or fields of applied physics learn the links to various areas of applied research.

These components are represented in the individual fields of the study programme Physics to different degrees (the graduate of theoretical physics has a deeper mathematical basis and less experience with practical laboratory measurements than an experimental physicist), but the curriculum of every physicist must include all of them; the same goes for the graduates of boundary fields such as meteorology, geophysics or biophysics.

On the other hand, it is not possible to choose certain “primary” fields out of the study fields (further differentiated by specializations). The fields originated around groups of successful scientists via natural development. A high-quality scientific output of these groups was the basic condition for their accreditation. It is not so important to what extent the individual fields cover the current trends of the global physical research due to the fact that the way of educating physicists guarantees the graduates a great deal of flexibility.

## DEFINITION OF THE OBJECTIVES OF EDUCATION

Specialized physical education at the Czech universities (the faculties of mathematics and physics and natural sciences) is primarily directed at training scientists. Physical education at other universities or higher technical schools represents the necessary foundation for studying the given field (chemistry, technical sciences, medicine, etc.). For a number of disciplines, physics is the necessary theoretical foundation. There is also another aspect, that is, a number of modern devices are based on the latest physical findings (for example measurements by means of nuclear magnetic resonance in medicine), and their effective use requires a certain knowledge of physics.

## GENERAL PROFILE OF GRADUATES

Graduates of the **Bachelor’s study programme** are able to solve common problems using the standard methodology, to work safely in the laboratory including a responsible assessment of the risks of such work, to collect and evaluate data including the results of their own experimental measurements with an understanding of all the restrictions related to the accuracy of data measurement, to communicate ideas, problems and their solutions to the professional public. They should successfully complete a research project the results of which do not have to be fit to be published yet; they can work on positions corresponding with this level of education, including jobs in the industry.

Graduates of the **Master’s study programme** are in addition able to apply their knowledge when solving new physical problems, have successfully completed a research project the results of which are potentially fit to be published.

Graduates of the **doctoral study programme** are capable of critical thinking when formulating new,



# EDUCATION DESCRIPTORS

Bachelor's study programme	Master's study programme	Doctoral study programme
	Study programme graduates	
<p>they demonstrate a knowledge of the mathematical basis in a sufficient scope enabling a deep understanding of classical and modern physics (differential and integral calculus of the real and complex domain, matrix algebra, linear algebra, distribution, ordinary and partial differential equations, special functions); they understand the logical construction of mathematics and the basic control methods of mathematical proofs;</p> <p>they demonstrate a knowledge of general physics and the experimental methods on which it is based (classical mechanics, electricity and magnetism, kinetic theory of gases, structure of substances, optics, physics of atoms, nuclei and elementary particles);</p> <p>they demonstrate a knowledge of theoretical physics on a deeper mathematical basis (analytical mechanics, electromagnetic theory, quantum mechanics, thermodynamics and statistical physics);</p> <p>they have mastered the basics of physical measurements and processing of data from different areas of physics, obtained in the practices related to the course of general physics;</p>	<p>they demonstrate a detailed knowledge within a field of physics (astronomy and astrophysics, biophysics and chemical physics, condensed matter physics, geophysics, physics of materials, meteorology and climatology, physics of surfaces and interfaces, nuclear and subnuclear physics, mathematical modeling, optics and optoelectronics, theoretical physics);</p> <p>they demonstrate a broad knowledge of the mathematical basis acquired at the Bachelor's degree;</p> <p>in the case of experimental fields, they demonstrate the knowledge of cutting edge research methods, grounded in a deeper theoretical basis; in the case of theoretical fields, they demonstrate the knowledge of advanced mathematical and computer techniques;</p> <p>they understand the broader context of their field within physics as a whole;</p> <p>they have a deeper understanding of the issues addressed in their thesis;</p> <p>they are able to apply their knowledge in scientific work and technical problems arising in the practice.</p>	<p>they acquire a deep knowledge in a particular area of physics that goes beyond the knowledge of the Master's degree;</p> <p>they demonstrate an ability to work under expert guidance on the research of problems at the frontiers of the current scientific knowledge of physics;</p> <p>one of the conditions for completing the doctoral study programme is to publish in a reviewed international journal;</p> <p>in the case of experimental fields, they demonstrate the ability to work with the latest research methods and to participate in their development; in the case of theoretical fields, they demonstrate the ability to develop the mathematical methods needed for the solution of the current physical problems;</p> <p>they have a deep knowledge of physics closely related to their doctoral thesis, and a wide insight into the current physics as a whole including its links to other subject areas;</p> <p>they are able to apply their knowledge to scientific work, technical problems arising in the practice and in areas outside physics, where it is possible to apply the methodology of physical research (such as chemistry,</p>

PROFESSIONAL KNOWLEDGE		
Bachelor's study programme	Master's study programme	Doctoral study programme
<p>they demonstrate experimental skills and the ability to perform demanding physical measurements;</p> <p>they demonstrate the knowledge of profiling courses focused either on the follow-up Master's study or leading to practical needs in the vocational studies;</p> <p>they demonstrate a basic knowledge of programming and computational methods;</p> <p>they understand the role of mathematics in the physical image of the world, the broader context of the position of physics in science and general culture, and the links of physics to the technical and practical applications.</p>	<p>Study programme graduates</p>	<p>biology, environmental protection and other issues close to physics).</p>

# PHYSICS

# EDUCATION DESCRIPTORS

Bachelor's study programme	Master's study programme	Doctoral study programme
	Study programme graduates	
<p>they are able to work in laboratories of the elementary and applied research under supervision;</p> <p>they are able to work with computers, evaluate the empirical data and create programs for data processing;</p> <p>they are able to use their knowledge in other fields than the physical research (for example in the analysis and processing of data in finance and other areas that use the computer methods);</p> <p>they can work independently with scientific literature and effectively search for data needed for the solution of specific problems;</p> <p>under supervision, they can work in laboratories of the elementary and applied research;</p> <p>they have a deep understanding of modern physical devices (for example diagnostic and therapeutic devices in medicine).</p>	<p>they are able to work independently on research tasks in laboratories of the elementary and applied research;</p> <p>they manage complex tasks when working with computers;</p> <p>they are able to use their knowledge in other fields than the physical research (for example in the analysis and processing of data in finance and other areas that use the computer methods);</p> <p>under supervision, they can examine problems in the most advanced areas of the contemporary physics;</p> <p>they can follow the latest scientific literature and develop research based on the obtained information;</p> <p>they are able to report on and discuss their results in a foreign language;</p> <p>based on an independent study of literature, they are able to orient quickly in other fields</p>	<p>they are able to work independently and solve scientific challenges of applied research;</p> <p>they are able to cooperate in teaching students at the Bachelor's and Master's levels;</p> <p>they are able to use their knowledge in other fields than the physical research;</p> <p>they are able to improve the results of their work so that they can be published in international journals;</p> <p>they can follow the latest scientific literature and develop research based on the obtained information;</p> <p>they are able to transfer research methods from other physical fields to their studied issue;</p> <p>based on an independent study of literature, they are able to orient quickly in other fields of physical research.</p>

complex problems, are able to develop and use the methods to solve new problems, determine procedures, plans, strategies for solving such problems, are able to communicate the subject of their expertise to the professional and general public alike, present the technological and scientific advancement to the society.

## 2.19 CHEMISTRY

### A BRIEF DESCRIPTION OF THE CHARACTER, THEMATIC SCOPE AND HISTORY OF THE FIELD

Chemistry systematically studies the properties, behaviour, composition, structure and reactivity of the matter at the atomic and molecular level. Its beginnings were particularly related to the development of technological procedures, such as the production of metals from ores, the production of alloys (bronze), ceramics, fermentation producing beer and wine, dyeing, the production of cheese, glass and soap, the extraction of plants and subsequent production of medicines or aromatic substances, etc. Modern chemistry studied at schools around the world dates back to the 18th century and its foundations are linked to the names of Antoine Lavoisier, John Dalton, Friedrich Wöhler and others. Chemistry was traditionally divided into organic chemistry (the chemistry of substances containing carbon), inorganic chemistry (the chemistry of all other substances), physical chemistry (the application of physical laws to chemical phenomena) and analytical chemistry (identification of substances and their composition), while the nature of chemistry itself implies that the boundaries between the individual fields, as well as the boundaries between chemistry and other subject areas, are very blurred.

Chemical study programmes are accredited at 22 faculties of the Czech universities. After completing the transition to a structured study, the historically given wide scope of the five-year chemistry programmes was reflected particularly into the setting of the first cycle, the Bachelor's study programmes. These programmes nowadays show a significant overlap with other areas, e.g. the study programmes of chemical biology, chemical physics, chemical engineering, chemistry and technology of environmental protection, chemical and processing engineering, chemistry and technology of food, etc. The universities are apparently aiming at addressing applicants with a clearly defined idea of their future careers, as well as at eliminating possible prejudices on the part of some less focused applicants by omitting the name of chemistry altogether (for example the Bachelor's study programme Synthesis and Production of Pharmaceuticals). Generally it may be said that the width and depth with which the key chemical topics are discussed in the individual Bachelor's study programmes may differ according to the specifics that are included in such a study programme. However, employers of the graduates of study programmes including chemistry in their names require the graduates to have at least the minimum standard knowledge of chemistry that is connected with this subject area. In the case of doctoral study programmes, in addition to the traditional programme Chemistry, there are some programmes which are very narrowly defined (clinical biochemistry, pharmaceutical chemistry, bioorganic chemistry, nuclear chemistry).

The professional character of the study of chemistry takes effect in a number of study programmes within which the universities include a practical part in cooperation with industrial partners. The study includes a chemical project corresponding with the requirements of the school and the industry.

The subject of the chemical education is to provide the information about the current state of knowledge in this discipline, the methodological procedures of further development including the perception of the broader context, and last but not least, to teach students to use this knowledge in a responsible and ethical manner.

### PRIMARY FIELDS

The most important components of the subject area Chemistry are the knowledge of and experience with the ground stones of this area, and inorganic, organic, physical, analytical and biological chemistry, which at the same time requires a basic knowledge of mathematics, physics and to a certain extent also biology. In addition to these basic components, there is adequate knowledge of other fields necessary in order to be successful in one of the more narrowly defined specializations, such as the above mentioned chemical engineering, computational chemistry, nuclear chemistry, etc.

## DEFINITION OF THE OBJECTIVES OF EDUCATION

The objective of education in the area of chemistry is to train competent and creative individuals who can work either in strictly chemical professions and biochemistry, or in related fields, such as bioengineering, pharmacology, medicine, agriculture, education or the state administration. This type of education is to increase awareness of the world at the molecular level and help to understand the physical behaviour of the matter; it is also supposed to set up lifelong abilities, knowledge and skills including the capability of logical thinking, clear articulation of ideas and critical assessment of experimental data and scientific literature, and to develop the personal qualities of the student, such as organizational skills and time management. The graduate of chemistry should be able to set up and operate various systems and devices used in chemistry and biochemistry, to obtain and interpret data via these devices, to understand and evaluate the risks related to chemistry, and to work in a safe manner.

## GENERAL PROFILE OF GRADUATES

Graduates of the **Bachelor's study programme** are able to solve common problems using the standard methodology, to work safely in the laboratory including a responsible assessment of the risks of such work, to collect and evaluate data including the results of their own experimental measurements with an understanding of all the restrictions related to the accuracy of data measurement, to communicate ideas, problems and their solutions to the professional public. They should successfully complete a research project the results of which do not have to be fit to be published yet; they can work on positions corresponding with this level of education, including jobs in the chemical industry. Given the dominant role of the English language in this field, the graduate should be able to work with such scientific literature and also communicate in English.

Graduates of the **Master's study programme** are in addition able to apply their knowledge when solving new chemical problems, have successfully completed a research project the results of which are potentially fit to be published, are able to take over the responsibility for the performed laboratory activities, and to evaluate and present the obtained results.

Graduates of the **doctoral study programme** are capable of critical thinking when formulating new, complex problems, are able to develop and use the methods to solve new problems, determine procedures, plans, strategies for solving such problems, are able to communicate the subject of their expertise to the professional and general public alike, present the technological and scientific advancement to the society.

# EDUCATION DESCRIPTORS

PROFESSIONAL KNOWLEDGE		
Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates		
<p>they demonstrate knowledge and understanding of the primary fields, i.e. organic, inorganic, physical, analytical and biological chemistry and chemical engineering; the knowledge and understanding are based on the necessary basics of mathematics, physics and biology, for example chemical terminology, conventions, units; the main types of chemical reactions and their characteristics; the characteristic properties of elements and their compounds including organometallic compounds, the relations within the periodic table. The structure of compounds and elements, stereochemistry; the character, behaviour and changes of the functional groups in the molecules of organic compounds, formation of bonds between atoms;</p> <p>they demonstrate the basic knowledge of some of the more narrowly defined fields of this area, such as macromolecular chemistry, chemistry of food, chemistry of materials, nuclear chemistry, quantum chemistry etc., for example the principles of quantum mechanics and their application to the description of the structure and properties of atoms and molecules;</p> <p>they demonstrate adequate knowledge of the</p>	<p>they demonstrate a broad knowledge and understanding based on the knowledge acquired in the Bachelor's study programme, which enables the development of original procedures and methods within the implemented research;</p> <p>they demonstrate a deep knowledge in the field of their specialization;</p> <p>they demonstrate the acquisition of knowledge that enables a successful entry into the doctoral study programme;</p> <p>they demonstrate a deep knowledge and understanding of the theories, concepts and methods corresponding to the current state of knowledge in at least one of the chemical disciplines;</p> <p>they demonstrate an understanding of the</p>	<p>they demonstrate a deep knowledge and understanding of the latest theories, concepts and methods in the studied discipline at the international level;</p> <p>they demonstrate the ability to formulate a dissertation thesis in the English or Czech language based on the published results in impacted journals;</p> <p>they demonstrate an understanding of the system of scholarly and scientific disciplines and research problems at the intersection of disciplines;</p> <p>they demonstrate the capability of critical</p>



Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates		
<p>relevant theories and methods of the elementary fields, for example the characteristics of different states of matter, theories applied to the description of these states; the principles of thermodynamics and their application in chemistry; the kinetics of chemical changes, catalysis, mechanistic interpretation of chemical reactions; the principles and procedures used in chemical analysis, the characterization of chemical compounds; the elementary techniques of the study of structure, spectroscopic methods;</p> <p>they demonstrate the basic knowledge of the procedures and methods of scientific work;</p> <p>they demonstrate the acquisition of knowledge that enables a successful entry into the Master's study programme;</p> <p>they demonstrate an understanding of the context of chemistry and health and nutrition of people and animals, the environmental risks, sustainable development, for example the relations between the structure of compounds and their properties; biomolecules, their structure and reactivity, the chemistry of important biological processes.</p>	<p>possibilities and conditions for, and limitations on, the use of findings in related disciplines.</p>	<p>analysis, evaluation and formulation of new, complex ideas.</p>

PROFESSIONAL KNOWLEDGE

# CHEMISTRY

# EDUCATION DESCRIPTORS

Bachelor's study programme	Master's study programme	Doctoral study programme
	Study programme graduates	
<p>they are able to use theoretical knowledge, equipment and standard methodology to obtain usable experimental results in the laboratory or operating conditions;</p> <p>they have gained practical skills in laboratory exercises in the basic disciplines of chemistry;</p> <p>they can work safely in the laboratory, can independently assess the risks associated with the work;</p> <p>as qualified graduates, they are able to find a regular employment, including positions in the chemical industry;</p> <p>they are able to collect and interpret relevant data and formulate conclusions respecting the scientific and ethical standards of the field;</p> <p>they are able to obtain information from sources in the English language;</p> <p>they know how to organize, present and communicate the obtained information as well as ideas, problems and possible solutions to professionals, in the written and oral form in the Czech language;</p> <p>they are able to understand and explain to the informed public the accuracy of experimental data and all the limitations arising therefrom;</p>	<p>they are able to draw on specialist knowledge in order to independently identify and creatively solve as yet unsolved theoretical or practical issues in the field;</p> <p>they are able to independently elaborate on a complex topic in the given field in writing; they can find a job as a chemical expert in the chemical or related industry, in control laboratories or the public administration;</p> <p>they are able to deal in an independent and creative fashion with a complex research problem through the use of the selected theories, concepts and methods in the discipline so that the results are fit to be published;</p> <p>they are able to use information from a variety of disciplines for the formulation of conclusions which they are able to clearly justify to the professional and general public;</p> <p>they can use the knowledge and understanding and their ability to solve problems in a new, unfamiliar environment, even very far from the field of chemistry;</p> <p>they are able to make use of some of the advanced research methods in the discipline</p>	<p>they are able to carry out an independent and original research that can be published in an international journal and goes beyond the current boundaries of knowledge in the field of Chemistry;</p> <p>they are able to critically evaluate the results of scientific work, including their own;</p> <p>they can develop new methods and use them to solve problems, they can also determine the strategy of solving a problem.</p>

EDUCATION DESCRIPTORS		
	Bachelor's study programme	
	Study programme graduate	
Professional skills	<p>they are able to use theoretical knowledge, equipment and standard methodology to obtain usable experimental results in the laboratory or operating conditions;</p> <p>they have gained practical skills in laboratory exercises in the basic disciplines of chemistry;</p> <p>they can work safely in the laboratory, can independently assess the risks associated with the work;</p> <p>as qualified graduates, they are able to find a regular employment, including positions in the chemical industry;</p> <p>they are able to collect and interpret relevant data and formulate conclusions respecting the scientific and ethical standards of the field;</p> <p>they are able to obtain information from sources in the English language;</p> <p>they know how to organize, present and communicate the obtained information as well as ideas, problems and possible solutions to professionals, in the written and oral form in the Czech language;</p> <p>they are able to understand and explain to the informed public the accuracy of experimental data and all the limitations arising therefrom;</p> <p>they are able to implement and complete a research project the results of which do not necessarily have the quality to justify their publication.</p>	<p>they are al that can be the curren</p> <p>they are al including</p> <p>they can d they can a</p>

## 2.20 EARTH SCIENCES

### A BRIEF DESCRIPTION OF THE CHARACTER, THEMATIC SCOPE AND HISTORY OF THE FIELD

Earth sciences is a collective name for the natural sciences which are focused on exploring the past, understanding the present and anticipating or influencing the future of the development of the planet Earth or its parts. These sciences primarily study the material composition, internal structure, surface and the surroundings of the Earth, as well as its history and relevant processes. Earth sciences provide education based on a multi- and interdisciplinary approach to complex natural systems. A comprehensive study of field methods, a number of spatial and temporal analytical capabilities and the challenge to use observation, quantitative analysis and imagination to make decisions with regard to many unknown parameters are the characteristics of education in the field of Earth sciences.

Historical foundations of the area are based on a long-term interaction of humans and the environment in an effort to acquire the necessary minerals, guarantee enough water sources, enough energy, to know destructive natural phenomena and how to protect oneself from them, predict the weather changes etc. These aspects have created background for the formation of the basic fields of modern Earth sciences. The rapid development of the science as a whole during the past century caused the emergence of a large number of specializations and disciplines; therefore, a modern scientist in the area of Earth sciences specializes in a minor segment of the science and cannot cover the whole subject area. At least a basic knowledge of the astonishing complexity of Earth sciences enables graduates to select those fields that are the subject of their interest.

It is important to emphasize two important factors that are common to all the basic disciplines of Earth sciences. The first is the unavailability of many subjects of study. Many rocks, as well as water or mineral deposits, are located deep below the Earth's surface; on the other hand, atmospheric phenomena take place high above the Earth. This is why graduates of Earth sciences must have the capability of a three-dimensional view of the subject of study. The second is the temporal factor which our experience finds difficult to grasp. Earth sciences are concerned with processes that have affected the rock environment for millions of years, examine the conditions on the Earth 3 or more billions of years ago, address the issue how the oceans came to be and how their composition changes over time, how atmosphere evolved or how life on the Earth or men evolved.

Modern Earth sciences are divided into many fields that can be summarized in several thematic groups.

Fields dealing with water and air on or above the solid surface of the Earth. These are fields studying the movement and expansion of water on the Earth (hydrology), glaciers and glacial activity (glaciology), seas and oceans (oceanography), the composition, structure and properties of atmosphere and the ongoing phenomena (meteorology) or climate (climatology). These study fields are divided into hydrological and atmospheric sciences and are separated from geological sciences which focus on the solid parts of the Earth.

Fields dealing with the physico-chemical composition of the solid parts of the Earth and related processes, such as the study of minerals (mineralogy), three major groups of rocks (igneous, sedimentary and metamorphic petrology), the chemistry of rocks (geochemistry), the deformation and

internal structure of rocks (structural geology) and the physical properties of rocks on and inside the Earth (geophysics).

Fields dealing with the study of shapes, the origin and age of the Earth's surface (geomorphology) and the analysis of processes that led to its creation.

Disciplines dealing with the geological history of the Earth, including the study of fossils and fossil records (paleontology), the development of sedimentary layers deposited generally over millions of years (stratigraphy), and isotope geochemistry and dating of rocks (geochronology).

Applied fields deal with a practical and beneficial application of Earth sciences. These are the study of fossil fuels (oil, natural gas and coal), the deposits of these fuels and minerals, geothermal energy for producing electricity and heating, geological surveys for a safe construction of important structures (bridges, nuclear reactors, roads, dams, high-rise buildings), taking into account the risks of landslides, volcanic eruptions, earthquakes, soil erosion etc.

The multidisciplinary nature of Earth sciences is thus an important aspect of this education.

It is quite evident that the knowledge and understanding of processes which shape and transform the Earth have inestimable value for individuals as well as society; that is why the primary objective and function of education in the field of Earth sciences are to enable graduates to acquire this knowledge effectively. Due to the width of the topic and the large amount of knowledge acquired in the history of the development of Earth sciences, it is very difficult to define a uniform set of elementary knowledge; consequently, several primary fields have been defined which cover the whole scope of this subject area to the greatest possible extent.

The main feature of the subject area Earth sciences is the development of a distinctive way of thinking, which includes:

- ability to be aware of and understand the temporal and spatial dimensions of the processes operating on the Earth,
- ability to integrate field, laboratory and theoretical data in a creative process, from observation to identification, synthesis and modeling,
- a deeper understanding of the need to use and preserve the Earth's natural resources.

Education in the field of Earth sciences brings knowledge of processes which have formed the Earth into its present form, knowledge of the consequences of such processes and their current manifestations. These are important contemporary social issues such as climate changes, human impact on the environment, the consequences of some dynamic natural phenomena, a lack of drinking water resources, mining etc. Most of these issues have a significant ethical dimension.

## PRIMARY FIELDS

Earth sciences cover a wide range of fields; among the most important are geology (including tectonics, structural geology, petrology, stratigraphy, paleontology, mineralogy, deposit geology), physical geography, geomorphology, pedology, hydrogeology, hydrology, geophysics, geochemistry, environmental geology, engineering geology and geodetics. Most of these fields cannot do without the basics of mathematics and physics today.

## DEFINITION OF THE OBJECTIVES OF EDUCATION

The objective of education in the field of Earth sciences is to prepare graduates of the respective fields for a career in specialist professions at the academic level (universities, the Academy of Sciences) and in specialized institutions (e.g. Czech Geological Survey), state administration, entities engaged in mining, the use of water resources, environmental assessment, natural hazards etc. Tertiary education in the field of Earth sciences must be based on the fact that there is no systematic elementary and secondary education in the field (as for example in the case of mathematics, physics and chemistry). Given that a substantial part of Earth sciences is the acquisition of data, one of the main objectives of education must be an ability to critically evaluate and adequately interpret data.

## GENERAL PROFILE OF GRADUATES

Graduates of the **Bachelor's study programme** have the basic knowledge of the history and composition of the Earth and the processes operating on and inside it. They are aware of the role of Earth sciences in society, and of other related fields. They know the basics of field and laboratory work, are able to describe, analyze and document the results of such work and clearly communicate them. They are able to assess problems in a large temporal and spatial scale.

Graduates of the **Master's study programme** have full knowledge of at least one field of Earth sciences. They are able to identify as yet unsolved individual problems, suggest and implement solutions. They can demonstrate this ability in a written formulation of a publishable project.

Graduates of the **doctoral study programme** are able to formulate complex problems and find original solutions to them. They participate in the international research community in the field, actively take part in meetings and conferences, and publish their results in respected international journals.

Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates		
<p>they demonstrate a broad knowledge and understanding of the basic processes related to the creation, evolution, internal structure and substance composition of the Earth (endogenous and exogenous processes, the relations between the solid Earth and its surroundings, plate tectonics, geology and geography, physical and chemical properties of rocks and minerals);</p> <p>they demonstrate adequate knowledge of other natural sciences relevant to Earth sciences (mathematics, physics, chemistry, biology)</p> <p>they demonstrate the basic knowledge of the procedures and methods of scientific work;</p> <p>they demonstrate an understanding of the social impact of Earth sciences (the use of mineral resources, natural hazards, drinking water resources, environment protection).</p>	<p>they demonstrate a deep knowledge and understanding of the theories, concepts and methods corresponding to the current state of knowledge in at least one of the disciplines of Earth sciences;</p> <p>they demonstrate an understanding of the possibilities and conditions for, and limitations on, the use of findings in related disciplines.</p>	<p>they demonstrate a deep and systematic knowledge and understanding of the theories, concepts and methods that are at the forefront of knowledge of the field at the international level;</p> <p>they demonstrate an understanding of the system of scholarly and scientific disciplines and research problems at the intersection of disciplines.</p>

## PROFESSIONAL KNOWLEDGE



# EDUCATION DESCRIPTORS

Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates		
<p>they can use theoretical knowledge and adequate equipment to acquire quantitative information in the field and in the laboratory; they can acquire, organize, process and present information;</p> <p>they are able to use computer technology for management, data processing and visualizing and presenting results.</p>	<p>they are able to draw on specialist knowledge in order to independently identify and creatively solve as yet unsolved theoretical or practical issues in the field;</p> <p>they are able to independently elaborate on a complex topic in the given field in writing;</p> <p>they are able to deal in an independent and creative fashion with a complex problem through the use of selected theories, concepts and methods in the given discipline;</p> <p>they are able to make use of some of the advanced research methods in the discipline</p>	<p>they are able to carry out an independent and original research that can be published in an international journal in the field of Earth Sciences;</p> <p>they are able to prepare an extensive research work which contributes to an increase in knowledge in the field of Earth sciences;</p> <p>they are able to critically evaluate the results of scientific work, including their own.</p>

## CHARACTERISTIC OCCUPATIONS AND RELEVANT REGULATED OCCUPATIONS

Professional graduates of Earth sciences can find good jobs in research today, due to an adverse age structure of the Academy of Sciences of the Czech Republic (four geoscience institutes), among other things. There are wide possibilities in the state administration (the issue of environment cannot do without a knowledge of Earth sciences) and entities engaged in mining, extensive construction, elimination of environmental damage or land recultivation.

## RELATIONS TO OTHER SUBJECT AREAS

Many concepts, theories and methods of other scientific disciplines are routinely adopted and applied in Earth sciences. The acquisition or consolidation of relevant knowledge of these fields thus forms an integral part of education in the field of Earth Sciences. It is desirable to deepen these interdisciplinary aspects and find common intersections with social sciences, economics and humanities.

## 2.21 INFORMATICS

### A BRIEF DESCRIPTION OF THE HISTORY, CHARACTER AND THEMATIC SCOPE

Informatics as a scientific discipline systematically studies and develops all aspects and forms of processing, organizing, storing and sharing data, information and knowledge through information systems and using information technologies. Informatics is above all a primary theoretical science but also has a significant and wide application in other applied fields. Informatics is primarily concerned with the systemic concept of processing, sharing and transfer of information. At the same time it studies the use of information in organizations and in communication between people, organizations and information systems. Information is a message or communication which reduces the degree of generality and disorder of a system. Information is also used as the default term for knowledge, communication and true and wanted message.

The history of informatics dates back to the first considerations of general algorithms for working with numbers or other data. The beginnings of informatics can be found in 1940s, together with the development of the first electronic computers. The term informatics was coined in France in 1962, via a combination of the words information and automatic; this term marked the fields which in the U.S. were called computer science and data processing. In German, Informationstechnik has a similar meaning. Based on an increasingly more intense connection of informatics and telecommunications, the term Information and Communication Technology (ICT), expressing the integration of the two technologies, emerged in 1990s.

The advent of electronic computers enabled a wide range of application of informatics, and secured it a place at the forefront of science. However, informatics is still a science about information and its processing. It is therefore no wonder that informatics is currently often seen as a mere science about processing computer information, since this field almost exclusively uses computer technology. The original meaning of the concept is broader, though, and it did not use to be limited to the field of computers alone. Along with the proliferation of computers in society, informatics became a cross-cutting discipline which is nowadays used in daily life and all economic and scientific fields.

### FUNCTION

The content of the subject area of informatics is an integration of the basic informatics disciplines and related traditional scientific fields (mathematics, system engineering, graphics, programming, psychology, communication etc.) with the environment and ways of solving practical problems. It combines the support of the development of systemic thinking in relation to the ways of solving professional and organizational tasks in corporations and companies, but also helps individuals in their everyday lives (both civil and professional).

Informatics as a subject area provides students with the current knowledge of the depth and richness of the information theory and its complex use in practice, develops their creativity, social communication, quantitative and combinatorial skills, innovative thinking which is accompanied by a significant development of technological changes. Using methods of problem-oriented and critical thinking, informatics seeks alternative solutions, applies and develops argumentation techniques, abstract thinking, generalization and simplification, and generates the capability of integrating individual components into a whole.

## PRIMARY FIELDS

The primary fields in the area of informatics are:

- logic and discrete mathematics (everywhere in the world, these fields are found under computer science, not mathematics),
- theory of algorithms and computability,
- discrete and continuous optimization, operational research,
- parallel and distributed systems, systems engineering,
- computer graphics and image processing,
- computer networks and communications,
- computer systems and data processing,
- programmable technical structures,
- artificial intelligence and natural language processing.

The most important components of informatics education are based on the foundations of mathematical theory, logical thinking and mathematical logic. These lead to processes of cognition and description of objective reality, abstraction and modeling, mastering the theory of systems in relation to the use of information systems in corporate applications. It is necessary to integrate the components of communication, interactions of human behaviour and perception of reality with information technologies, the knowledge of psychology, network communication, linguistics, social and neural networks, computer networks, graphics and multimedia communication. An important component is the issue of the development of the computer thinking as a relevant method to solve practical problems in the related theoretical disciplines. This approach also covers algorithmic thinking including recurrence, distribution and parallel options and their limits, and finding approaches to the areas of system design and simulation methods.

A significant component is also the recognizability of objective reality (methods and techniques of data processing), the concepts of its processing and transformation into information outputs and functions (with the deployment of programmable technical structures). At the same time, components of abstraction and abstract thinking are used, including different levels of thinking, cognition and knowledge of paths to virtual reality. It is necessary to search a definition of the issue of society informatization, its specification, proposal and method of solution, including the impact on the development of society. This knowledge is related to an important component describing algorithms and databases in all forms of storage. Informatics as a scientific discipline should also master the process of understanding the opportunities and potential of automation, including a search for a balance between automation and a necessary humanization of information systems. The last component is a general provision of access to the relevant information sources including the mastery of computer tools and means of automation.

## DEFINITION OF THE OBJECTIVES OF EDUCATION

The objective of education in the field of Informatics is to prepare graduates for a career in information professions at the academic level (universities, the Academy of Sciences) and in specialized software development and programming companies and institutions, in the state administration and entities engaged in analysis and design of information systems. The Bachelor's primary study programme provides the first level of higher education in informatics. Graduates acquire the necessary and broad theoretical knowledge of this scientific discipline, get acquainted with the principles and concepts of mathematical informatics and a systemic approach to objective reality, are able to design programs of their own and use information systems, computer networks and the process of

communication which they can immediately upon the completion of the Bachelor's study use in practice to design and implement computer systems. The subject area Informatics at the same time provides a suitable training for further study and future work in informatics as a theoretical scientific field (or in interdisciplinary fields on the boundary between mathematics and informatics).

The follow-up Master's study programme Informatics is intended for students who have good prerequisites for studying informatics disciplines and scientific components, and wish to pursue a deeper study of informatics as an independent scientific discipline. In this subject area, students deal with the contemporary methods of informatics with a focus on its global objectives. Graduates at the same time acquire knowledge and methods which enable them to focus on deeper issues of informatics, far exceeding the basic needs in the area of programming and software systems.

## GENERAL PROFILE OF GRADUATES

Graduates have theoretical knowledge of the given scientific discipline that includes mathematical analysis, logic, linear algebra, discrete mathematics, probability and statistics, algorithms, data structures, the theory of languages and automats, and all levels of ICT architectures (digital and analog circuits, processors and the architecture of HW machines, operating systems, databases, computer networks, security, software engineering). In the field courses, they complete their professional profile with a balanced set of professional knowledge and skills in the field of computer architecture, system programming, the theory of graphs and advanced algorithms, and they are thus prepared for a successful career or further study of any discipline in the field of informatics. They have a deep knowledge of the architectures of processors, understand mathematical models and are able to use them when designing and analyzing algorithms with respect to the computational complexity and practical solvability of tasks. They know the tools and formal models for the design, specification, effective implementation and analysis of the properties of different algorithms (including heuristic and approximate) within various computer architectures.

Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates		
<p>they demonstrate knowledge and understanding of basic concepts of mathematics and theoretical informatics, are acquainted with the basics of propositional and predicate logic, and have mastered the basic principles of proving the properties of programs, for example basic mathematical concepts such as set and session, arrangement, numeric fields, basic combinatorics and probability and statistics. Concepts such as syntax, semantics, proof, truth and provability of formulas, regular and context-free language, pushdown automaton, recursion and recursive functions,</p> <p>they demonstrate a knowledge of the basics of programming, know the basic data and control structures, for example numeric systems, the principles of arithmetic operations in computers. Numbers in the fixed and floating amount, scalar, vector, matrix and multidimensional array, record,</p> <p>they demonstrate knowledge of the computer architecture, computer networks and computer systems, as well as the basics of operating system architecture, including concepts such as file systems, processes and planning, for example Von Neumann architecture, processor, memory and its hierarchy,</p>	<p>they demonstrate an overview of theoretical and practical foundations of informatics and are acquainted with them (for example decidable and undecidable problems, complexity),</p> <p>they demonstrate a deep knowledge of the field of their specialization, for example graphics and related concepts,</p> <p>they demonstrate the knowledge of programming in different paradigms, the ability to understand complex programs and analyze their properties; they know the principles of software engineering,</p> <p>they demonstrate a knowledge of the principles of operating systems, parallel and distributed systems, including planning, coordination, synchronization and communication of processes, for example communication via standard network protocols, access management</p> <p>they demonstrate an understanding of the possibilities and conditions for, and limitations on, the use of the knowledge of informatics in related disciplines.</p>	<p>they demonstrate a deep knowledge of the latest theories, concepts and methods in the studied discipline at the international level,</p> <p>they demonstrate the ability to formulate a high-quality paper in the English or Czech language, publishable at an international conference or in an impact journal,</p> <p>they demonstrate an understanding of the system of scholarly and scientific disciplines and research problems at the intersection of disciplines,</p> <p>they demonstrate the capability of critical analysis, evaluation and formulation of new, complex ideas.</p>

## PROFESSIONAL KNOWLEDGE

# EDUCATION DESCRIPTORS

PROFESSIONAL KNOWLEDGE		
Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates		
peripherals, IP, TCP and UDP protocols, the principles of switching and routing in computer networks, they demonstrate a knowledge of the model of relational database, as well as a knowledge of data modeling and design of simple data structures; they demonstrate knowledge of SQL commands, the concept of transaction and atomic processing, for example integrity constraints, functional dependencies and keys of relational schemas; ER diagrams, the principles of the optimization of SQL queries, they demonstrate the basic knowledge of the procedures and methods of qualified		



Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates		
<p>they are able to design or manage smaller computer systems, to ensure the operation of common operating systems as well as smaller computer networks,</p> <p>they can find an error in a simpler computer system and the steps to eliminate it,</p> <p>they are able to hold relatively simple independent positions or work as team members responsible for a specific part of a large system,</p> <p>they can design a relatively small database system or an information system, and design and implement a simple Web application,</p> <p>they can obtain and process information in the English language,</p> <p>they can organize, process and present the acquired information in the written and oral form in the Czech or English language; they can also prepare documentation for the implemented work or its part,</p> <p>they are able to test a complex computer and information system,</p> <p>they are able to implement and complete an independent project according to a specific assignment.</p>	<p>they can independently design and manage large computer systems, find and fix errors, and suggest methods of their optimization, they are able to design a specific system in the field of their specialization (computer network, database, information system, artificial language processing system, control systems including systems using artificial intelligence, simulation and other systems etc.), using also unconventional and untested methods,</p> <p>they are able to work independently or within interdisciplinary teams, lead teams of medium size.</p> <p>they are able to communicate with people, both partners (team members) and clients,</p> <p>they are able to analyze non-standard requirements and situations and suggest solutions based on a non-trivial modification of the existing processes and components,</p> <p>they are able to generalize based on the principles and provided specifications, they have the capability of a synthetic view of and synthetic approach to solving specific problems,</p> <p>they can lead medium-sized teams, while being able to estimate the competencies of</p>	<p>they are able to carry out an independent and original research that can be published in an international journal and goes beyond the current boundaries of knowledge in the field of informatics,</p> <p>they are able to critically assess the results of scientific or other highly qualified work, including their own,</p> <p>they can develop new methods and tools and use them to solve problems, they can also determine the strategy of solving a problem.</p>

## PROFESSIONAL SKILLS

# INFORMATICS

# EDUCATION DESCRIPTORS

Bachelor's study programme	Master's study programme	Doctoral study programme
	Study programme graduates	
	<p>individual members and assign work and responsibility accordingly, based on an interview with the client, they can prepare specifications even for complex systems, and synthetically put together individual specifications with the help of their team members,</p> <p>they can prepare detailed documentation for the implemented work or its part, as well as prepare a text describing a brand new design or architecture of a yet unimplemented</p>	

	Bachelor's study programme	Master's study programme
	Study programme graduates	
<b>Professional skills</b>	<p>they are able to design or manage smaller computer systems, to ensure the operation of common operating systems as well as smaller computer networks,</p> <p>they can find an error in a simpler computer system and the steps to eliminate it,</p> <p>they are able to hold relatively simple independent positions or work as team members responsible for a specific part of a large system,</p> <p>they can design a relatively small database system or an information system, and design and implement a simple Web application,</p> <p>they can obtain and process information in the English language,</p> <p>they can organize, process and present the acquired information in the written and oral form in the Czech or English language; they can also prepare documentation for the implemented work or its part,</p> <p>they are able to test a complex computer and information system,</p> <p>they are able to implement and complete an independent project according to a specific assignment.</p>	<p>they can independently design and manage large computer systems, find and fix errors and suggest methods of their optimization,</p> <p>they are able to design a specific system in the field of their specialization (computer network, database, information system, artificial language processing system, control system including systems using artificial intelligence simulation and other systems etc.), using a unconventional and untested methods,</p> <p>they are able to work independently or with interdisciplinary teams, lead teams of medium size.</p> <p>they are able to communicate with people, both partners (team members) and clients,</p> <p>they are able to analyze non-standard requirements and situations and suggest solutions based on a non-trivial modification of the existing processes and components,</p> <p>they are able to generalize based on the principles and provided specifications, they have capability of a synthetic view of and synthetic approach to solving specific problems,</p> <p>they can lead medium-sized teams, while being able to estimate the competencies of individual members and assign work and responsibility accordingly,</p> <p>based on an interview with the client, they can prepare specifications even for complex systems, and synthetically put together individual specifications with the help of their team members,</p> <p>they can prepare detailed documentation for the implemented work or its part, as well as prepare a text describing a brand new design architecture of a yet unimplemented system</p>

## 2.22 BIOLOGY AND ECOLOGY

### A BRIEF DESCRIPTION OF THE HISTORY, CHARACTER AND THEMATIC SCOPE

Biology is a science about life. More accurately, it is a set of sciences which thoroughly study living systems in terms of their structure, function, way of life, reproduction and heredity, and historical development. Ecology, which is one of the basic biological fields, is interdisciplinary and integrates the individual biological disciplines. It deals with the study of mutual relations between organisms and their external environment.

The first knowledge of biological disciplines was based on the practical needs of people and was associated with the breeding of animals and cultivation of plants. Later and more comprehensive concepts of the life sciences appeared in antiquity, mainly in connection with medical disciplines. In modern times, people's interest turned mostly to a further understanding of animals and plants, and subsequently to the knowledge of the human body and its anatomy. After the discovery of the microscope and the formulation of the cell theory, the understanding of evolution got to the forefront. In the early 20th century, research was focused not only on organisms as a whole, but also on their basic building blocks - cells. Only later was an increased attention given to communities and ecosystems, that is, ecology. Other new disciplines gradually emerged and were divided according to their specializations. At present, trends aimed at a synthetic approach to the division of biological disciplines are frequently promoted; this means an upgraded study of biodiversity rather than the traditional classification into botany and zoology. These changes are affected above all by a new concept of classifying organisms and new approaches to their study (development of molecular biology).

Among the most important discoveries in the field of biology is undoubtedly the discovery of the cell as the basic building block of organisms; this discovery was significant for other related disciplines as well. Among the most important personalities in the field are M. J. Schleiden, T. Schwann and J. E. Purkyně. The knowledge of the principles of evolution is connected with the name of C. Darwin; J. G. Mendel was the one to lay the foundations of genetics and formulate its laws. J. D. Watson and F. Crick identified the structure of DNA.

Biological disciplines have never developed evenly, nor do they develop evenly today. The greatest progress in natural sciences in general occurred mainly in interdisciplinary fields. An example of a qualitatively new field, which has however experienced and is still experiencing exponential development, is molecular biology, which affects not only genetics, physiology and microbiology, but also systematic scientific disciplines of traditional fields such as botany and zoology (the issue of transgenic plants, the possibility of transplantation of animal organs to humans, determination of plant and animal species with the use of the sequence of nucleotides in nucleic acids). The development of genetics has significantly influenced not only a number of applied fields such as breeding, zootechnics and medicine, but also the establishment of new methods e.g. in criminology or archeology. At the same time, however, it has also brought problems to be solved in social sciences, especially philosophy. This applies particularly to new discoveries and technologies in connection with the possibility of their misuse within the human population (e.g. cloning animals, interferences in the genome of organisms). Previous interdisciplinary barriers are thus gradually overcome - the phase of diversification is replaced by the process of integration.

The key disciplines for biology and its further development are mainly chemistry and physics. There are links to other areas as well, such as Earth sciences or mathematics, while cohesion does not belong exclusively to experimental biological disciplines any longer. Biology is closely related to

agriculture, forestry, food industry, medicine and veterinary medicine. Overlaps into social sciences are also more and more important, e.g. into archeology, sociology or criminology.

Ecology provides basic theoretical background of all activities aiming at the protection and creation of environment. Ecology studies biota at different levels: the individual, population, community and ecosystem. Ecology has a wide scope across all biological disciplines, both vertically (e.g. ecology of animals and plants) and horizontally, e.g. ecology of fish, amphibians and other vertebrates.

During the development of biology, the approach to examining organisms has changed and is still changing. This leads to constant changes in the classification of organisms. From the originally monitored morphology with mere visual assessments and the anatomy of organisms with the use of the microscope to the methods of molecular biology, which are among the most modern approaches today. The classification of biological fields is closely related to this. The classical biological fields include botany, zoology, anthropology and microbiology. Within these fields, there are specialized disciplines such as parasitology, mycology, algology and others. Then there are sciences dealing with the study of certain characteristics of living systems, such as physiology. Among the relatively new disciplines are genetics and molecular biology.

In some areas, the scientific fields may overlap. These are above all fields studying living systems from a more comprehensive and general point of view, e.g. cytology and cell biology.

## FUNCTION

The objective of biological education is to provide the current level of knowledge about the life of organisms and their interactions. Last but not least, this includes the knowledge of modern biotechnologies and their importance in terms of the environment and its protection. The ethical dimension of their implementation is also related to this.

## PRIMARY FIELDS

The dynamic development of biological sciences in the past period saw the emergence of a large number of specializations and fields of interdisciplinary character. Modern biology is thus divided into many fields which can be classified into several groups.

**systematic fields**, which include classical disciplines such as botany, zoology, mycology, algology, anthropology,

**experimental fields**, which include e.g. physiology of organisms and genetics,

**the so-called umbrella (interdisciplinary) fields**, such as ecology.

There is also a specific group of **boundary fields**, such as biochemistry.

Study programmes of biology and ecology are currently offered at 11 faculties of the Bohemian and Moravian universities, while these are the faculties of science, environment and recently even education.

## DEFINITION OF THE OBJECTIVES OF EDUCATION

The objective of biological education (including ecology) is to train professionals in a wide range of biological fields for research and work in specialized professions at universities, institutes of the Academy of Sciences and scientific departments with applied research, in addition to the basic research.

These specialists can also work in the field of the protection and management of nature, in the state administration and local government, and as teachers at various grades and types of schools.

## GENERAL PROFILE OF GRADUATES

Biology is a very broad field with many specializations. It is necessary to determine the key primary fields of the general scientific basic in the Bachelor's study, so that specialized Master's and doctoral studies can build on them. The study of biology is structured.

Graduates of the **Bachelor's study programme** have a broad scientific knowledge across the primary biological and ecological fields. They have acquired knowledge and skills which can be used in the field and in the laboratory. Using standard methodologies, they are able to solve common problems in the field, analyze and document them, and subsequently interpret the outputs of a simple partial research. They also have the knowledge and skills in the fields of physics and chemistry. They are able to work with basic laboratory equipment and know the safety regulations that apply to both laboratory and field work. In terms of intellectual skills, they are able to work with Czech as well as foreign-language literature. They are able to complete a literature search on the given issue using modern information and communication technologies.

Graduates of the **Master's study programme** have a deep knowledge in one of the biological or ecological fields. They are able to formulate individual research hypotheses and design the methods of their verification using standard methodologies, or partially innovate them. They are able to evaluate and adequately interpret the results of the individual research. They are able to create a partial output of research work and publish it in the form of a scientific paper in a scientific journal or at a scientific conference.

Graduates of the **doctoral study programme** are able to work in teams and cooperate on solving tasks of a complex nature with original outputs for the benefit of both science and practice. They participate in projects and professional meetings at the national and international level. They are able to write a publication for renowned international scientific journals.

Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates		
<p>they demonstrate knowledge and understanding across the basic biological fields (systematic and experimental) which include botany, zoology, anthropology, microbiology, physiology of organisms, genetics and ecology as a biological scientific discipline; within an interdisciplinary inclusion of biology among natural sciences, they demonstrate the necessary knowledge of propaedeutic fields such as chemistry, geology, physics and mathematics, for example anatomy, morphology, classification and ecology of living organisms, including their mutual relations,</p> <p>they demonstrate an understanding of the key biogeochemical processes and their essence, they understand the relations between and interdependence of living and non-living nature and the understanding of nature as an integrated whole,</p> <p>they demonstrate the basic knowledge of some specialized fields such as evolutionary biology, virology, developmental biology and the integrated issue of biodiversity, for example the understanding of phylogenetic relations and the developmental connections, in the historical and recent context,</p>	<p>they demonstrate a broad knowledge and understanding based on the knowledge acquired in the Bachelor's study programme, which enables the development of original procedures and methods within the implemented research,</p> <p>they demonstrate a deep knowledge in the field of their specialization,</p> <p>they demonstrate the acquisition of knowledge that enables a successful entry into the doctoral study programme,</p> <p>they demonstrate a deep knowledge and understanding of the theories, concepts and methods corresponding to the current state of knowledge in at least one of the biological and ecological disciplines,</p> <p>they demonstrate an understanding of related fields including applied scientific fields, for example parasitology, phytopathology, biotechnology, the use of medicinal plants in alternative medicine etc.</p>	<p>they demonstrate a deep knowledge and understanding of the latest theories, concepts and methods in the studied discipline at the international level,</p> <p>they demonstrate an ability to write a dissertation thesis in the Czech or foreign language, with its results fit to be published in scientific journals, especially in impact factor journals,</p> <p>they demonstrate an understanding of the system of scholarly and scientific disciplines and interdisciplinary research problems, addressed by professional teams,</p> <p>they demonstrate an ability to think critically, formulate original hypotheses with suggestions of their verification and solve research tasks in a comprehensive manner.</p>

## PROFESSIONAL KNOWLEDGE



# EDUCATION DESCRIPTORS

PROFESSIONAL KNOWLEDGE		
Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates		
<p>they demonstrate adequate knowledge of the relevant theories and methods of the basic fields, for example modern approaches to the study of organisms at the cellular level, the interconnection of biological and socio-scientific fields, e.g. archeology,</p> <p>they demonstrate the basic knowledge of the procedures and methods of scientific work,</p> <p>they demonstrate the acquisition of knowledge necessary for the follow-up Master's study,</p> <p>they demonstrate an understanding of the connections between biology and the issue</p>		

Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates		
<p>they are able to use theoretical knowledge, equipment and standard methodology to obtain adequate outputs in the laboratory or operating conditions;</p> <p>they demonstrate practical skills acquired in the basic biological disciplines, such as the use of equipment and tools in the field, the use of laboratory equipment, the mastery of the basic laboratory techniques and methodologies when working with natural substances,</p> <p>they know how to respect and observe basic safety rules in the field and in the laboratory,</p> <p>they are able to perform both laboratory and field work at a certain level,</p> <p>they are able to collect and interpret relevant data and formulate conclusions respecting the scientific and ethical standards of the field,</p> <p>they can find, classify and interpret information from printed and electronic sources, both in the Czech and a foreign language (especially English),</p> <p>they can formulate individual issues of a simple nature and propose solutions orally and in writing in Czech,</p>	<p>they are able to draw on specialist knowledge in order to independently identify and creatively solve as yet unsolved theoretical or practical issues in the field, formulate hypotheses and verify them,</p> <p>they are able to independently elaborate on a complex topic in the given field in writing, they can work as biologists in research, the state administration, protection of nature and also education,</p> <p>they are able to deal in an independent and creative fashion with a complex research problem through the use of the selected theories, concepts and methods in the discipline so that the results are fit to be published;</p> <p>they are able to use information from a variety of disciplines for the formulation of conclusions which they are able to clearly justify to the professional and general public.</p> <p>they are able to popularize scientific work, they can solve individual problems in related fields, such as agriculture, forestry, pharmacy,</p> <p>they are able to make use of some of the complex and advanced research methods in</p>	<p>they are able to carry out an independent and original research that can be published in an international journal and goes beyond the current boundaries of knowledge in the field of biology and ecology,</p> <p>they are able to critically evaluate the results of scientific work, including their own, and are capable of self-evaluation,</p> <p>they know how to initiate modifications and new original methods of scientific work, and determine a suitable strategy when solving problems.</p>

## PROFESSIONAL SKILLS

Bachelor's study programme	Master's study programme	Doctoral study programme
<p>they are able to apply theoretical knowledge when solving practical problems,</p> <p>they are able to participate in research</p>	<p>Study programme graduates</p> <p>the discipline in such a manner as to obtain</p>	
		<p>new and original information.</p>

<b>Professional skills</b>	<p>they are able to use theoretical knowledge, equipment and standard methodology to obtain adequate outputs in the laboratory or operating conditions;</p> <p>they demonstrate practical skills acquired in the basic biological disciplines, such as the use of equipment and tools in the field, the use of laboratory equipment, the mastery of the basic laboratory techniques and methodologies when working with natural substances,</p> <p>they know how to respect and observe basic safety rules in the field and in the laboratory,</p> <p>they are able to perform both laboratory and field work at a certain level,</p> <p>they are able to collect and interpret relevant data and formulate conclusions respecting the scientific and ethical standards of the field,</p> <p>they can find, classify and interpret information from printed and electronic sources, both in the Czech and a foreign language (especially English),</p> <p>they can formulate individual issues of a simple nature and propose solutions orally and in writing in Czech,</p> <p>they are able to apply theoretical knowledge when solving practical problems,</p> <p>they are able to participate in research projects, especially in their individual parts, formulate and interpret the outputs, which do not necessarily have to be published.</p>	<p>they are able to draw on specialist knowledge in order to independently identify and creatively solve as yet unsolved theoretical or practical issues in the field, formulate hypotheses and verify them,</p> <p>they are able to independently elaborate on a complex topic in the given field in writing</p> <p>they can work as biologists in research, the state administration, protection of nature and also education,</p> <p>they are able to deal in an independent and creative fashion with a complex research problem through the use of the selected theoretical concepts and methods in the discipline so that the results are fit to be published,</p> <p>they are able to use information from a variety of disciplines for the formulation of conclusions which they are able to clearly justify to professional and general public.</p> <p>they are able to popularize scientific work</p> <p>they can solve individual problems in related fields, such as agriculture, forestry, pharmacy</p> <p>they are able to make use of some of the complex and advanced research methods in the discipline in such a manner as to obtain new and original information.</p>
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## 2.23 ARCHITECTURE

### A BRIEF DESCRIPTION OF THE CHARACTER, THEMATIC SCOPE AND HISTORY OF THE FIELD

The main objective of tertiary education in the architectural fields is to train creative professionals with artistic and technical skills, who are able to build, rebuild and maintain the values of the built environment. The essence of architectural education lies above all in the development of complex designer skills necessary for a creative and technically correct formation of a space, whether this is a building and its interiors, a city or a cultural landscape. The architectural practice covers a wide range of cultural, social and historical, artistic and technical, but also economic, legal, environmental and political aspects. Programmes in the field of architecture are thus specifically developed on the borders between artistic and technical fields and humanities as a complex and wide-range education, so that the graduates are able to organically integrate the creative and designing parts with technical implementation, and at the same time place their work in a broader artistic and social context.

Teaching architecture and civil engineering at the Czech polytechnic schools dates back to the 18th century, when this programme, together with that of civil engineering, developed at the Czech Technical University in Prague and from the late 19th century also at the University of Technology in Brno. Even back then, architecture was understood as a synthesis of art, science and technology. The ambivalent mooring of the field in both the technical and artistic subject area is confirmed by the fact that architecture is also taught at art schools and universities; the programme of architecture was established at the Academy of Nobility in Prague as early as 1842. After Czechoslovakia was founded, the architectural education in today's form continued at the Czech Technical University in Prague, the University of Technology in Brno and the Academy of Fine Arts in Prague; in 1946, the Academy of Arts, Architecture and Design in Prague also gained university status.

The development of architecture and civil engineering and major changes in the architectural profession after 1948 fundamentally affected the development of university education in the field for a long time to come. Under the influence of the contemporary opinion on the design and construction of buildings, marked by the conditions of the then nationalized design activities and construction output and state-monitored priorities of the consistent industrialization of civil engineering and standardization of buildings, the architectural education at technical universities, at that time offered in the programme Architecture and Civil Engineering, was divided in 1960 - into Architecture which held the universality and comprehensiveness of the education of architects itself, and Civil Engineering, focused only on the technical disciplines and the implementation stage of architectural work.

Significant changes in civil engineering and the profession and study of architecture occurred again after 1989. The field of architecture was strongly influenced by the end of the state and cooperative monopoly on the design and implementation of buildings and the end of the state-controlled development of civil engineering. In the previous regime, the design and implementation of a majority of buildings were unified, using prefabricated building parts with a very limited offer of materials and technologies; after 1989, the preparation and implementation of buildings and the modifications of landscape significantly changed. The education and practical application of architects were freed and shifted to the today's creative and human-friendly position.

The architectural profession could again be pursued as a liberal occupation. Unlike the previous period, when a majority of architects worked in large design institutes and were divided into the artistic

and designing and the technical and implementation groups, most architects nowadays work in small studios or completely individually. This had a major impact on the architectural education and made the faculties of civil engineering gradually transform their programmes of civil engineering into a more complex study of architecture and civil engineering. This development was also accelerated by the entry into the European Union and an effort to harmonize the education of architects at the faculties of civil engineering with the requirements of the Directive on the recognition of professional qualifications in the field of architecture.

Architecture and urban planning are now therefore studied not only at the faculties of architecture and art academies, but also at the faculties of civil engineering. In 1994, a new faculty of architecture was founded at the Technical University of Liberec, and the Faculty of Civil Engineering was founded at VŠB-Technical University of Ostrava in 1997. In 2010, the first private college with an architectural programme (Architectural Institute in Prague) was accredited in Prague. The field of landscape architecture or related fields of design are also offered at other faculties and universities (technical, artistic and agricultural) with a varied emphasis on the specifics of the graduate profile; however, such programmes are controlled by the respective directives on the recognition of professional qualification.

Other directions and concepts of education in the field of architecture are established on this basis. The study programmes of architecture are gradually harmonized with the European programmes; all architectural programmes at the Czech faculties of architecture (the Czech Technical University in Prague, the University of Technology in Brno, the Technical University of Liberec) and art academies (the Academy of Arts, Architecture and Design in Prague and the Academy of Fine Arts in Prague) were notified in the years 2007 - 2012. The association between renowned architects in teaching and achieving a balance between studio teaching and technical disciplines, as well as field-specific architectural disciplines including humanities, socioscientific courses and artistic courses, show the trend and the functions of this subject area – to keep maintaining and guaranteeing the comprehensiveness of education.

## PRIMARY FIELDS

In accordance with the valid legislation of Act No. 360/1992 Coll., architectural education is divided into the following three fields that are authorized by the Czech Chamber of Architects:

- architecture,
- urban planning,
- landscape architecture.

The fields of architecture, in accordance with the European standards, deal mainly with the design of buildings and urban planning; the fields of urban planning themselves are reserved to the graduates of other study programmes than the architectural ones. Landscape architecture is a relatively independent field, which is however linked to the traditional field of architecture via many connections and bonds; architecture, that is, also affects nature and landscape, and the knowledge of such subjects forms a standard part of the architectural education, even if its scope is not enough to meet the requirements for the so-called “recognized” education, and is considered to be a mere “related” education.

## DEFINITION OF THE OBJECTIVES OF EDUCATION

The requirements for the length and manner of education and the requirements for the basic knowledge, skills and abilities of an architect, determined by Directive 2005/36/EC and Act No.

360/1992 Coll., are defined in 11 articles listed in the Annex to the above Act. The architectural training at universities must, according to this standard, ensure a balance between the theoretical and practical aspects of architecture, and lead to the achievement of:

- an ability to create architectural projects that meet both aesthetic and technical requirements,
- adequate knowledge of the history and theory of architecture and related arts, technologies and humanities,
- a knowledge of the fine arts as one of the influences on the quality of an architectural work,
- adequate knowledge of urban design, planning and the skills involved in the process of designing,
- an understanding of the relationship between people and buildings, and between buildings and their environment, and the need to relate buildings and the spaces between them to human needs and scales,
- an understanding of the profession and the role of the architect in society, in particular in preparing designs that take account of social factors,
- a knowledge of the methods of investigation and preparation of assignments for a project design,
- an ability to understand the structural design, constructional and engineering problems associated with the building design,
- adequate knowledge of physical problems and technologies and of the function of buildings in order for them to provide suitable internal conditions of comfort and protection against the weather,
- the necessary design skills to meet the building users' requirements within the constraints imposed by cost factors and building regulations,
- adequate knowledge of the industries, organizations, regulations and procedures related to the integration of sub-projects within the overall project.

The theoretical and practical training leading to the architectural qualification, in conformity with the requirements of Directive 2005/36/EC on the recognition of professional qualifications, must also have the following formal characteristics:

- the total duration of the theoretical and practical education must include either at least four years of full-time study at a university or comparable educational institution, or at least six years of study at a university or comparable educational institution, of which at least three years take the form of full-time study,
- the education must be completed by a successful passing of an examination in order to obtain the academic title.

In accordance with the above standards, the Czech Chamber of Architects monitors the temporal and proportional balance of the education in three basic blocks for the entire period of study; these blocks must provide the students with the required knowledge, skills and abilities:

- studio courses;
- the basic profile subjects in architectural, urban and landscape disciplines, including the arts, humanities, social sciences and supporting disciplines;
- scientific and technical and managerial courses, including supporting disciplines.

The purpose of the requirement for a balance of the content and form of study at the Bachelor's and Master's levels, especially during the first four years of study (directly from the first year, based on an interconnection between the studio education, the basic profile courses and technical courses), is monitoring the comprehensiveness and universality of the education, and an effort to prevent a premature specialization, "*which might keep the student from acquiring an overall balanced view of various important aspects of the education and training required from architects*", as is stated in the ACETA Recommendation of April 2007, as regards the evaluation of structured architectural



programmes. This document is implemented by the Czech Chamber of Architects when assessing and deciding on including a programme in “*the list of schools with recognized education*”, and by the advisory bodies of the European Commission when notifying schools within the EU and listing them in Annex V of Directive 2005/36/EC, which authorizes an automatic recognition of the qualifications in the field of architecture throughout Europe.

## GENERAL PROFILE OF GRADUATES

The education of architects in the Czech Republic is generally structured into the Bachelor's, Master's and doctoral degrees. In order to be able to work as an authorized architect, the student must complete the Master's degree, as is expressly determined by Section 8 (2) a) of Act No. 360/1992 Coll., on the profession of authorized architects and authorized engineers and technicians active in construction, as amended. The doctoral study is focused on a deeper study of individual theoretical, research and scientific or artistic issues, and is only marginally related to the profession itself.

Graduates of the **Bachelor's study programmes** in the field of architecture have the basic and decisive knowledge and skills needed for the profession - the necessary knowledge of technical, artistic, ecological, sociological, demographic and economic disciplines within architecture, with an ability to understand the mutual connections; the necessary knowledge of the theories, concepts and methods of the field that enable the graduate to collect data and analyze a given problem, or to perform technical, constructional and controlling functions; an understanding of the possibilities, conditions and limitations of the use of the theories, concepts and methods in practice. In addition to the above mentioned knowledge, with the use of specialist knowledge and based on a generally defined task, graduates of the Bachelor's study programmes can solve practical problems in the field, find, organize and interpret information relevant to resolving a defined practical problem in the field, use some basic techniques and artistic methods to the extent necessary for dealing with practical problems in practice, including designing simple innovative procedures.

The aim and purpose of the Bachelor's study is to provide students with the possibility of a transfer between schools on the basis of a comparable educational system and prepare them for the Master's study or enable them to pursue the profession under the supervision of an authorized architect; with architecture, as is the case with other comparable independent (liberal) professions - such as doctors or lawyers, that require high levels of qualifications and extensive practical experience acquired under professional guidance, before they commence an independent, responsible professional practice, students are required to complete the Master's degree before they pursue the profession; in total, together with the follow-up Master's study of at least two years, the education meets the standard requirement of five-year duration, which should be followed in the Czech Republic by at least three years of professional experience under supervision. The completion of the Bachelor's study thus does not allow such graduates to apply for authorization under the same conditions that apply to the Master's graduates; the Bachelor's education is considered a mere related education. During the test of professional competency, the applicant must therefore demonstrate the knowledge of the missing part of the study in a special field examination covering the scope of the state exam. Their practice licence and the length of supervised practice must also meet specific criteria.

A possible inclusion of the Bachelor graduates in professional practice and their professional possibilities in the subsequent practice also follow from the above facts. Even though the Bachelor's study does not enable the graduates to pursue the same professions as the Master graduates, it is a basic educational level of a coherent higher education the graduates from which can work on positions that require education in the field; however, they cannot pursue the profession independently.

Within the activity and functional classification, under the conditions pursuant to Act No. 360/1992

Coll., as regards the authorization by the Czech Chamber of Architects in the field of architecture, graduates of the Bachelor's study programme are entitled to carry out activities that rank among medium-skilled professional activities, authorizing for management of component parts of contracts and resolving partial issues; as the length of practice increases, selected capable graduates can also gradually step up to positions that are classified as highly skilled.

Graduates of the Bachelor's study programme who do not wish to pursue an independent professional practice in the field of architecture can work in an office under the supervision of an authorized architect or in the public administration, for example at building offices, provision authorities, offices for the conservation of monuments or the protection of nature and landscape, and other specialized administrative offices that require the minimum of a Bachelor's degree, completed by special proficiency examinations according to special legislation.

Despite the above limitations imposed on the competencies of pursuing the profession and the restricted access of graduates of the Bachelor's architectural programmes to independent professions, the Czech Chamber of Architects and the European institutions, when assessing and notifying architectural study programmes, that is, including them in "*the list of schools with recognized education*", consider the Bachelor's programmes to be the basic criterion and, in terms of their content and structure, the most important level of education. During the Bachelor's study, the basic parameters and the quality of the whole education are fixed, based on the comprehensiveness and universality of education, required from the beginning of the studies in the case of architectural programmes, completed by increasing the amount of knowledge and skills in the Master's programmes. For this reason, the Chamber and the advisory bodies of the European Commission, when assessing the architectural programmes, place a great deal of emphasis on the fulfilment of the requirements controlled by the Directive and the law, especially as regards the evaluation of the content and structure of the Bachelor's study programmes. In the Bachelor's programme, that is, the students of architecture acquire the basic and decisive knowledge and skills to pursue the profession; the Master's programme generally "only" complements this knowledge and skills with related fields of urban planning and landscape architecture, and the knowledge needed to be able to pursue independent professions in the field of management and law.

Graduates of the **Master's study programmes** in the field of architecture demonstrate an enhanced understanding of theories, concepts and methods corresponding with the current state of knowledge in architectural fields that enable one to pursue highly skilled professions in the area of civil engineering, as well as to prepare, implement and manage demanding building activities, analyze and synthesize problems of the architectural practice, e.g. the operation and management of the office and the management of architectural, landscaping or urban planning jobs, and also to pursue independent design and planning activities in relation to the provision of related professional services and legal information (legal environment). In addition, they demonstrate an understanding of the possibilities and conditions of and restrictions on the use of knowledge gained in related fields for the solution of architectural issues.

In addition to the above mentioned knowledge, using their specialist knowledge, graduates of the Master's study programmes can independently identify and creatively solve theoretical and practical problems of the architectural practice, in particular:

- develop urban planning documentation, including planning documents,
- prepare project documentation (including relevant planning documents), with the exception of engineering buildings,
- prepare project documentation of garden landscaping including planning documents and relevant parts of the planning documentation,
- participate in the preparation of the project documentation of engineering buildings, made by an authorized engineer, especially in the case of buildings which are designated as significant buildings by a special regulation, urban plan or a decision of the planning authority, in

- terms of architecture or urban planning,
- perform architectural or urban construction surveys,
- issue expert opinions, process documentation and reports for the partial evaluation of the impact of buildings on the environment, also for the purposes of proceedings at the state authorities,
- prepare project documentation of the interior of buildings,
- perform an author or technical supervision over the implementation of the building.

Graduates of the Master's study programmes can independently and creatively solve complex problems using selected theories, concepts and methods of civil engineering, can realize extensive analytical-synthetic works within a building company and within a civil engineering production, are able to:

- manage the implementation of simple buildings,
- perform geodetic measurements for design activities and surveying work, unless a special regulation provides otherwise,
- represent the developer or planner on the basis of authority in land, building or final inspection proceedings,
- hold specific functions in the bodies of state administration in territorial planning or building regulations, unless a special regulation provides otherwise.

Graduates of the Master's study programmes can apply some of the advanced research practices in the fields of civil engineering and geodetics in a manner allowing for gaining new original information based on the theory and practice.

In **architectural disciplines**, recognized professional education which is a condition for granting authorization in the field of architecture means a study with a primary focus on architecture, urbanism and urban planning, conceived throughout the studies as a multidisciplinary education, with a temporal and proportional balance of technical disciplines and humanities and theoretical and practical courses that provide the graduate with knowledge, skills and abilities determined by Directive 2005/36/EC and Act No. 360/1992 Coll., defined in the above 11 articles also published in the Annex to the said Act.

In the fields focused on **urban planning**, recognized professional education which is a condition for granting authorization in the field of urban planning means a study with a primary focus on urbanism and urban planning, conceived throughout the studies as a multidisciplinary education, with a temporal and proportional balance of technical disciplines and humanities and theoretical and practical courses that provide the graduate with the following knowledge, skills and abilities:

- skills and abilities to develop urban plans and projects and planning documentation that satisfy both natural and cultural, social, economic and technical requirements,
- knowledge of the history and theory of urbanism (urban design) and urban planning and related natural sciences, humanities and technical sciences,
- knowledge and understanding of culture as one of the main influences on the quality of urban plans and projects and planning documentation,
- to an adequate extent, the knowledge and understanding of architecture, civil engineering and the urban infrastructure, and skills associated with the process of planning,
- understanding of the relationship between people and the urban environment and between the urban environment and landscape, the need to design different spaces and environments in accordance with human needs and scales,
- an understanding of the profession and the role of the urban and planning architect in society, in particular in preparing designs that take account of social factors,
- knowledge of the methods of research and analyses and preparation of the assignments for the development of urban projects or planning documentation,

knowledge of the whole process of urban planning and design, and the skills and abilities to solve the natural, cultural, social, economic and technical issues of the land and the care of its values,  
 knowledge of the construction technology shaping the environment, especially with respect to health care, the natural landscape and environmental components in order to improve the quality of life,  
 skills and abilities to plan so as to meet the users' requirements within the constraints of the given economic possibilities and legal and technical regulations,  
 knowledge of the relevant disciplines, fields, technologies, regulations and procedures that must be coordinated within the urban creation, when planning activities and for the implementation of planning documents.

In the fields focused on **landscape architecture**, recognized professional education which is a condition for granting authorization in the field of landscape architecture means a study with a primary focus on the design and planning of landscapes in built-up and open areas including the care for nature and landscape and its sustainable development, conceived throughout the studies as a multidisciplinary education, with a temporal and proportional balance of natural sciences, technical disciplines and humanities and theoretical and practical courses that provide the graduate with the following knowledge, skills and abilities:

skills to create garden plans and designs and landscape plans and projects that satisfy both natural and cultural, aesthetic and technical requirements,  
 knowledge of the history and theory of landscape architecture and related arts, natural sciences, humanities and technologies,  
 knowledge and understanding of culture as one of the main influences on the quality of a landscape architectural work,  
 to an adequate extent, the knowledge and understanding of architecture and civil engineering, urban planning and skills associated with planning and design,  
 an understanding of the relationship between people and landscape, people and landscape architectural works, and between these works and their environment, and the need to relate the garden and landscape to human needs and scales,  
 an understanding of the profession and the role of the landscape architect in society, in particular in preparing designs that take account of social factors,  
 knowledge of the methods of research and analyses and preparation of the assignments for the development of landscape projects or landscape planning,  
 knowledge of the whole process of planning landscape architecture, and skills to solve natural landscape, technological, constructional and engineering problems associated with landscape architecture,  
 knowledge of the biological laws, technologies and features of garden and landscape plans and projects designed to provide a high-quality user and technical standard and to lead to an improvement of environmental quality,  
 skills and abilities to design and plan so as to meet the requirements of the users of landscape architecture and landscape plans, within the constraints of the given economic possibilities and legal and technical regulations,  
 knowledge of the disciplines, fields, technologies, regulations and procedures relating to the integration of individual special projects and plans in the overall project or plan, and organization of the overall project or plan.

Graduates of the **doctoral study programmes** in the field of Architecture can, in addition to the profession itself, work as researchers or university teachers in the relevant fields. They demonstrate a deep and systematic knowledge and understanding of the theories, concepts and methods that are at the forefront of knowledge at the international level, enabling them to pursue conceptual and

Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates		
<p>they demonstrate the necessary knowledge and understanding of the subject and scope of architectural disciplines - architecture and urban planning and landscape architecture, corresponding to the contemporary state of knowledge, especially in all the elementary and partly also the related disciplines in their field, in a reasonable range of requirements of Act No. 360/1992 Coll. and Directive 2005/36/EC on the recognition of professional qualifications in the field of architecture and requirements of the CCA Authorization Procedure in the fields of urban planning and landscape architecture, characterized by an emphasis on the unique profiling of the studies on a given field, all the time conceived as a multidisciplinary, universal and comprehensive education with a time and proportionally balanced ratio of vocational and technical and theoretical disciplines and humanities, practical courses and specific forms of learning, with architectural fields from the beginning being based on a high proportion of studio teaching, promoting an understanding of the context and application of a holistic approach in practice; they also demonstrate the acquisition of the necessary professional theoretical and practical</p>	<p>they demonstrate an extensive knowledge and understanding of the subject and scope of architectural disciplines - architecture and urban planning and landscape architecture, corresponding to the contemporary state of knowledge in all the elementary and also the related disciplines in their field, in a reasonable range of requirements of Act No. 360/1992 Coll. and Directive 2005/36/EC on the recognition of professional qualifications in the field of architecture and requirements of the CCA Authorization Procedure in the fields of urban planning and landscape architecture, characterized by an emphasis on the unique profiling of the studies on a given field, all the time conceived as a multidisciplinary, universal and comprehensive education with a time and proportionally balanced ratio of vocational and technical disciplines and humanities, theoretical and practical courses and specific forms of learning, with architectural fields from the beginning being based on a high proportion of studio teaching, promoting an understanding of the context and application of a holistic approach in practice; they also demonstrate the acquisition of the necessary professional theoretical and practical knowledge in all</p>	<p>they demonstrate a deep and systematic knowledge and understanding of the subject and scope of the field corresponding with the current state of knowledge that enables communication not only within the given field, but also with the representatives of boundary and other fields, they are for example well acquainted with the whole field of architecture, urban planning and landscape architecture, to an extent exceeding the level of the Master's students; they have theoretical knowledge of the basic and the necessary related disciplines that are studied to such a degree that they can be directly used for examining the selected individual subfield. They have deep theoretical and practical knowledge above all in the specific selected field of their specialization. The study is focused on the individual scientific, research and artistic areas of their specialization.</p> <p>they demonstrate a deep and systematic knowledge and understanding of the theories, concepts and methods that are at the forefront of knowledge in the field at the international level, enabling them to pursue conceptual, managerial and planning activities in practice in the field of scientific research;</p>

## PROFESSIONAL KNOWLEDGE



# EDUCATION DESCRIPTORS

PROFESSIONAL KNOWLEDGE		
Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates		
<p>knowledge, especially in the elementary and partly related disciplines of education required in the individual fields of application in practice at the Bachelor's level and in the subsequent Master's study, in addition to theoretical knowledge of the essential disciplines of natural sciences, social sciences and humanities, such as ecology, sociology, history of art and architecture, etc., and the basic practical field disciplines - such as studio production, theory of construction, urban development, construction, protection of buildings, sites and landscapes or dendrology, etc.; they will gain a partial knowledge of related disciplines - environment, technical equipment and technology of buildings, building materials, supporting structures, infrastructure of settlements, or the creation and maintenance of lawn and planting, etc., they demonstrate the necessary knowledge of the theories, concepts and methods of the field, enabling them to collect data and carry out the analysis and synthesis of a problem, pursue a professional practice under the supervision of an authorized architect or lower managerial functions and the management of individual parts of projects, they for example understand the methods of</p>	<p>the elementary and related disciplines of education required in the individual fields concerning the approach to the given profession; in addition to an extension of the already acquired knowledge of the basic disciplines in the field, the study is aimed at the acquisition of knowledge of related fields, necessary for large-scale projects and plans, and the knowledge of management, economics and law, needed in order to be able to pursue the profession and higher managerial functions independently; in all the listed disciplines, the gained knowledge is wider and deeper than in the case of graduates from the Bachelor's studies,</p> <p>they demonstrate an extensive knowledge and understanding of the theories, concepts and methods corresponding with the current state of knowledge in the architectural, urban and landscape fields, enabling them to hold the highest possible functions in these professions; they are able to prepare, implement and manage legally defined planning, designing and building activities, analyze and synthesize technical problems, they for example demonstrate the knowledge and understanding of the use of all the theories, concepts and methods, so that they</p>	<p>they for example understand the scientific methods used in the field of their focus and are able to apply and innovate them; they demonstrate an understanding of the system of sciences and research problems on the boundaries between the fields of civil engineering, architecture, urban planning and landscape architecture allowing for an interdisciplinary cooperation; they demonstrate knowledge not only of architecture, urban planning and landscape architecture which enables them to manage research and creative activities, acquire deep theoretical,</p>

Bachelor's study programme	Master's study programme	Doctoral study programme
<p>processing all the stages of a project, functional and spatial designs of buildings, lands or landscapes, including the knowledge needed to be able to design details and products, or interior projects (or scenic buildings), they demonstrate an understanding of the possibilities, conditions and limitations of the use of theories, concepts and methods in the architectural, urban and landscape practice and related fields, such as civil engineering, forest engineering, ecology, etc., for example they can use creative methods when solving practical problems, and they decide independently based on their knowledge and understanding of the conditions, limitations and bonds between the individual field requirements.</p>	<p>can, upon meeting the requirements of the law and the professional chamber, work as authorized or registered architects in the authorized fields of architecture, urban planning and landscape architecture, or within individual specializations focused on the design of urban systems of ecological stability, of related non-regulated fields - scenic buildings, interior creation, design etc.,</p> <p>they demonstrate an understanding of the possibilities, conditions and limitations of the use of the knowledge of related fields for the solution of problems of the architectural, urban or landscape practice, they for example demonstrate an understanding of the use and application of the knowledge of related fields, such as material, civil and forest engineering, ecology, economics, design etc., corresponding with the requirements for the profession, when working on innovative methods in the field of their profession and related fields, such as civil engineering, agriculture, forestry etc., they demonstrate the ability to use new artistic and technical methods, materials, constructions and technologies including aspects of sustainable development.</p>	<p>practical and scientific knowledge, and pursue their own scientific work, but also of another related field according to their further specialization, for instance civil engineering, transport, agriculture, ecology, economics, design, art history etc.</p>

## PROFESSIONAL KNOWLEDGE

# ARCHITECTURE



# EDUCATION DESCRIPTORS

## PROFESSIONAL SKILLS

Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates		
<p>using the specialist knowledge and knowledge of related fields (due to their skills, acquired and verified via repeated application during project-oriented studio courses throughout the studies), based on a specifically given task, they are able to solve practical issues in their field, for example pursue individual parts of the given professional activity in construction within the scope of the obtained professional certificates - they can participate in designing and planning activities, the implementation and management of construction, research and management of construction, research processing, coordination of specialists, supervision of constructions etc.; they are able to design and implement minor constructions using well-known and verified methods and technologies. They are able to understand the issue of large systems and, as team members, independently implement their individual parts; they are able to justify and document the selected methods, participate in the implementation and management of simple constructions and supervise the implementation, they can prepare extensive documentation, especially in the case of common or previously implemented solutions, they can find, classify and interpret</p>	<p>using the specialist knowledge and knowledge of related fields (due to their skills, acquired and verified via repeated application during project-oriented studio courses throughout the studies), they can independently define and creatively solve theoretical and practical problems in their field, and after the completion of the legally established professional practice and acquisition of the authorization, they are eligible to pursue the relevant professional activities in construction; they can for example independently prepare planning documentation including planning documents, prepare the project documentation of urban buildings or gardens or landscapes including planning documents and relevant parts of the planning documentation, they are able to participate in the preparation of the project documentation of engineering buildings made by an authorized engineer, carry out architectural or urban surveys, issue expert opinions, process documentation and reports for individual assessments of the impact of constructions on the environment, prepare the project documentation of interiors, provide an author or technical supervision over the implementation of a building; they are</p>	<p>they are able to design and use advanced research methods in the field of architecture, urban planning and landscape architecture in a manner allowing for an expansion of knowledge gained by means of original research in order to solve problems and innovations of professional practice and scientific research and artistic activities in their field; they can for example propose new, efficient and theoretically well justified solutions based on original technical and artistic ideas that are accepted by the international scientific and professional community in the area, and can realize extensive and complex works, usually as leaders of research teams; to find solutions, they are able to choose the appropriate processes as well as technologies based on the use of the latest findings, they can individually defend the proposed solutions in professional discussion at the international level,</p> <p>they are able to develop and evaluate theories, concepts and methods in the fields of architecture, urban planning and landscape architecture, including defining fields or their inclusion in the broader area of related disciplines according to their specialization; for example, they can implement, evaluate,</p>

Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates		
<p>information relevant to the solution of the defined practical problem in the field, they can for example analyze the requirements in the assignment and determine the links and requirements related to the work; they are able to compare, evaluate and select suitable methods and technologies with regard to the standard, quality of the work and sustainable development, they are able to tell whether a problem can be solved via the known methods and procedures, they can solve relatively demanding individual tasks, they are able to underline and justify the architectural and urban value of the final solution, they are able to defend the proposed solution in the team or during a professional discussion, they can use some basic technical, research and artistic methods to the extent needed to solve practical problems in the field, including the proposal of simple innovative procedures; they can for example solve artistic, technical and technological problems in assignments using simple theoretical and research knowledge from the conceptual level to the solution of all the details and the whole problem.</p>	<p>also able to implement simple structures, take measurements and perform the layout of buildings, represent builders during the individual proceedings or hold professional functions in the field of urban planning and building regulations within the state administration bodies,</p> <p>they can independently and creatively solve complex problems using selected theories, concepts and methods of civil engineering, architecture, urban planning and landscape architecture, they can prepare extensive analytical and synthetic papers in the stage of the preparation and implementation of an architectural proposal, urban plan or landscape modifications, they can for example analyze the requirements of assignments and determine the links and requirements of a work, they are able to compare, evaluate and select suitable theories, concepts and methods and suitable materials, constructions and technologies with regard to the standard, quality of the work and sustainable development; they are able to tell whether a problem can be solved via known methods and procedures, and in the case of non-standard situations, they are able to modify the methods accordingly; they are able to design</p>	<p>compare and develop the most complex theories, methods and procedures that are currently available, anticipate developments in their field, solve interdisciplinary problems requiring not only the knowledge of their field, but also the knowledge of related fields,</p> <p>they are able to implement applied research and artistic and creative activities, verify hypotheses in practice, or propose a practical use for the findings of a research, theoretical research and creative activity.</p>

# EDUCATION DESCRIPTORS

Bachelor's study programme	Master's study programme	Doctoral study programme
	<p>Study programme graduates</p> <p>large-scale works, which requires a complex and integral way of thinking and demanding thought and creative processes, and implement such processes as the leader or a member of a team, since they can independently implement individual demanding tasks and defend the proposed solution in the team or in professional discussions,</p> <p>they can use some of the advanced research or artistic methods in the fields of civil engineering, architecture, urban planning and landscape architecture in a manner enabling them to obtain new original information or innovations grounded in both theory and practice, they can for example apply new technical, scientific and artistic results and methods to practice on the basis of a study of literature, projects and implementations,</p>	

□

# ARCHITECTURE

<p><b>Professional skills</b></p>	<p>using the specialist knowledge and knowledge of related fields (due to their skills, acquired and verified via repeated application during project-oriented studio courses throughout the studies), based on a specifically given task, they are able to solve practical issues in their field, for example pursue individual parts of the given professional activity in construction within the scope of the obtained professional certificates - they can participate in designing and planning activities, the implementation and management of construction, research processing, coordination of specialists, supervision of constructions etc.; they are able to design and implement minor constructions using well-known and verified methods and technologies. They are able to understand the issue of large systems and, as team members, independently implement their individual parts; they are able to justify and document the selected methods, participate in the implementation and management of simple constructions and supervise the implementation, they can prepare extensive documentation, especially in the case of common or previously implemented solutions, they can find, classify and interpret information relevant to the solution of the defined practical problem in the field, they can for example analyze the requirements in the assignment and determine the links and requirements related to the</p>	<p>using the specialist knowledge and knowledge of related fields (due to their skills, acquired and verified via repeated application during project-oriented studio courses throughout the studies), they can independently define and creatively solve theoretical and practical problems in their field, and after the completion of the legally established professional practice and acquisition of the authorization, they are eligible to pursue the relevant professional activities in construction; they can for example independently prepare planning documentation including planning documents, prepare the project documentation of urban buildings or gardens or landscapes including planning documents and relevant parts of the planning documentation, they are able to participate in the preparation of the project documentation of engineering buildings made by an authorized engineer, carry out architectural or urban surveys, issue expert opinions, process documentation and reports for individual assessments of the impact of constructions on the environment, prepare the project documentation of interiors, provide an author or technical supervision over the implementation of a building; they are also able to implement simple structures, take measurements and perform the layout of buildings, represent builders during the individual proceedings or hold professional functions in the field of urban planning and building regulations within the state administration</p>
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they are able to design and use advanced research methods in the field of architecture, urban planning and landscape architecture in a manner allowing for an expansion of knowledge gained by means of original research in order to solve problems and innovations of professional practice and scientific research and artistic activities in their field; they can for example propose new efficient and theoretically well-justified solutions based on original technical

## 2.24 CIVIL ENGINEERING

### A BRIEF DESCRIPTION OF THE CHARACTER, THEMATIC SCOPE AND HISTORY OF THE FIELD

Civil engineering as a technical discipline is among the oldest fields of higher technical education. The oldest technical university in Central Europe was founded in Prague as an institution for the builders of military defences, and is considered to be the institution on which the continuous development leading to the today's Czech Technical University in Prague was based. From the 18th century, can for example propose new efficient and theoretically well-justified solutions based on original technical

Since their beginnings, civil engineering fields have been widely profiled - from surveying, building and artistic ideas that are accepted by the international scientific and professional community in the area and can realize extensive and complex works, usually as leaders of research teams, to find solutions, they are able to choose the appropriate processes as well as technologies based on the use of the latest findings, they can individually defend the proposed solutions in professional discussion at the international level.

The main objective of tertiary education in civil engineering is to train creative graduates with high theoretical and practical qualities. The width of range in civil engineering leads to a relatively narrow specialization at all university institutions and division of study into a number of fields. Yet these fields share, especially in the first years, the classic common foundations.

The work of a civil engineer or Bachelor of civil engineering includes a creation, transformation and preservation of environment - it is significant in terms of culture, history, economics and politics. Other directions and concepts of education in the field of civil engineering are established on this basis.

they are able to develop and evaluate theories, concepts and methods in the fields of architecture, urban planning and landscape architecture, including defining fields or their inclusion in the broader area of related disciplines according to specialization; for example, they can implement, evaluate, compare and develop the most complex theories, methods and procedures that are currently available, anticipate developments in their field, solve interdisciplinary problems requiring not only the knowledge of their field, but also the knowledge of related fields, management piping networks, revitalization of water courses and reservoirs, waste in water management).

they are able to implement applied

they are able to implement applied

they are able to implement applied

they are able to implement applied

they are able to implement applied

they are able to implement applied

4. **building constructions** (development of knowledge in the field of the theory, construction, reliability and failure mechanisms of buildings, with a selection of further specializations, i.e. the mechanics of supporting structures, concrete and masonry constructions, metal, wooden and composite constructions, geotechnics, or experimental techniques and testing),
5. **fields of transport structures** (rail constructions, roads),
6. **material fields** (development of knowledge in the field of the theory of building materials with the following basic disciplines - physics of substances, physical chemistry of silicates, theory of composite materials, microstructure of building materials, use of building materials, durability and maintenance of materials and constructions, measuring and diagnostic methods, modeling of physical processes and tasks of building physics),
7. **geodetics and cartography**.

Primary fields at civil engineering faculties include also sets of theoretical courses as well as courses of a broader scientific basis, which must be mastered by all qualified university graduates employable in the field of civil engineering.

Individual faculties further specialize in some interdisciplinary or unconventional study programmes, e.g. economic and managerial programmes in civil engineering (development of knowledge in the field of construction investments, project management, corporate management, spatial economics, value analysis, quality management, marketing management and risk management), environmental engineering, military buildings, property management and operation of buildings, geotechnics etc.

## DEFINITION OF THE OBJECTIVES OF EDUCATION

The objective of education in the subject area “Civil Engineering” is to educate graduates so that they acquire knowledge, skills and understanding of the phenomena and processes of the main civil engineering fields, i.e. fields of civil engineering in a broader sense, preparation and implementation of buildings, fields of water structures, building constructions, transport structures, material fields and geodetics and cartography.

The objective of education is to provide each graduate with specialist knowledge, professional skills and general competencies in the subject area “Civil Engineering”, which correspond with the completed qualification level. When completing studies in a particular field of this subject area, graduates shall be able to demonstrate appropriate specialist knowledge and skills in the studied field.

## GENERAL PROFILE OF GRADUATES

Graduates of the **short cycle** in the subject area “Civil Engineering” demonstrate specialist and detailed knowledge and understanding of natural scientific, technical, information and civil engineering fields, they demonstrate knowledge of the methods required for pursuing independent construction and basic geodetic activities connected with practical activities on construction sites, they are able to find and classify information relevant for the solution of the defined practical problem in the construction and geodetic practice, they can solve practical problems in the construction and geodetic practice.

Graduates of the **Bachelor’s study programmes** in the subject area “Civil Engineering” have the knowledge and understanding of technical, artistic, ecological, sociological, demographic and economic disciplines within civil engineering, with an ability to understand the mutual connections;



the necessary knowledge of the theories, concepts and methods of the field that enable the graduate to collect data and analyze a given problem, or to perform technical, constructional and controlling functions; an understanding of the possibilities, conditions and limitations of the use of the theories, concepts and methods in the construction practice. They are able to draw on specialist knowledge in order to deal with practical problems in the discipline of civil engineering when presented with a broadly specified task, especially at lower levels of management.

In addition to the above mentioned knowledge, with the use of specialist knowledge and based on a generally defined task, graduates of the Bachelor's study programmes can solve practical problems in the field, find, organize and interpret information relevant to resolving a defined practical problem in the field, use some basic techniques and artistic methods to the extent necessary for dealing with practical problems in practice, including designing simple innovative procedures.

Graduates of the **Master's study programmes** in the subject area "Civil Engineering" show an extensive knowledge and understanding of the subject and scope of the knowledge, skills and competencies of civil engineering corresponding to the current state of knowledge, including a knowledge of related disciplines required for performing the job. In the field of Civil Engineering, after obtaining the certificate of an authorized engineer, they are able to independently, safely and professionally manage complex construction works, and perform complex measurements within the fields of geodetics and cartography that are subject to verification.

Graduates of the **doctoral study programmes** in the subject area "Civil Engineering" demonstrate a deep and systematic knowledge and understanding of the theories, concepts and methods that are at the forefront of knowledge at the international level, enabling them to pursue conceptual and planning activities in practice as well as in the area of scientific research. They are able to design and use advanced research methods in the fields of civil engineering and geodetics and cartography in a manner allowing for an extension of knowledge via the original research in relation to resolving practical as well as scientific and research issues. They are able to implement applied research, verify hypotheses in practice, or propose a practical use for the research findings.

# EDUCATION DESCRIPTORS

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
<p>they demonstrate specialized and detailed knowledge and understanding of natural scientific, technical, information and civil engineering fields, for example the knowledge of mathematics and physics within Civil Engineering or perfect knowledge of lower geodetics within Geodetics and Cartography (measurements of lengths and angles, profiles, levelling, tacheometry as the basic geodetic tasks),</p> <p>they demonstrate a knowledge of the methods required for an independent performance of constructional and basic geodetic activities connected with practical activities on construction sites, within the field of Civil Engineering they for example demonstrate theoretical and practical knowledge of the basic methods of construction, within the field of Geodetics and Cartography they demonstrate theoretical and practical knowledge</p>	<p>they demonstrate a knowledge and understanding of the natural scientific, technical, economic and information disciplines within the scope of civil engineering, with an ability to understand the mutual context,</p> <p>they demonstrate a knowledge of the theories, concepts and methods of the field, enabling them to collect data a perform an analysis of the problem, perform technical constructional and managerial functions; within the field of Civil Engineering they for example demonstrate theoretical and practical knowledge which allows them to work as master builder, site manager and, upon meeting the professional requirements, authorized engineer; within the field of Geodetics and Cartography they demonstrate theoretical and practical knowledge which allows them to work as independent geodesists subject to verification by an officially</p>	<p>they demonstrate an extensive knowledge and understanding of the subject and scope of the civil engineering and geodetic fields corresponding with the current state of knowledge including a knowledge of related disciplines; they for example demonstrate theoretical, specialist and practical knowledge in the field of civil engineering, based on the current state of scientific knowledge, research and development,</p> <p>they demonstrate a broad and deep knowledge and understanding of the theories, concepts and methods corresponding with the current state of knowledge in the civil engineering and geodetic fields, enabling them to hold high positions in the field of construction; they further demonstrate an ability to prepare, implement and manage complex construction activities, an ability to analyze and synthesize problems of the construction</p>	<p>they demonstrate a deep and systematic knowledge and understanding of the subject and scope of the field corresponding with the current state of knowledge enabling them to communicate not only within the field but also with the representatives of boundary and other fields; in the field of Construction and Transport Structures they for example demonstrate a deep and systematic knowledge of the theory, construction, reliability and failure mechanisms of constructions, with a focus on the mechanics of supporting structures, concrete and masonry structures, metal, wooden and composite constructions, geotechnics, rail constructions, roads, or experimental techniques and testing; in the field of Physical and Construction Material Engineering they demonstrate the knowledge of the methodology of independent scientific work and a deep and</p>

PROFESSIONAL KNOWLEDGE

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
<p>required to pursue an independent career in geodetics including activities that are subject to verification by an officially entitled geodetic engineer, they demonstrate a knowledge of the theories and concepts on which the methods of the field are based, and a knowledge of their application in practice including construction works; within the field of Civil Engineering they for example demonstrate the knowledge of the basics of natural scientific theories and their application in practice, within the field of Geodetics and Cartography they demonstrate the knowledge of the basic mathematical theories and their application to the basic geodetic measurements on construction sites.</p>	<p>entitled geodetic engineer, and they demonstrate the knowledge necessary for them to be able to work at cadastral offices, they demonstrate an understanding of the possibilities and conditions for, and limitations on, the use of the theories, concepts and methods in the construction and geodetic practice.</p>	<p>practice, for example in the field of Civil Engineering they demonstrate the ability to work as authorized engineers upon the completion of professional examinations, and in the field of Geodetics and Cartography they demonstrate theoretical and practical knowledge enabling them to work as managers in geodetics and building implementation; upon meeting the respective requirements, they can also obtain an authorization to verify the outcomes of geodetic activities, and they demonstrate the necessary knowledge enabling them to work as managers at cadastral offices, they demonstrate an understanding of the possibilities, conditions and limitations of the use of a knowledge of related fields for the solution of practical problems; in the field of Civil Engineering they for example demonstrate the knowledge of possible applications of related</p>	<p>systematic knowledge of the disciplines of physics of substances, physical chemistry of silicates, theory of composite materials, microstructure of building materials, use of building materials, durability and maintenance of materials and constructions, measuring and diagnostic methods, modeling of physical processes and tasks of construction physics; in the field of Civil Engineering Management they demonstrate a deep and systematic knowledge of construction investments, project management, corporate management, spatial economics, value analysis, quality management, marketing management and risk management; in the field of Water Management and Water Structures they demonstrate a deep and systematic knowledge in the field of the theory of water management; among the constructional, technical and operational</p>

## PROFESSIONAL KNOWLEDGE

# EDUCATION DESCRIPTORS

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
			<p>applications are above all hydro-technic constructions, hydromelioration structures, public water supply, waste water treatment, urban drainage, water management systems, reconstruction of water management piping networks, revitalization of water courses and reservoirs, waste in water management,</p> <p>they demonstrate a deep and systematic knowledge and understanding of the theories, concepts and methods that are at the forefront of knowledge in the field at the international level, enabling them to pursue conceptual and planning activities in practice and in the area of scientific research; in the field of Civil Engineering they for example demonstrate theoretical and practical knowledge enabling them to hold managerial and scientific positions in civil engineering and related material and technology fields; in the field of</p>

PROFESSIONAL KNOWLEDGE

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
			<p>Geodetics and Cartography they demonstrate theoretical and practical knowledge enabling them to hold managerial and operational positions or manage research teams; upon meeting the respective requirements, they can obtain an authorization to verify the outcomes of geodetic activities, they demonstrate a knowledge of related fields, mainly natural sciences and technology, and innovation in the methods of solving problems and developing new measuring techniques and technologies, they demonstrate an understanding of the system of sciences and research problems on the boundary between civil engineering and geodetics, which allows for an interdisciplinary cooperation; in the field of Civil Engineering they are able to manage technological and research activities using deep theoretical, practical and scientific knowledge, and they are</p>

PROFESSIONAL KNOWLEDGE

# CIVIL ENGINEERING

# EDUCATION DESCRIPTORS

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
<p>they are able to find and organize information relevant to devising a solution to a specified practical task in the construction and geodetic practice,</p> <p>they are able to solve practical problems in the construction and geodetic practice, for example in the field of Civil Engineering they are able to solve some technological problems.</p>	<p>using specialist knowledge, on the basis of a specific given task they are able to solve practical problems in civil engineering especially at lower levels of management; in the field of Civil Engineering they are for example able to safely and professionally implement and manage construction works within the scope of their authorization, they can prepare parts of the project documentation of buildings (including the relevant urban planning documents) within the scope of their authorization according to the field of study, perform statistical and dynamic measurements of constructions, perform constructional, technical and engineering surveys, perform the testing and diagnostics of constructions unless a special regulation provides otherwise, issue expert opinions, process documentation and reports on</p>	<p>using specialist knowledge, they are able to independently define and creatively solve a theoretical or practical problem in the construction and geodetic practice; in the field of Civil Engineering they can for example independently manage and professionally manage complex construction works upon obtaining the authorized engineer certificate; in the field of Geodetics and Cartography they can perform complex measurements within geodetics and construction practice that are subject to verification, they can obtain authorization to verify the outcomes of geodetic activities, they can work as managers at the cadastral offices,</p> <p>they can independently and creatively solve a complex problem using the selected theories, concepts and methods of civil engineering, they can implement extensive</p>	<p>they can design and use advanced research methods in civil engineering and geodetics and cartography in a manner that enables them to increase knowledge by original research for the solution of practical and scientific problems; in the field of Civil Engineering they can for example use and creatively apply scientific knowledge in order to innovate techniques and technologies in practice; in the field of Geodetics and Cartography they can use and creatively apply scientific knowledge in geodetics and cartography in order to increase the efficiency and accuracy of geodetic measurements and calculations,</p> <p>they are able to develop and evaluate theories, concepts and methods of civil engineering and geodetic fields including the definition of fields or their classification into a broader area of related technical and natural scientific disciplines,</p>

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
	<p>individual assessments of the impact of structures on environment (also for the purposes of legal proceedings with public authorities), manage the implementation of constructions, perform geodetic measurements for projecting activities and surveying works unless special regulations provide otherwise, supervise the implementation of constructions, represent the builder or planner during the land, building or final inspection proceedings based on authorization, work as specialists for public authorities in the field of building regulations or urban planning unless a special regulation provides otherwise; in the field of Geodetics and Cartography they are able to perform complex geodetic measurements and work as executive officers for the cadastral offices. Unless they have obtained the required certification, the outcomes of their activities are subject to</p>	<p>analytical and synthetic works within a building organization and building production; in the field of Civil Engineering they can for example design, prepare and manage technological processes of construction and the implementation of constructions using the latest knowledge of related fields of technology; in the field of Geodetics and Cartography they can design and implement unconventional methods, innovations of devices and processing of special geodetic measurements, they can use some of the advanced research methods in the fields of civil engineering and geodetics in a manner that enables them to acquire new original information based on theory and practice; in the field of Civil Engineering they can for example apply new scientific results to practice and further develop practical knowledge based on literature; in the field</p>	<p>using specialist knowledge and based on a given task, they can independently address common practical issues in construction fields and implement simple practical activities, and implement complex activities under supervision; in the field of Civil Engineering they can for example manage simple construction works, read construction drawings, plan simple construction tasks; in the field of Geodetics and Cartography they can perform independent geodetic tasks that are subject to verification by an officially entitled geodetic engineer, they are able to collect and process relevant information within the assigned construction tasks; in the field of Civil Engineering they can for example process simple construction documentation; in the field of Geodetics and Cartography they can perform activities that are subject to verification by an officially</p>



# EDUCATION DESCRIPTORS

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
	<p>verification by an officially entitled geodetic engineer, they can find, organize and interpret information relevant to the solution of the defined practical problem in the construction and geodetic practice; in the field of Civil Engineering they can for example process individual parts of technical reports on construction works; in the field of Geodetics and Cartography they can write technical reports on the results of geodetic activities within the scope of their authorization, they can use some basic research methods in civil engineering and geodetics to the extent needed to solve practical problems in the field, including the proposal of simple innovative procedures; in the field of Civil Engineering they can for example solve technological problems using simple research knowledge.</p>	<p>of Geodetics and Cartography they can apply the latest scientific knowledge to practice during special and very accurate geodetic activities.</p>	<p>entitled geodetic engineer, they are able to implement applied research, verify hypotheses in practice, or propose a practical use for the research findings.</p>

## CHARACTERISTIC OCCUPATIONS AND RELEVANT REGULATED OCCUPATIONS

The primary profession of graduates from the Faculty of Civil Engineering is that of civil engineer or Bachelor of civil engineering; in the case of Geodetics and Cartography, it is geodetic engineer or Bachelor of geodetics.

The prescribed activities require an authorization which can be obtained from the respective professional chambers, and these graduates then work as authorized engineers or geodesists.

The fields of civil engineering are characterized by the existence of a professional chamber - Czech Chamber of Authorized Engineers and Technicians. Membership in the Chamber and authorization are necessary for the person to be able to perform many construction activities. For that reason, most faculties of civil engineering of the Czech technical universities offer four-year Bachelor's study programmes.

Graduates of the **short cycle** in the subject area "Civil Engineering" can perform independent construction and basic geodetic activities related to practical work on construction sites.

Graduates of the **Bachelor's study programmes** in the subject area "Civil Engineering" have specialist knowledge and skills which allow them to work as master builders, site managers and, upon meeting the professional requirements, authorized engineers; in the field of Geodetics and Cartography they can work as independent geodesists subject to verification by an officially entitled geodetic engineer, they can also work at the cadastral offices.

Graduates of the **Master's study programmes** in the subject area "Civil Engineering" have specialist knowledge and skills that enable them to hold high positions in the field of construction; they further demonstrate an ability to prepare, implement and manage complex construction activities, an ability to analyze and synthesize problems of the construction practice, for example in the field of Civil Engineering they demonstrate the ability to work as authorized engineers upon the completion of professional examinations, and in the field of Geodetics and Cartography they can work as managers in geodetics and building implementation; upon meeting the respective requirements, they can also obtain an authorization to verify the outcomes of geodetic activities, and they can work as managers at cadastral offices.

Graduates of the **doctoral study programmes** in the subject area "Civil Engineering" can, in addition to the profession itself, work as researchers or university teachers in the relevant fields.

## RELATIONS TO OTHER SUBJECT AREAS

Civil Engineering, as one of the technical engineering fields, is closely related to other technical disciplines - in the field of construction technology to the general mechanical and material engineering, i.e. the subject area "Mechanical Engineering and Materials", in the field of construction implementation to mechanical fields, i.e. again the subject area "Mechanical Engineering and Materials"; the fields of technical equipment are closely related to the subject areas "Mechanical Engineering and Materials", "Electrical Engineering" etc. Construction management is closely related to economic fields, i.e. the subject area "Economics", geotechnical fields and construction foundations are related to geology, i.e. the subject area "Earth Sciences", water structures are related to hydrology, chemistry and other natural scientific fields, i.e. the subject areas "Earth Sciences" and "Chemistry". The connection with the subject area "Architecture" is only too logical.

Due to the rapidly developing automation of measurement, acquisition and processing of data, geodetic fields are today oriented at physical, mathematical and aerospace industries and cutting-edge information and communication technology, i.e. the subject areas "Physics", "Mathematics and

Statistics”, “Mechanical Engineering and Materials”, “Information Technology and Cybernetics”.

All fields in the subject area “Civil Engineering” require the connections to theoretical fields of mathematics, physics, statics, construction mechanics, computer technology etc., i.e. the subject areas “Physics”, “Mathematics and Statistics”, “Mechanical Engineering and Materials”, “Information Technology and Cybernetics”.

## 2.25 ELECTRICAL ENGINEERING

### A BRIEF DESCRIPTION OF THE CHARACTER, THEMATIC SCOPE AND HISTORY OF THE FIELD

Electrical engineering as the third technical field joined the two existing fields, civil and mechanical engineering, at the end of the 18th century. First it was power electrical engineering, represented by electric motors and generators, and lighting and heating. Further development was enabled by high-frequency technology, electronics and microelectronics. Semiconductors and the technology of integrated circuits enabled the development of computer technology, which was hardly imaginable before. Practical applications of digital technology affected virtually all areas of human activity, especially communication and decision-making (management). Instrumentation parts of all information and cyber systems are still based on electrotechnics (microelectronics). There are futurological speculations about the potential of bionic implementations, but these are still in the phase of laboratory experiments.

The foundations of the faculties of electrical engineering originated at the faculties of mechanical engineering, later at the faculties of mechanical and electrical engineering.

The main objective of tertiary education in electrical engineering is to train creative graduates with high theoretical and practical qualities. The width of range in electrical engineering leads to a relatively narrow specialization at all university institutions and division of study into a number of fields. Yet these fields share, especially in the first years, the classic common foundations of theoretical physics, mathematics, the theory of circuits etc.

### PRIMARY FIELDS

Two historical fields - high- and low-current electrical engineering - divided into specialized primary fields with the development of knowledge:

High-current electrical engineering:

**The production and distribution of electrical energy** include the knowledge of all usable energy sources from conventional thermal power plants using fossil fuels to gas units and nuclear power. With regard to ecology, alternative sources based on photovoltaics and wind power plants are used more and more often. With increasing globalization and the necessary optimization of consumption, distribution systems have become very sophisticated and extensive systems with high demands on safety, reliability, the possibility of back-up etc.

**Electrical machines and devices** represent not only rotating machines - motors and generators, but also a wide range of additional components - switchboards, circuit breakers, switches, converters etc.

**Power electrical engineering** and **electrotechnology** are based on a vast array of applications and more or less direct use of specialized fields of electrical engineering. The field is also concerned with low-current applications, see *Low-current electrical engineering and electronics* below.

Low-current electrical engineering and electronics:

**Telecommunication technology** as a structured field is based on line communications

(telephony) and includes all types of transport and recording of information. The key role is played by systems using increasingly higher frequencies, signal digitization and brand new technologies. The field is increasingly more general and deals with the processing and transfer of digitized information. The theory and processing of signals is an important issue which originated in the field of telecommunication technology and also in the fields of the theory of electrical circuits and automation technology, and in many cases is an independent field.

**Microelectronics** originated as an independent field due to the huge application potential of micro- and nanotechnologies. The field also deals with power applications. On the boundary of microelectronics, there are currently the up-to-date constructions of sensors and actuators, formerly classified as “non-electrical variables converters”.

**Automation and measurement and control technology** are based on electrical engineering. That is why these systems have always been studied, developed and produced in the environment of electrical industry. The same goes for instrumental parts - hardware of digital processors and computers.

**Biomedical technology** originated as a combination of medical science and practice and increasingly more complex diagnostic and therapeutic devices. As is the case with automation technology, it is thus understandable that the necessary background for these - virtually service - activities lies within electrical engineering. This field does not include only service technologies for medical devices, but also the electrical manifestations of living organisms and the development of cutting-edge methods of signal processing, while signals are scanned in living organisms by various sensors.

**Electrotechnology** as a field is based on a vast array of applications and more or less direct use of specialized fields of electrical engineering. The field is also concerned with power applications, see *High-current electrical engineering* above.

**Theoretical electrical engineering** is no longer an independent primary field, with the exception of cases in which it covers various boundary issues which may belong in both the high-current and the low-current field. The field is based on a vast array of applications and more or less direct use of specialized fields of electrical engineering. This is why there is not much space left for basic theoretically-oriented research, which must be done within a different structure in order to maintain the development of the field. Therefore, there are specialized groups dealing with basic research tasks at some faculties or institutes.

## DEFINITION OF THE OBJECTIVES OF EDUCATION

The production of electrical systems, especially communication, automation and digital, is characterized by a high degree of integration of the individual components into functional blocks, produced with the use of the technologies of microminiaturization. Maintenance and any repairs are done via replacements of entire subsystems because the purchase price is only a fraction of the costs to repair a damaged part. This is especially true with everyday consumer devices (mobile phones, televisions, camcorders, cameras, refrigerators, washing machines etc.). The methodology of the design and construction of electrical devices is also strongly influenced by this fact. Although a relatively extensive knowledge of theoretical physics, mathematics, the theory of circuits and other scientific fields is required in order to understand the functional principles of devices, for their maintenance and operation it is enough to complete tertiary vocational education. This contradiction is problematic even for graduates of the Bachelor's study. The result is work based on the trial and error method, instead of at least partially theoretical analysis of the problem, its understanding and subsequent solution.

## GENERAL PROFILE OF GRADUATES

Graduates of the **short cycle** demonstrate specialist and detailed knowledge and understanding of the field of electrical engineering (or the specializations: high-current electrical engineering, low-current electrical engineering, electronics); using basic theoretical and practical knowledge, they can independently solve simple tasks in the field of electrical operations, compare the strengths and weaknesses of individual devices or systems.

Graduates of the **Bachelor's study programmes** demonstrate a broad knowledge and understanding of the field of electrical engineering and a broad knowledge of the methods used in such fields; they demonstrate an ability to apply theoretical and practical tools of the field in practice; using theoretical and practical knowledge, they can solve minor tasks in electrical operations; they can define the strengths and weaknesses of individual devices or systems, are able to decide the suitability of a product for the required activity and construct a complex system using components available in the market.

Graduates of the **Master's study programmes** demonstrate a broad knowledge of the theoretical foundations and practical methods, needed in the engineering professions in the fields of high- and low-current electrical engineering and electronics; they demonstrate a knowledge of related fields, are able to design and implement complex electrical and electronic systems; they can independently and creatively solve problems in the given field of electrical and electronic systems, are able to creatively use the latest knowledge and contribute to its optimum application.

Graduates of the **doctoral study programmes** demonstrate a deep and systematic knowledge and understanding of the field of electrical engineering, they demonstrate a deep and systematic knowledge of the theories, concepts and methods of solving problems in the field of electrical engineering, they demonstrate an understanding of the system of sciences and research problems in the field of electrical engineering/electronics and related (boundary) fields; they can use and design research methods, find new effective and progressive methods of learning the essence of problems in the field of electrical engineering/electronics; they can use and design new advanced research methods in the field of electrical engineering/electronics, they are able to carry out applied research, verify hypotheses in practice, or propose practical use of the research findings.

# EDUCATION DESCRIPTORS

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
<p>they demonstrate a specialist and detailed knowledge and understanding in the field of electrical engineering (or of the specializations: high-current electrical engineering, low-current electrical engineering, electronics); they for example understand the basic methods of work in the field of electrical engineering/electronics; they have a knowledge of physics at an adequate level, they demonstrate knowledge of methods used in electrical fields, they are for example able to understand the functional principles and laws based on which electrical and electronic devices operate;</p> <p>they are able to apply the practical tools of the field to individual specific cases, they for example know the rules for working in the field of electrical engineering</p>	<p>they demonstrate a broad knowledge and understanding in the field of electrical engineering (or of the specializations: high-current electrical engineering, low-current electrical engineering, electronics); they for example understand the basic methods of work in the field of electrical engineering/electronics. They have the necessary theoretical knowledge of physics and mathematics;</p> <p>they demonstrate a broad knowledge of the methods used in electrical fields, they are for example able to understand the</p>	<p>they demonstrate a broad knowledge of the theoretical foundations and practical methods needed in the engineering professions in the fields of high- and low-current electrical engineering and electronics; they have for example knowledge of basic scientific disciplines such as mathematics, physics, the theory of electrical and electronic circuits, communication systems, technologies and systems of automatic operation; they are able to devise complex operational devices and find optimum constructional variants (assembled from commercially produced components);</p> <p>they demonstrate a knowledge of the design and operation of complex electrical and electronic systems, for example they demonstrate knowledge of the functions and features of modern electrical and electronic systems at the level of current knowledge; according to their specialization, they focus on a narrower field of electrical</p>	<p>they demonstrate a deep and systematic knowledge and understanding of the field of electrical engineering/electronics; they for example have an overview of the current state of knowledge in the field (electrical engineering/electronics) and they are able to formulate issues which need to be addressed in order to acquire new knowledge;</p> <p>they demonstrate a deep and systematic knowledge of the theories, concepts and methods of solving problems in the field of electrical engineering/electronics and closely related fields (computer technology); they for example understand the nature of laws and restrictions that govern the operation of complex systems with elements based on electrical engineering/electronics;</p> <p>they demonstrate an understanding of the system of sciences and research problems in the field of electrical engineering/electronics and related (boundary) fields; they for example understand the professional</p>

PROFESSIONAL KNOWLEDGE



Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
<p>using basic theoretical and practical knowledge, they can independently solve simple tasks in the field of electrical operations, they are for example able to manage the operation and possible repairs of electrical and electronic systems under supervision;</p> <p>they can compare the strengths and weaknesses of specific devices or systems; they are for example able to carry out maintenance and operate smaller electrical facilities.</p>	<p>they are able to apply the theoretical and practical tools of the field to individual specific cases, they for example know the rules for working in the field of electrical engineering including safety regulations;</p> <p>using theoretical and practical knowledge, they can solve simple tasks in the field of electrical operations, they are for example able to manage the operation and possible repairs of electrical and electronic systems, design simple systems and supervise their implementation;</p> <p>they can define the strengths and weaknesses of a particular device or system, they are for example able to assess the operation of a system and decide to modify or replace it; they are able to carry out maintenance and manage the operation of smaller electrical facilities; out of commercially produced components and subsystems, they can assemble smaller blocks for the implementation of specified functions;</p>	<p>they can use the above knowledge for the design and implementation of complex electrical and electronic systems; they are for example able to carry out systematic analysis and synthesis of the functional blocks of complex electrical and electronic devices, they are able to design more modern variants of technological units using new principles and technologies;</p> <p>they can independently and creatively solve problems in the given field of electrical and electronic systems; they are for example able to lead research teams as managers, both in the phase of proposal and in the phase of implementing complex technological units;</p> <p>they can creatively apply the latest knowledge in the field and contribute to their optimum application; they for example use new discoveries and products with an improved structure and parameters, optimize the measurement, control and communication systems using newly produced</p>	<p>they can use and design research methods, find new effective and progressive methods of learning the essence of problems in the field of electrical engineering/electronics; based on a detailed study of technical literature, for example, they are able to assess the possibilities of further development of technologies and estimate the possibilities of results in the current state of knowledge;</p> <p>they can use and design new advanced research methods in the field of electrical engineering/electronics; they are for example able to analyze, define and use new methods for achieving the set objective;</p> <p>they are able to implement applied research, verify hypotheses in practice, or propose a practical use for the research findings.</p>

## PROFESSIONAL SKILLS

# EDUCATION DESCRIPTORS

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
	<p>they are able to decide on the suitability of a particular product for the required work and assemble a more complex system from components available in the market; they are for example able to design an individual device for the implementation of the set work; they can design a device which practically solves the specified function (measurement of technical parameters, management at the level of PLC technology, subsystems of energetic blocks etc.).</p>	systems and their parts.	

	Short-cycle programme	Bachelor's study programme	Master's study
	Study programme graduates		
Professional skills	<p>using basic theoretical and practical knowledge, they can independently solve simple tasks in the field of electrical operations, they are for example able to manage the operation and possible repairs of electrical and electronic systems under supervision;</p> <p>they can compare the strengths and weaknesses of specific devices or systems; they are for example able to carry out maintenance and operate smaller electrical facilities.</p>	<p>they are able to apply the theoretical and practical tools of the field to individual specific cases, they for example know the rules for working in the field of electrical engineering including safety regulations;</p> <p>using theoretical and practical knowledge, they can solve simple tasks in the field of electrical operations, they are for example able to manage the operation and possible repairs of electrical and electronic systems, design simple systems and supervise their implementation;</p> <p>they can define the strengths and weaknesses of a particular device or system, they are for example able to assess the operation of a system and decide to modify or replace it; they are able to carry out maintenance and manage the operation of smaller electrical facilities; out of commercially produced components and subsystems, they can assemble smaller blocks for the implementation of specified functions;</p> <p>they are able to decide on the suitability of a particular product for the required work and assemble a more complex system from components available in the market; they are for example able to design an individual device for the implementation of the set work; they can design a device which practically solves the specified function (measurement of technical parameters, management at the level of PLC technology, subsystems of energetic blocks etc.).</p>	<p>they can use the above knowledge and implementation of complex electronic systems; they carry out systematic analysis of the functional blocks of complex electronic devices, they are able to design modern variants of technical systems according to new principles and technical requirements;</p> <p>they can independently solve complex problems in the given field of electronic systems; they are able to lead research teams as well as in the phase of proposal and implementing complex tasks;</p> <p>they can creatively apply their knowledge in the field and contribute to the development of new applications; they for example discover new products and their structure and parameters, measurement, control and systems using newly produced parts.</p>

## 2.26 ENERGETICS

### A BRIEF DESCRIPTION OF THE CHARACTER, THEMATIC SCOPE AND HISTORY OF THE FIELD

The need to use energy has been associated with people since the prehistoric times. The mastery of fire meant survival in areas outside the subtropical climate. Fire machines were the first energy sources of mechanical power and they enabled the development of technology based on a different principle than the unstable energy source of wind or the locally limited source of hydroelectric power. Fire machines (steam engines) are associated with the as yet unsurpassed theory of thermal efficiency described by Sidi Carnot 200 years ago.

Energetic fields at universities are associated with the development of steam engines and sources for these engines - that is, steam boilers. A major step forward was the development of turbomachines working with the pressure drop of propellants - that is, the turbines.

At present, the field of energetics includes obtaining usable forms of energy (mechanical energy, electrical energy, heat, cold and compressed air) out of three types of primary energy - fossil fuels, nuclear fuels and renewable energy sources (solar radiation, water energy, lithosphere energy, wind energy and biomass).

The subject of the subject area *Energetics* is primary renewable and non-renewable energy sources, the possibilities of their use, the possibilities of their transformation into other usable forms of energy and the minimization of adverse environmental impacts of energy transformations.

The objective of learning is to analyze the possibilities of an optimum use of primary energy sources in general and to reduce the dependence on limited reserves of non-renewable primary sources.

In the subject area *Energetics*, a significant role is played by the international aspect of problems; energy sources, their availability and supportability are the subject of a strategic approach at the national and international level.

### PRIMARY FIELDS

The primary fields in the subject area *Energetics* are:

classic (fossil) energetics: this field is mainly concerned with the production of electrical energy in power plants and its distribution via the transmission system, and also with the mining, distribution and use of coal, oil, natural gas, bottled gas and wood; in a broader sense, it also includes the construction and production of power plants for fossil fuels;

renewable energy sources: this field is concerned with the forms of energy available on the Earth and obtained primarily from nuclear transformations inside the Sun; among other sources are the heat inside the Earth and the inertia of the system of the Earth and the Moon; humanity makes use of such energy in the form of e.g. solar radiation, wind energy, hydro-power, tidal power, geothermal energy, biomass etc.;

nuclear sources based on the fission reaction: this field is concerned with non-renewable energy sources because the fuel is in the form of uranium bound in rocks; nuclear energy is released from nuclear reactions in the atomic nucleus; it is possible to use it via special equipment, and the respective technical and economic field is called nuclear energetics; for

peaceful purposes, the fission reaction of uranium or plutonium is currently used in industry, and the use of thorium is considered; the subject of an intense research is the practical use of thermonuclear fusion, above all the conversion of hydrogen into helium;  
 nuclear fusion: this field is concerned with the use of the combination of light atomic nuclei and the parallel energy release; one of the ways to achieve the fusion is cause the nuclei to hit each other with sufficient energy that exceeds the Coulomb barrier, using high temperature and pressure - this is thermonuclear fusion; there is a number of ways to perform nuclear fusion without high temperatures - e.g. muon catalysis, pyroelectric fusion; however, none of these ways will probably be fit to be used as an energy source.

## DEFINITION OF THE OBJECTIVES OF EDUCATION

Education in this area is provided at technical universities under three cycles: Bachelor's, Master's and doctoral. Education in this area has been recently provided at some non-university colleges and tertiary vocational schools. The basic educational objective in this area is to create a profile of a graduate who (in relation to education cycle) gains knowledge, skills and understanding of trends and processes of the main fields of energetics and related accompanying trends and consequences of using the energy sources, demonstrates the knowledge of solutions to technical and software issues, has the ability to communicate professional issues (both orally and in writing) in Czech and in foreign language (mostly English), has the ability to work in a team and has achieved a fundamental capability of self-education in a particular field (in relation to the completed education cycle), while the independence in self-education is increasing along with the cycle level.

The objectives of education are defined in more detail below in the table of descriptors. At the Bachelor's level, it is primarily the education of specialists capable of providing independent solutions to less complex tasks in the field of energetics, or specialists - team members - capable of providing solutions to more complex tasks. At the Master's level, the objective is to educate specialists capable of resolving complex issues independently or specialists capable of managing a team of individuals able to deal with such tasks. At the doctoral level, it is the education of specialists able to resolve scientific and research issues or other demanding and complex tasks. Education towards perceiving the ethical dimension of human activity is a must at all levels.

## GENERAL PROFILE OF GRADUATES

Graduates of the **short cycle** demonstrate specialist and detailed knowledge of the subject and scope of specific specializations of the field of energetics and they understand them; they have the knowledge of a specific energy specialization which may be one of the following: heat balance, types of heat transfer, basic electrical circuits and circuit applications; they demonstrate an overview of the theories and concepts underlying the methods of the field, and of their application in practice; using specialist knowledge and based on a specified task, they can independently solve common practical problems in the field, for example implement smaller-scale works.

Graduates of the **Bachelor's study programmes** demonstrate extensive knowledge of the subject and scope of the specializations in the field of energetics and understand them; they have the knowledge of the most important areas of hydromechanics and thermomechanics and electrical engineering; using specialist knowledge and based on a generally specified task, they can solve practical problems in the field, for example independently design and implement smaller-scale works; they know how to find, classify and interpret information relevant for the solution of the defined practical problem.

Graduates of the **Master's study programmes** demonstrate a deep and broad knowledge of the

subject and scope of the field and specialization of energetics at the level corresponding with the current state of knowledge, and they understand it; they demonstrate an understanding of the possibilities, conditions and limitations of the use of knowledge of related fields, using specialist knowledge they can independently define and creatively solve a theoretical or practical problem in the field, they can independently and creatively solve complex problems using selected methods in the field of the respective energetic specializations.

Graduates of the **doctoral study programmes** demonstrate a deep and systematic knowledge of the subject and scope of the specializations in the field of energetics; they demonstrate a deep and systematic knowledge and understanding of the theories, concepts and methods that are at the forefront of knowledge in the field at the international level; they demonstrate an understanding of the system of sciences and research problems on the boundary between energetics and related fields; they can design and use advanced research methods in energetics in a manner that enables them to increase their knowledge via original research; they are able to develop and evaluate the theories, concepts and methods of energetics including the definition of fields or their classification within a broader area of related technical and natural scientific disciplines; they are able to implement applied research and verify hypotheses in practice.

Graduates have the key intellectual abilities that characterize the analytical-engineering approach to issues, and especially:

- the capability of abstraction and simplification for the purposes of identification and modeling of the essence of the problem,
- the ability to organize facts and compare, structure, analyze and evaluate qualitative and quantitative data,
- the ability to assess the implications of possible solutions, recognize the limitations of their use and assess the possible effects in comparison with set objectives,
- the ability to communicate the results to professionals-energy-experts and professionals from other fields or amateurs,
- the capability of critical thinking in relation to restrictive conditions of analysis in the context of energetics - economics - ecology from the local and global perspective.

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
<p>they demonstrate a specialized and detailed knowledge of the subject and scope of specific specializations in energetics and, for example, an understanding of the most important parts of basic theoretical disciplines, mainly mathematics and physics;</p> <p>they have the knowledge of a specific energetic specialization which may be heat balance, types of heat transfer, basic electrical circuits, circuit applications;</p> <p>they have an overview of the theories and concepts underlying the area of study and the means of putting them into practice.</p>	<p>they demonstrate an extensive knowledge and understanding of the subject and scope of the field of energetics; they for example show understanding of the most important parts of basic theoretical disciplines, mainly mathematics, physics, electrical engineering, hydro- and thermomechanics;</p> <p>they have the knowledge of the most important parts of hydro-mechanics and thermomechanics and electrical engineering, which are especially thermal calculations with the basic types of heat transfer, the design and detailed calculations of heat exchangers, the solution of thermal schemes of specific circuits;</p> <p>they demonstrate a knowledge of the methods of the field, for example the methods in the individual specializations of energetics (heat, electricity, hydro- and nuclear energetics);</p> <p>they demonstrate an</p>	<p>they demonstrate a deep and extensive knowledge of the subject and scope of the field and specialization of energetics, corresponding with the current state of knowledge, and they for example understand the most important parts of the basic theoretical disciplines which are especially mathematics, physics, electrical engineering, hydro- and thermomechanics; they also demonstrate knowledge of the most important parts of thermal engineering, electrical engineering, ecology of energy equipment, management of industry systems, the basics of energy economics, obtaining data from real processes and their further processing;</p> <p>they demonstrate a deep and extensive knowledge of the methods corresponding with the current state of knowledge in the field of energetics, and they for example understand</p>	<p>they demonstrate a deep and systematic knowledge of the subject and scope of the specializations in the field of energetics and understand them; they are for example well acquainted with the complete field of energetics, to an extent beyond the Master's degree; their theoretical knowledge of the basic disciplines (e.g. mathematics, physics, hydro- and thermodynamics, nuclear physics, thermal machines, electrical engineering, electrical machines, circuits, networks) is so deep that it can be directly used for research in the given subfield; their theoretical and practical knowledge is especially deep in the field of their specialization;</p> <p>they demonstrate a deep and systematic knowledge of theories, concepts and methods that are at the forefront of knowledge in the field at international level, and understand, for example, the scientific</p>

## PROFESSIONAL KNOWLEDGE



# EDUCATION DESCRIPTORS

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
		<p>the methods of the individual specializations of energetics on which they generally focus;</p> <p>they demonstrate an understanding of the possibilities and conditions for, and limitations on, the use of knowledge from related disciplines, such as, in</p>	<p>methods used in the areas of their focus and are able to apply them independently;</p> <p>they demonstrate an understanding of science and research topics in between the disciplines of energetics and related fields and, for example, demonstrate knowledge not only of energetics, but also of other cooperating fields depending on their further individual focus.</p>

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
<p>drawing on specialist knowledge and based on a generally specified task, they are able to devise solutions to common practical problems in the discipline, for example, they can implement smaller-scale works (thermal and constructional design of heat exchangers), especially with the use of known and proven practices and technologies, as members of research teams, they can implement parts of complex systems and can manage mid-scale thermal or electrical stations and construct individual equipment;</p> <p>they are able to select and make use of the information needed for dealing with a specific problem.</p>	<p>using specialist knowledge and based on a generally specified task, they are able to solve practical problems in the field, for example they can independently design and implement smaller-scale works (the calculation and design of heat exchangers, the calculation and design of electrical circuits, simple machines), using mainly known and proven methods and technologies;</p> <p>they are able to understand the issue of large facilities, and as members of research teams they can independently implement individual parts and justify and document chosen methods;</p> <p>they are able to manage smaller thermal or electrical facilities and networks;</p> <p>they can prepare extensive reports, especially on the intended or implemented solutions;</p> <p>they are able to find, organize</p>	<p>drawing on their specialist knowledge, they are able to define and work creatively and independently in order to devise solutions to theoretical and practical problems in the discipline, for example, they can analyse the needs and define requirements for the devices produced in the field of energetics;</p> <p>they are able to recognize whether a problem can be solved via known methods;</p> <p>they can independently and creatively solve complex problems using selected methods in the given fields of energetics; they can for example design large-scale works (complex works such as the design and calculation of steam boilers) and implement them as members or leaders of research teams; they are able to choose suitable methods and technologies and modify common practices in non-standard</p>	<p>they are able to design and use advanced research methods in the field of energetics in a manner allowing for expansion of knowledge gained by means of initial research, for example, they are able to propose new, efficient and theoretically well justified solutions based on original ideas that are accepted by the international scientific and professional community in the area, and can realize extensive and complex work, usually as leaders of research teams, to find solutions, they are able to choose the appropriate processes as well as technologies based on the use of the latest findings, individually, they can develop extensive texts in English presenting complicated ideas and are able to defend proposed solutions in discussion at international level;</p> <p>they are able to develop and evaluate theories, concepts and methods in energetics including</p>

## PROFESSIONAL SKILLS

# EDUCATION DESCRIPTORS

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
	and interpret information relevant to devising a solution to a	<p>situations; they can compare and evaluate various methods and defend a proposed solution in professional discussion; as members of research teams, they can independently implement individual demanding tasks and manage complex energetic units; they are able to prepare extensive reports presenting complex measurements and challenging thought processes; they can make use of some of the advanced research methods in the discipline of energetics in such a manner as to obtain new and original information based on the original theory and practice, for example, they can</p>	<p>defining fields or their inclusion in the broader area of related science and technical disciplines, for example, they can implement, evaluate and compare the most complex procedures that are currently available, anticipate developments in their field, solve interdisciplinary problems requiring not only the knowledge of energetics, but also knowledge from a cooperating field; they are able to implement applied research, verify hypotheses in practice, or propose a practical use for the research findings.</p>

## CHARACTERISTIC OCCUPATIONS AND RELEVANT REGULATED OCCUPATIONS

**Short-cycle** graduates are able to understand the function of devices in the specialization for which they were trained. They can hold posts of heads of operating groups after attending training on specific tasks. Graduates may get jobs of qualified sales persons and marketing specialists as they are sufficiently educated in order to be able to communicate with the general public about the parameters and the utility properties of power-producing facilities.

Graduates of **Bachelor's study programmes** can pursue professional activities in operation with the possibility of future development of knowledge and expertise in relation to the equipment entrusted. Graduates have the potential to carry out activities that rank among medium-skilled professional activities, authorizing for management of component parts of contracts and resolving partial issues; as the length of practice increases, selected capable graduates can also gradually step up to positions that rank among highly skilled professional activities. Graduates are employable as operational, engineering and management personnel in power plants and heating plants, in energy departments in all types of industrial enterprises, transport organizations as well as non-productive sphere, also in state administration bodies. They are employable as designers of energy distribution systems, designers in heat solution companies, designers of heat supply systems, water treatment and wastewater treatment plants as well as inspectors and testing technicians. Graduates may get jobs of qualified sales persons and marketing specialists as they are sufficiently educated in order to be able to communicate with the general public about the parameters and the utility properties of power-producing facilities.

Graduates of **Master's degree programmes** may hold the majority of posts in the development (design) teams with a view of understanding of not only all the functional parts, but especially with the ability to justify or improve them. Several years of practical experience is an essential prerequisite mainly for team leaders. Graduates are employable in computation, as designers or developers in power plants. Graduates are employable in engineering, manufacturing and management.

**Doctoral study** is a preparation for highly qualified professional research activities. In the field of education *Energetics* there is basic research, which needs to be developed at a world-class level by postgraduate students and graduates, researchers at faculties, in the academy of sciences and resort research institutes. After upgrading qualification in doctoral study, graduates are employable as researchers or university teachers in respective fields.

## RELATIONS TO OTHER SUBJECT AREAS

Energetic fields are closely related to the subject areas *Physics, Mathematics and Statistics, Chemistry, Mechanical Engineering and Materials, Electrical Engineering* (especially power electrical engineering and its distribution of electrical energy and management and control of electrical networks), *Civil Engineering, Transport and Transportation Services, Economics*. Classical (fossil) fields of energetics overlap into the subject area *Mining and Mineral Processing*.

## 2.27 INFORMATION TECHNOLOGY AND CYBERNETICS

### A BRIEF DESCRIPTION OF THE CHARACTER, THEMATIC SCOPE AND HISTORY OF THE FIELD

The subject area Information Technology and Cybernetics (formerly Automatic Computers, Electronic Computers, Computer Science and Informatics) originated under Automation and Measurement at most electrical engineering faculties of technical universities in former Czechoslovakia in the late sixties. The initial function focused primarily on complex technical computing gradually expanded to mass data processing, simulation and modelling as well as technological process management. The areas that occurred later included word processing, the development of large, integrated information systems, processing of graphic information, video and voice, the development of systems with features of intelligence and analysis and processing of various types of data including large volumes. All activities have been recently influenced by the availability of high-performance computing systems and possibilities of rapid communication between them.

With regard to the fact that computer technology has become a required tool for all scientific as well as application areas, many interdisciplinary areas originated having a greater or lesser proportion of information technology tools and methods. The term *information technology* started to be very attractive at the time of great changes in higher education in the early 1990s and since that time has been included in the titles of programmes of study, fields of study and specializations, usually for marketing purposes, which means that information technology often plays only a marginal role at the user level.

*Faculties specializing in informatics have gradually separated from faculties of electrical engineering. It was a similar process compared to the gradual separation of faculties of electrical engineering from faculties of mechanical engineering, which took place in the second half of last century.* The main education goals at faculties of electrical engineering and similar faculties at technical universities was to focus on the profile of graduates covering a wide range of scientific, research, development, manufacturing, sales, service, training and education activities in both the electrical areas and electronics (hardware) as well as software areas (software). Also, the aforementioned education goals were adopted also by the newly established faculties specializing in informatics. The three-cycle study programme (formerly two-cycle) now produces graduates with high chances of employability depending on varying degree of creativity and independence. The demand for graduates with this specialization has not been saturated to date.

Informatics courses at technical universities differ in some respects from general informatics courses: courses at technical universities are usually designed so that education is focused mainly on providing qualification for the development of technical or other practical applications; the hardware issue is often being represented to a greater extent. By contrast, university courses (subject area Informatics), more typically emphasize theoretical and non-technical issues. However, this difference has been gradually disappearing.

### PRIMARY FIELDS

The following primary fields (areas) rank among primary fields (or components used to build more

general fields).

**Computer systems and networks** are focused on building computer systems (including high-performance systems), building computer networks, on researching, developing and manufacturing hardware components of computer systems. Therefore, this field requires most the knowledge of principles of physics and electronics.

**The subject area information systems and software engineering** focuses on the development and manufacturing of a variety of applications used virtually in all enterprises, institutions and in private life; these applications have been focusing on Internet environment recently. An excellent knowledge of relevant technologies is required besides the necessary skills in the area of algorithms and programming.

**Intelligent systems** include all activities aimed at simulating intelligent human behaviour. These include the interdisciplinary robotics and mechatronics. Looking back into history, the area has largely developed from modelling and simulation, which builds on more than thirty years of tradition.

**Computer graphics, image processing and multimedia technology** is an area of information technologies which has seen a dramatic growth recently, both in terms of technical equipment design and software solutions. Speech processing is an important segment, both in terms of analysis and synthesis as well as experiments, research and development of various applications in this area. In addition, this influences also art and culture segments.

**The area of Analysis and Data Processing** includes various types of data processing using diverse methods. The data is often of a complex and unknown structure. Also, usually there is a large amount of data, which causes high computational intensity.

In addition to the aforementioned primary fields, many new multidisciplinary fields have been developing including important ones such as *bioinformatics* and computer science focused on other natural sciences, whether for applications in particular science fields, or for getting inspired by their principles and paradigms. This justifies the existence of a wide range of projected study fields, which can develop by “mixing the aforementioned ingredients” using a specific ratio. Examples include the tools of studying environment such as geonics, hydrology, tools of studying atmosphere etc. Also, IT programmes and fields of study offered at technical universities include disciplines such as *logic*, *mathematical (theoretical) informatics* etc.

## DEFINITION OF THE OBJECTIVES OF EDUCATION

Education in the area of information technology is provided at technical universities under three cycles: bachelor's, master's and doctoral. Education in this area has been recently provided at some non-university colleges and tertiary vocational schools. The basic educational objective in this area is to create a profile of a graduate who (in relation to education cycle) gains broad knowledge of devising solutions to technical and software problems, has the ability to communicate (both orally and in writing) in Czech and in foreign language (mostly English) in areas touching on his/her specialist knowledge, has the ability to work in a team and has achieved a fundamental capability of self-education in a particular field (in relation to the completed education cycle), while the independence in self-education is increasing along with the cycle level.

The objectives of education are defined in more detail below in the table of descriptors. At the bachelor's level, it is primarily the education of specialists who are able to work independently in order to devise solutions to less complex problems in the field of information technology, or work in a team of specialists (devising solutions to complex problems). At the Master's level, the objective is to educate specialists capable of resolving complex issues independently or specialists capable of managing a team of individuals able to deal with such tasks. At the doctoral level, it is the education of specialists

able to resolve scientific and research issues or other demanding and complex tasks. Education towards perceiving the ethical dimension of human activity is a must at all levels.

## GENERAL PROFILE OF GRADUATES

**Short-cycle** graduates are able to understand the function of devices in the specialization for which they were trained. Graduates have a broad knowledge of devising solutions to technical problems, are able to communicate (both orally and in writing) in Czech and in foreign language (mostly English), are able to work in a team and have the basic skills of self-education in their field.

Graduates of **bachelor's degree programmes** understand the most important parts of basic theoretical disciplines, mainly mathematics, discrete mathematics, theoretical computer science, decision and management theories. They have the knowledge of the most important areas of informatics and cybernetics, which are mainly algorithms and programming, computer design, operating systems, basic theories of industrial system management, creating computer networks, acquiring data of real processes and their processing, software engineering, development of database and information systems, creating web applications and processing various kinds of data. The breadth and the depth of knowledge and skills of graduates is such that they are able to perform their profession virtually after completion of a bachelor's degree programme.

Compared to graduates of bachelor's degree programmes, the graduates of **master's degree programmes** show a broader and deeper knowledge as well as a broader and deeper understanding of the theoretical basis. The knowledge of specialized disciplines is also broader and deeper among them. Graduates are also familiar with developing areas whose wider practical application can be expected in the future.

Graduates of **doctoral degree programmes** are capable of devising solutions to the most complex research and development problems. They have extremely deep knowledge of theoretical disciplines such as particularly deep knowledge of a specific area in which they work. They also have a very good overview of the developments in the entire area of information technology and cybernetics.

Graduates are employable in all areas including scientific research, development in industry, operation, maintenance, sales and service of computer and software systems, as operating executives in computing centres of various institutions, typically in banking, insurance, healthcare, and transport sector as well as in state and local government institutions. Graduates are employable also in education sector, as secondary school and university teachers after gaining teaching qualifications. Graduates show high ability of self-education; typically, they gain additional qualifications in economy and law (in addition to own field of expertise). With regard to the demanding theoretical background, graduates have good intellectual equipment to achieve high flexibility in the labour market, as well as good organizational skills and well-developed ability and willingness to adopt new technologies and devise solutions to unusual problems



Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
<p>demonstrate a specialized and detailed knowledge of the area of study and the scope of the field of information technology and, for example, understanding of the most important parts of basic theoretical disciplines, mainly mathematics and discrete mathematics;</p> <p>demonstrate knowledge from the major areas of computer science, including mainly algorithms and programming, computer design, operating systems, creating computer networks, software engineering, information system development, development of Web applications;</p> <p>have an overview of the theories and concepts underlying the area of study and the means of putting them into practice.</p>	<p>demonstrate a broad knowledge of the subject and the scope of the field of information technology and cybernetics and, for example, understanding of the most important parts of basic theoretical disciplines, mainly mathematics, discrete mathematics, theoretical computer science, decision and management theories;</p> <p>have the knowledge of the most important areas of informatics and cybernetics, which are mainly algorithms and programming, computer design, operating systems, basic theories of industrial system management, creating computer networks, acquiring data of real processes and their processing, software engineering, development of database and information systems, creating web applications, and are capable of analysing non-complex problems under the aforementioned fields.</p> <p>demonstrate the necessary</p>	<p>demonstrate a broad and deep knowledge and understanding of the area of study and the scope of the field of information technology and cybernetics corresponding to the current state of knowledge, for example, demonstrate the knowledge of basic theoretical disciplines such as mathematics, discrete mathematics, theoretical computer science, information theory, automatic control theory, in addition, demonstrate the knowledge of major areas of informatics and cybernetics, which are mainly algorithms and programming, design of computers, operating systems, creating computer networks, software engineering, development of database and information systems, development of Web applications, industrial control systems, data acquisition from real processes and processing such data, artificial intelligence systems;</p> <p>demonstrate advanced</p>	<p>demonstrate a deep and systematic knowledge and understanding of the subject and the scope of the field of information technology and cybernetics, for example, the theoretical knowledge of basic disciplines (e.g. mathematics, discrete mathematics, information theory, the theory of automatic control) is deepened so that it is directly applicable for exploring selected sub-disciplines; a deep theoretical and practical knowledge is mainly in the specific sub-discipline of their focus;</p> <p>they demonstrate a deep and systematic knowledge of theories, concepts and methods that are at the forefront of knowledge in the field at international level, and understand, for example, the scientific methods used in the areas of their focus and are able to apply them independently;</p> <p>demonstrate understanding of science and research problems</p>

## PROFESSIONAL KNOWLEDGE

# EDUCATION DESCRIPTORS

PROFESSIONAL KNOWLEDGE			
Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
	<p>knowledge of theories, concepts and methods in the discipline, for example, demonstrate the knowledge of methods from different areas of information technology and cybernetics; demonstrate the understanding</p>	<p>knowledge and deep understanding of theories and methods corresponding to the current state of knowledge in the discipline of information technology and cybernetics, for example, demonstrate the knowledge of methods from various areas of information technology and cybernetics, despite the fact that they specialize in a narrower field;</p> <p>demonstrate understanding of the possibilities and conditions for, and limitations on, the use of knowledge from related</p>	<p>at the intersection of the disciplines of information technology and cybernetics and related fields and, for example, demonstrate knowledge not only of information technology and cybernetics, but also of other cooperating fields depending on their further individual focus.</p>

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
<p>drawing on specialist knowledge and based on a broadly specified task, they are able to devise solutions to common practical problems in the discipline, for example, they can implement smaller-scale works (software and hardware products, computer systems, control systems, especially with the use of known and proven practices and technologies, as members of research teams, they can implement parts of complex systems and can manage mid-scale software, hardware systems and networks; they are able to select and make use of the information needed</p>	<p>drawing on specialist knowledge and based on a broadly specified task, they are able to deal with practical problems in the discipline, for example, they are able to work independently in order to design and realize small-scale works (software and hardware products, computer systems, control systems, computer networks), especially with the use of known and proven processes and technologies, they are able to understand the issue of complex systems and as members of research teams, they are able to work independently in order to realize their individual parts; they are able to justify and document selected procedures of devising solutions; they are able to manage mid-scale software, hardware and network systems and also systems including artificial intelligence; they are able to develop extensive texts, especially texts describing the proposed or implemented solutions;</p>	<p>drawing on their specialist knowledge, they are able to define and work creatively and independently in order to devise solutions to theoretical and practical problems in the discipline, for example, they can analyse the needs and define requirements for the works produced in the field of information technology and cybernetics, they are able to recognize whether a problem can be resolved using the established procedures;</p> <p>they are able to work independently and creatively in order to devise solutions to complex problems using selected methods in the field of information technology and cybernetics, for example, they can design large-scale works (software products, computer systems, control systems) and implement them as members or as leaders of a research team, they can select appropriate procedures and technologies</p>	<p>propose and use advanced research methods in the discipline of information technology and cybernetics in such a way as to extend existing knowledge in the discipline through original research, for example, they are able to propose new, efficient and theoretically well justified solutions based on original ideas that are accepted by the international scientific and professional community in the area, and can realize extensive and complex works, usually as leaders of research teams, devise solutions, they are able to select the appropriate processes as well as technologies making use of the latest findings, they can work independently in order to develop extensive texts in English presenting complicated ideas and are able to defend proposed solutions in discussion at international level;</p> <p>able to develop and evaluate theories, concepts and methods</p>

## PROFESSIONAL SKILLS

# EDUCATION DESCRIPTORS

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
	able to find, organize and interpret information relevant to devising a solution to a specified practical task.	to devise the desired solutions, in non-standard situations they can usually modify procedures accordingly, they are able to compare and evaluate different methods and defend a proposed solution in a discussion, as members of research teams, they can work independently in order to implement the most demanding subtasks as well as manage extensive software, hardware systems, control systems and networks, they can develop extensive texts presenting complex ideas; they can make use of some of the advanced research methods in the discipline of information technology and cybernetics in such a manner as to obtain new and original information based on the original theory and practice, for example, they can apply new scientific knowledge and further develop scientific results based on theoretical study of literature	in information technology and cybernetics including defining fields or their inclusion in the broader area of related science and technical disciplines, for example, they can implement, evaluate and compare the most complex procedures that are currently available, anticipate developments in their field, solve interdisciplinary problems requiring not only IT knowledge, but also knowledge from a co-operating field; they are able to implement applied research, verify hypotheses in practice, or propose a practical use for the research findings.

## CHARACTERISTIC OCCUPATIONS AND RELEVANT REGULATED OCCUPATIONS

The characteristic occupations include the following: programmer, developer, web application developer, IT analyst, software engineer, designer, system administrator, network administrator, software/hardware/network specialist, IT security specialist, project manager, researcher, consultant, sales manager, etc.

## RELATIONS TO OTHER SUBJECT AREAS

The fields under subject area *Information Technology and Cybernetics* are closely linked to subject areas *Physics, Mathematics and Statistics, Chemistry, Engineering and Materials, Electrical Engineering, Computer Science, Civil Engineering, Transport and Transportation Services, Economics, Biology and Ecology, General Medicine and Dentistry*.

The aforementioned relation is in that all the above-mentioned fields need to store, process and analyse specific data, which they generate. Sometimes, it is data with complicated structure or large volumes of data which increases the need to use sophisticated methods of processing and analysis. Also, all the aforementioned fields require different kinds of IT systems. The fields under subject area *Information technology and cybernetics* provide the required solutions.

## 2.28 MECHANICAL ENGINEERING AND MATERIALS

### A BRIEF DESCRIPTION OF THE CHARACTER, THEMATIC SCOPE AND HISTORY OF THE FIELD

Subject area *Mechanical Engineering and Materials* is built on the basis of mathematics, physics and material science.

Mechanical engineering is a technical discipline which deals with the design, manufacture and maintenance of machines and equipment. It is one of the eldest and most comprehensive technical disciplines. Mechanical engineering includes knowledge of the basic disciplines of physics, such as mechanics, kinematics, dynamics, thermodynamics, material science, and others. Mechanical engineers use the knowledge of these disciplines together with tools such as CAD, rapid prototyping and product life-cycle management to design manufacturing, energy and transport machinery and equipment.

Records of mechanical engineering were found in many ancient and medieval cultures around the world. Mechanical engineering saw an important breakthrough in England during the 17th century, when Sir Isaac Newton formulated his Newton's Laws of Motion (law of inertia, law of force, the law of action and reaction).

Mechanical engineering has seen a rapid growth during the Industrial Revolution, but its origins can be traced back to ancient times. The field of mechanical engineering has been undergoing a continuous development, mechanical engineers are employable not only in traditional engineering fields, but also in a number of interdisciplinary fields such as biomechanics, mechatronics, nanotechnology and composites.

Mechanical engineering is characterized by an extremely rich variety of products, ranging from mechanical parts of large investment projects, large machinery and equipment (naval vessels, nuclear reactors, etc.) through machine tools, transportation equipment, as well as precision engineering products (e.g. mechanical laboratory instruments, watches etc.). The maturity of this sector reflects a state's economic advancement. The current production is characterized by an effort to reduce the consumption of raw materials and increase the share of value added, i.e. the invested workload (particularly mental).

The width of range in mechanical engineering and materials leads to a relatively narrow specialization at all university institutions and division of study into a number of fields. Yet these fields share, especially in the first years, the classic common foundations of theoretical physics, mathematics, etc.

During studies, students gain a general overview of the following areas: mathematics, descriptive geometry, mechanics (statics, kinematics, dynamics), elasticity, thermodynamics, hydromechanics, measurement, manufacturing technology, design and logical control, structure and properties of materials and the knowledge of required modern tools, such as CAD. Mechanical engineers are expected to demonstrate also basic knowledge of chemistry and other fields of physics and electrical engineering. Many engineering companies, especially those operating in industrialized countries, use modern tools such as the above-mentioned CAD and others - CAE, FEA, CAM, CNC to design and manufacture products; the mastering of these is usually part of the offer of programmes of study in mechanical engineering.

The basic function of tertiary education in mechanical engineering and materials is to educate creative

and technically equipped professionals in the field of mechanical engineering and materials in the broadest sense (e.g. including design).

## PRIMARY FIELDS

Primary fields of subject area *Mechanical Engineering and Materials* include:

technology fields:

**metallurgy** (including metallurgy, mining and processing of metals and their alloys, production of pig iron, steel, their refining, production of non-ferrous metals and their subsequent processing, raw materials for metallurgy, physical metallurgy, physics of metals, secondary metallurgy, classical and continuous casting of steel, powder metallurgy, thermal technology and industrial ceramics);

**foundry** (moulding compounds and their preparation, production of moulds and cores, models, melting the load, furnace and pre-furnace, casting, continuous casting);

**engineering technology** (basic areas of the discipline include engineering materials and their coating, production of machine parts - forming, welding, soldering, bonding, casting, machining, assembly, etc., physical metallurgy and limit states of materials, production machinery and equipment, including numerically controlled, automated and flexible manufacturing systems, their design and management, application of numerical methods for modelling and technological design, inspection and quality control, organization and economic evaluation);

construction fields:

manufacturing machinery and construction (construction of production, earthmoving, mining and building machinery and equipment, the principles and design-construction realization of machinery and equipment, operation and maintenance, design and dimensioning of machine components, structural nodes and machinery equipment in terms of structural design and with respect for the principles of functionality, technology, costs of production and operation, industrial design including environmental aspects);

**hydraulic and pneumatic machinery and equipment** (fluid mechanisms, hydraulic machines, pneumatic machinery equipment, operation and maintenance of fluid mechanisms, technical diagnostics and reliability of hydraulic mechanisms, properties of fluids, lubricating equipment, transportation of liquids, transport and handling equipment, construction of machinery parts of fluid systems, protection of environment);

**energy machinery and equipment** (construction and operation of boilers, steam turbines, nuclear reactors, steam generators and heat exchangers, the field covers the entire range of thermal technology and energetics, i.e. the technology of producing utility energies with minimal impact on the environment, conventional and nuclear power);

**applied mechanics** (aimed mainly at the field of continuum mechanics focusing on the mechanics of rigid and deformable bodies and environment and furthermore on the challenging stationary and non-stationary inner and outer mechanics of incompressible and compressible fluids, the theory of thermal calculations applied to machines and equipment, analysis and solutions both



through computational modelling and experimenting, transmission of force, strength and resistance of machine parts, machine dynamics, vibration; integral part of the study is to deepen the knowledge of the areas of both theoretical and applied mathematics and physics and mastery of methods and means of experimental research in engineering machines and structures; the required mathematical tools allow for mass use of computer technology to solve complex problems of technology practice;

**technical diagnostics, repair and maintenance** (ensuring operational reliability of machinery and equipment using technical diagnostics, designing diagnostic systems, managing and planning maintenance, lubricants and lubrication systems, solving issues of machine life, ensuring that production machines and equipment are kept operational);

**materials** (the field of materials or material engineering is at the intersection of the fields of natural science (physical chemistry), engineering sciences and manufacturing technology. The general theoretical basis arises from the knowledge of material sciences using physics and chemistry so that students can solve theoretical problems in the discipline of materials engineering and demonstrate basic knowledge required to understand the ongoing material processes and methods of their study. Includes, clarifies and systematically uses the knowledge of technology of materials, their structure and properties in order to design the most effective application and use the properties of materials in structures and devices and systems that are represented these days in almost all fields of human activity. Includes areas: technical materials, non-ferrous metals and special alloys, diagnostics and materials design, materials recycling);

system fields:

**automatic control and engineering informatics** (a field based on the common principles of engineering disciplines with an interdisciplinary approach to the field of automation, control and applied informatics; includes the design and operation of management systems including policies of technical management of small businesses, computer support for technical and economic tasks, the use of software tools for working with multimedia objects, the design and use of database programmes and other supporting tools for control systems and their application in the field of web support, and information technology);

**mechatronics** (system design of structure and control of mechatronic systems characterized by a complex structure comprising mechanical, electrical and control subsystems - such as industrial robots, manipulators, manufacturing equipment, robotized workplace, mobile machine systems, automotive subsystems, biorobotics; the field covers the area of design, construction, management, operations, retrofit and diagnostics of machine tools, industrial robots and manipulators and manufacturing systems composed of these; integral part of the study is the mastering of individual routine computer work in relation to a wide range of activities, ranging from engineering calculations, using CAD systems (mechanical and electrical) MathCAD, the ability to carry out simulation of dynamic properties using simulation programmes - such as MATLAB-Simulink, modelling the dynamics of mechanisms, modelling and simulation of fluid dynamics (CFD), carrying out strength calculations (FEA), signal analysis, programming control system and using computers in control systems and automated devices);

process fields:

**operation and management of power machinery and equipment** (optimal

operation and management of energy equipment in mechanical, metallurgical, chemical, food and transport companies, and in particular in energetics, the operation of energy facilities, methods of energy management and marketing, energy technologies of industrial energetics, gas sector, water economy and alternative energy sources, achieving energy savings, development trends in new energy technologies in industry, construction, agriculture, transport, the use of renewable and secondary energy sources - solar energy, wind energy, biomass and waste, heat pumps and components of centralized and decentralized heat supply; environmental technologies in energy equipment and the impact of operation of energy equipment on the environment, economic evaluation of investments in energetics, environmental protection);

**transport equipment and technology** (technology, efficient organization and management of transport processes and operation of vehicles, mechanics in transport, construction and operation of vehicles, quantitative methods of organization and management of processes, technology, organization and management of rail and road transport, economics in transport, the impact of transport on the environment, the basic structural units of vehicles, vehicle reliability);

**process and material engineering** (chemical and physical methods for material testing, chemical engineering);

**industrial engineering** (design of technological facilities, i.e. manufacturing processes, design of production units, i.e. production systems, organization and management of production and pre-production processes and their evaluation, production organization and management, management knowledge in the field, production quality and compliance, product certification, basic marketing activities, quality management systems for industrial enterprises and basic general and business economics, basic legal, safety and hygiene regulations required for designing and managing engineering enterprises, management methods and techniques).

Primary fields at engineering and material faculties include also sets of theoretical subjects as well as subjects of a broader scientific basis, which must be mastered by all qualified university graduates employable in the field of mechanical engineering and materials.

The production of components for microelectronics, informatics, components for precision mechanics and optics and mechanical equipment of nanotechnologies are becoming the leading fields. The development of these fields is associated with the emergence of technology centres closely linking research and application of advanced technologies. A privileged position has been occupied by the automotive industry, where most robots and automated production lines are applied. The production of other means of transport, especially aviation and rocketry is important too. The production of machine tools and consumer goods has held an important position too.

Individual faculties also specialize in some interdisciplinary programmes of study (biomechanics, biomedicine, mechatronics, etc.) or in other non-traditional programmes, such as business and management disciplines in mechanical engineering (development of knowledge in the field of machinery investment, project management, corporate management, spatial economics, value analysis, quality management, marketing management, and risk management) etc. Independent faculties, such as the Faculty of Biomedical Engineering (CTU) or the Faculty of Mechatronics (TUL) have been established based on some interdisciplinary studies.

**The sectors of mechanical engineering industry include:**

**heavy machinery** (provides equipment for key economic enterprises - mines, smelters, factories; generally, these include operations providing production for the enterprise; as the production of heavy engineering enterprises consumes a large amount of materials, and, at the same time, products are designed for one specific recipient, they are located near metallurgical bases; there has been a trend recently for metallurgical complexes to build their own engineering operations or vice versa, engineering operations build their own metallurgical plants; products: mining machinery, metallurgy plants, etc.);

**medium-heavy machinery** (produces manufacturing machinery for most sectors as well as branches of light industry, mostly machine tools; this field includes the manufacturing of cars and motorcycles, whose mass production represents the greatest part of medium-heavy machinery from the perspective of financial volume; medium-heavy machinery includes a range of industries producing heavy transport vehicles, construction and agricultural machinery, wood logging and woodworking, production of ships, wagons and locomotives, production of aircraft is a specific field; the production of industrial robots has become an independent branch recently, greatly unifying work procedures and performance of a whole line; the greatest use of industrial robots has occurred in the automotive industry);

**light machinery** (comprising all industries producing consumer electronics and electrical engineering; a typical indicator of this type of mechanical engineering is the large-scale production with little need for skilled labour and low consumption of material; location is determined mainly by the offer of cheap labour, which is why developing countries have been scoring success in this field; products: radios, TVs, consumer electronics);

**precision machinery** (includes fields of precision mechanics, optics, manufacturing of measuring instruments and special equipment for medical and other purposes and most recently complex electronics; the main feature of the field is the predominance of skilled labour over quantity and value of material; this is reflected in their location in advanced countries which is mostly conditioned by close cooperation with scientific research);

**investment machinery** (ensures the production of complete units for energetics, transport, mining and manufacturing industry; these are the turnkey supplies; a company cooperates with many subcontractors and completes a work in a customer's target country; provides all technologies, equipment as well as final assembly; production of such investment units is possible only in areas with high concentration of diverse and advanced engineering).

## DEFINITION OF THE OBJECTIVES OF EDUCATION

The fields under the subject area *Engineering and Materials* are typically implemented at technical universities in three cycles: bachelor's, master's and doctoral. Education in this area has been recently provided at some non-university colleges and tertiary vocational schools. The basic educational objective in this area is to create a profile of a graduate who (in relation to education cycle) gains broad knowledge and skills from main fields under the subject area Mechanical Engineering and Materials and demonstrates understanding of trends and processes of these fields, the knowledge of solutions to technical and software problems, is able to communicate (both orally and in writing) in Czech and in foreign language (mostly English) in areas touching on his/her specialist knowledge, is able to work in a team and has achieved a fundamental capacity of self-education in a particular field (in relation to completed education cycle), while the independence in self-education is increasing along with the cycle level. When

completing studies in a particular field of this subject area, graduates shall be able to demonstrate appropriate specialist knowledge and skills in the studied field.

The objectives of education are defined in more detail in the table of descriptors shown below. At the bachelor's level, it is primarily the education of specialists who are able to work independently in order to devise solutions to less complex problems, or work in a team of specialists (devising solutions to complex problems). At the Master's level, the objective is to educate specialists capable of resolving complex issues independently or specialists capable of managing a team of individuals able to deal with such tasks. At the doctoral level, it is the education of specialists able to resolve scientific and research issues or other demanding and complex tasks. Education towards perceiving the ethical dimension of human activity is a must at all levels.

## GENERAL PROFILE OF GRADUATES

**Short-cycle** graduates are able to understand the function of devices in the specialization for which they were trained. Graduates have a broad knowledge of devising solutions to technical problems, are able to communicate (both orally and in writing) in Czech and in foreign language (mostly English), are able to work in a team and have the basic skills of self-education in their field.

Graduates of **bachelor's degree programmes** demonstrate the understanding of technical and economic disciplines within the scope of the disciplines of mechanical engineering and materials, they are able to understand relations between them, they demonstrate the required knowledge of theories, concepts and methods of a field allowing for data collection and analysis of a problem, performance of technical and management roles, they understand the possibilities and conditions for, and limitations on, the use of the theories, concepts and methods of the discipline in practice.

In addition to the above-mentioned knowledge, drawing on their specialist knowledge and based on a broadly specified task, graduates of bachelor degree programmes can devise solutions to practical problems in a discipline, find, organize and interpret information relevant to devising a solution to a specified practical problem in the discipline, use selected basic techniques to the extent necessary for dealing with practical problems in industry practice, including designing simple innovative procedures.

Graduates of **master's degree programmes** show an extended knowledge of fields of mechanical engineering and materials corresponding to the current state of knowledge, including knowledge of related disciplines required for performing the job.

Graduates demonstrate an enhanced knowledge of solid body mechanics, engineering technology, elasticity and strength, fluid mechanics, thermodynamics, engineering materials, designing parts of machine mechanisms, designing selected production machines, technical cybernetics, information technology, technical measurements and experimental methods, with emphasis on the knowledge of the field of their graduation (specialization). Main emphasis is put on the readiness and ability to develop, elaborate and use computer methods in devising solutions to technical problems. During their studies, students can focus on designing and developing machinery, energy or hydraulic machines. Graduates are able to perform static, kinematic and dynamic analysis of mechanisms and structures, apply fracture mechanics in the evaluation of limit states of components and structures, assess the reliability and durability of machines, thermal stress, solve technical tasks of flow, dynamics of hydromechanic and thermodynamic systems and heat and mass transfer. In specific applications, graduates are able to use and develop computer support in their design, engineering and research activity. A deeper understanding of the fundamental disciplines of mechanical engineering forms a broad basis for creative approach in mechanical engineering and further professional growth through

various forms of lifelong learning.

In addition to the above-mentioned knowledge, drawing on their specialist knowledge, graduates of master's degree programmes can work independently and creatively in order to identify and devise solutions to theoretical and practical problems of mechanical engineering practice, in particular:

- read technical drawings of products and machine parts and suggest the most effective ways and methods of their manufacturing, assembly, finishing, packing and shipping,
- propose technical means and their number, nature and type of machinery and equipment for manufacturing in accordance with a prescribed procedure and target capacity,
- decide on the method of quality control and technical tests, co-operate on production quality control,
- provide and organize technological preparation of engineering production, design the layout of machinery and products, material flow, continuity of workplaces and other technical conditions,
- test new methods of production, cooperate on the implementation of technological changes and innovation activities,
- ensure technical preparation of changes in product range and introduce new products into production,
- carry out technical supervision in the workplace, monitor compliance with technological procedures.

Graduates of master's degree programmes can work independently and creatively in order to devise solutions to complex problems using selected theories, concepts and methods of mechanical engineering, they can realize extensive analytical-synthetic works within a company and within a mechanical engineering production.

Graduates of master's degree programmes can make use of some of the advanced research methods in the discipline of mechanical engineering and materials in such a manner as to obtain new and original information based on the theory and practice.

Graduates of **doctoral degree programmes** demonstrate a deep knowledge of mathematics, physics, mathematical modelling, programming, mechanics and dynamics of solid and deformable bodies and environment, materials science, thermodynamics and fluid mechanics at the level allowing for their practical application and development of engineering methods, they master the principles of blast production of pig iron as well as alternative ironmaking production methods, processing and casting of steel in metallurgical industry, in research and design organizations, they demonstrate the knowledge of producing and processing non-ferrous metals, they master science and research methods in their discipline and are able to make use of these creatively under complex, non-standard conditions, they can critically assess issues in their field as well as interdisciplinary issues and are able to devise corresponding solutions.

In addition to the above-mentioned knowledge, graduates of doctoral degree programmes can prepare, implement and compile a report on the result of laboratory experiment, they are able to use expert terminology and process complex technical documentation, they can devise solutions to problems using scientific methods, present and defend their solutions in front of professional community, discuss problems in foreign language, they are able to develop, elaborate and use computer methods in practical use when solving technical problems, they can work independently in order to devise solutions to scientific or developmental problems, provide exact definitions of these, describe the current state of knowledge in the field, they can elaborate and publish a scientific work, publish in a peer-reviewed journal at the national or international level, they are capable of advanced creative activity and thus fundamentally contribute to devising new solutions, they can test new methods of production, cooperate on implementation of technological changes and innovation activities.



Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
<p>demonstrate a basic knowledge of mathematics, constructive geometry, physics, chemistry, computer graphics, mechanics of solid and deformable bodies and environment, materials science, thermodynamics and fluid mechanics at the level permitting their practical application, in areas such as materials, they master the basic principles of blast production of pig iron and alternative ironmaking, furthermore, they are able to control the basic principles of production, processing and casting of steel in metallurgy, research and design organizations, they also demonstrate basic understanding of the production and processing of non-ferrous metals;</p> <p>they master the basics of materials technology and production of structures in mechanical engineering;</p> <p>they demonstrate an overview of basic methods and means</p>	<p>they demonstrate knowledge of mathematics, constructive geometry, physics, chemistry, computer graphics, mechanics of solid and deformable bodies and environment, materials science, thermodynamics and fluid mechanics at the level permitting their practical application, in areas such as materials, they master the principles of blast production of pig iron and alternative ironmaking, furthermore, they are able to control the principles of production, processing and casting of steel in metallurgy, research and design organizations, they also demonstrate understanding of the production and processing of non-ferrous metals;</p> <p>they master the basics of materials technology and production of structures in mechanical engineering;</p> <p>they demonstrate the knowledge of the key scientific methods in a discipline, they are able to use</p>	<p>they demonstrate knowledge of mathematics, physics, mathematical modelling, programming, dynamics of solid and deformable bodies and environment, materials science, thermodynamics and fluid mechanics at the level permitting their practical application as well as development of engineering methods, in areas such as materials, they master the principles of blast production of pig iron and alternative ironmaking, furthermore, they are able to control the principles of production, processing and casting of steel in metallurgy, research and design organizations, they also demonstrate understanding of the production and processing of non-ferrous metals;</p> <p>they master the materials technology and production of structures in mechanical engineering;</p> <p>they master the basic scientific</p>	<p>they demonstrate deep knowledge of mathematics, physics, mathematical modelling, programming, mechanics and dynamics of solid and deformable bodies and environment, materials science, thermodynamics and fluid mechanics at the level permitting their practical application as well as development of engineering methods, for example in areas such as materials, they master the principles of blast production of pig iron and alternative ironmaking, furthermore, they are able to control the principles of production, processing and casting of steel in metallurgy, research and design organizations, they also demonstrate understanding of the production and processing of non-ferrous metals;</p> <p>they master scientific and research methods in their discipline and are able to apply them under complex and non-standard conditions;</p>

## PROFESSIONAL KNOWLEDGE

# EDUCATION DESCRIPTORS

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
	<p>some of their basic variations in practical contexts; they master methods and means</p>		
PROFESSIONAL KNOWLEDGE			



Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
<p>independently, and without the help of expert guidance, they are able to devise solutions to specified practical problems in their discipline;</p> <p>they are able to use expert terminology as well as process less complex technical documentation;</p> <p>they can read technical drawings of products or parts and propose methods of their production;</p> <p>they are able to carry out basic fitting, assembly, finishing, packaging and dispatch;</p> <p>they can perform expert analysis of less complex machinery and production technologies, they are able to analyse and evaluate simpler technical solutions;</p> <p>they can propose technical means and their number, nature and type of machinery and equipment for basic production in accordance with a prescribed procedure and target capacity;</p>	<p>they are able to construct simple parts, assemblies up to designing a less complex machinery including all required strength calculations and balance sheets;</p> <p>they are able to use expert terminology as well as process technical documentation;</p> <p>they can read technical drawings of products or parts and propose most efficient methods of their production;</p> <p>they are able to carry out fitting, assembly, finishing, packaging and dispatch;</p> <p>they can perform expert analysis of machinery and production technologies, they are able to analyse and evaluate technical solutions;</p> <p>they can propose technical means and their number, nature and type of machinery and equipment for production in accordance with a prescribed procedure and target capacity;</p>	<p>they are able to critically assess problems in their discipline and demonstrate understanding of interdisciplinary problems;</p> <p>they can construct machinery including all required strength calculations and balance sheets;</p> <p>they are able to use expert terminology as well as process technical documentation;</p> <p>they can read technical drawings of products or parts and propose most efficient methods of their production;</p> <p>they are able to propose the method of carrying out fitting, assembly, finishing, packaging and dispatch;</p> <p>they are able to develop new engineering methods in order to devise solutions to issues in their discipline;</p> <p>they can perform expert analysis of machinery and production technologies, they are able to analyse and evaluate technical</p>	<p>they are able to prepare, implement and compile a report on results of a laboratory experiment;</p> <p>they are able to use expert terminology as well as process complex technical documentation;</p> <p>they can devise solutions to problems using scientific methods and present/defend proposed solutions in front of scientific community as well as discuss these in a foreign language;</p> <p>they are able to develop, elaborate and use computer methods in devising solutions to practical technical problems;</p> <p>they are able to work independently in order to devise solutions to scientific or developmental problems, define them precisely and map the current state of knowledge in a particular field;</p> <p>they are able to write up and release a scientific survey work, publish it in a peer-reviewed journal at the national or</p>

## PROFESSIONAL SKILLS

# EDUCATION DESCRIPTORS

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
<p>they are able to carry out technical supervision in the workplace, monitor compliance with technological procedures;</p> <p>they are able to provide and organize technological preparation of basic engineering production, design the layout of machinery and products, material flow, continuity of workplaces and other technical conditions.</p>	<p>they are able to carry out technical supervision in the workplace, monitor compliance with technological procedures;</p> <p>they are able to provide and organize technological preparation of mechanical engineering production, design the layout of machinery and products, material flow, continuity of workplaces and other technical conditions;</p> <p>they are able to prepare, implement and compile a report on results of a laboratory experiment;</p> <p>they are able to ensure technical preparation of changes in product range and introduce new products;</p> <p>they can test new methods of production, cooperate on the implementation of technological changes and innovation activities;</p> <p>they are able to decide on the method of quality control and</p>	<p>solutions;</p> <p>they can propose technical means and their number, nature and type of machinery and equipment for production in accordance with a prescribed procedure and target capacity;</p> <p>they are able to carry out technical supervision in the workplace, monitor compliance with technological procedures;</p> <p>they are able to prepare, implement and compile a report on results of a laboratory experiment;</p> <p>they are able to ensure technical preparation of changes in product range and introduce new products;</p> <p>they can test new methods of production, cooperate on the implementation of technological changes and innovation activities;</p> <p>they are able to decide on the method of quality control and</p>	<p>international level;</p> <p>they are able to work independently and creatively in such a way as to contribute to devising new solutions;</p> <p>they can test new methods of production, cooperate on the implementation of technological changes and innovation activities;</p>

	<b>Short-cycle programme</b>	<b>Bachelor's study programme</b>	<b>Master's study</b>
	Study programme graduates		

Professional skills			
	<p>independently, and without the help of expert guidance, they are able to devise solutions to specified practical problems in their discipline;</p> <p>they are able to use expert terminology as well as process less complex technical documentation;</p> <p>they can read technical drawings of products or parts and propose methods of their production;</p> <p>they are able to carry out basic fitting, assembly, finishing, packaging and dispatch;</p> <p>they can perform expert analysis of less complex machinery and production technologies, they are able to analyse and evaluate simpler technical solutions;</p> <p>they can propose technical means and their number, nature and type of machinery and equipment for basic production in accordance with a prescribed procedure and target capacity;</p> <p>they are able to carry out technical supervision in the workplace, monitor compliance with technological procedures;</p> <p>they are able to provide and organize technological preparation of basic engineering production, design the layout of machinery and products, material flow, continuity of workplaces and other technical conditions.</p>	<p>they are able to construct simple parts, assemblies up to designing a less complex machinery including all required strength calculations and balance sheets;</p> <p>they are able to use expert terminology as well as process technical documentation;</p> <p>they can read technical drawings of products or parts and propose most efficient methods of their production;</p> <p>they are able to carry out fitting, assembly, finishing, packaging and dispatch;</p> <p>they can perform expert analysis of machinery and production technologies, they are able to analyse and evaluate technical solutions;</p> <p>they can propose technical means and their number, nature and type of machinery and equipment for production in accordance with a prescribed procedure and target capacity;</p> <p>they are able to carry out technical supervision in the workplace, monitor compliance with technological procedures;</p> <p>they are able to provide and organize technological preparation of mechanical engineering production, design the layout of machinery and products, material flow, continuity of workplaces and other technical conditions;</p> <p>they are able to prepare, implement and compile a report on results of a laboratory experiment,</p> <p>they are able to ensure technical preparation of changes in product range and introduce new products;</p> <p>they can test new methods of production, cooperate on the implementation of technological changes and innovation activities;</p> <p>they are able to decide on the method of quality control and technical tests, co-operate on production quality control.</p>	<p>they are able to critically assess their discipline and demonstrate of interdisciplinary problems</p> <p>they can construct machinery required strength calculation sheets;</p> <p>they are able to use expert terminology as process technical documentation;</p> <p>they can read technical drawings or parts and propose most efficient their production;</p> <p>they are able to propose the method out fitting, assembly, finishing and dispatch;</p> <p>they are able to develop new methods in order to devise solutions their discipline;</p> <p>they can perform expert analysis and production technologies, analyse and evaluate technical solutions;</p> <p>they can propose technical means number, nature and type of machinery equipment for production in accordance with a prescribed procedure and target capacity;</p> <p>they are able to carry out technical supervision in the workplace, monitor compliance with technological procedures;</p> <p>they are able to prepare, implement a report on results of a laboratory experiment;</p> <p>they are able to ensure technical changes in product range and introduce new products;</p> <p>they can test new methods of production cooperate on the implementation technological changes and innovation activities;</p> <p>they are able to decide on the method control and technical tests, co-operate production quality control.</p>

CHARACTERISTIC OCCUPATIONS AND RELEVANT REGULATED OCCUPATIONS	
ess problems in rate understanding ;	they are able to write and compile a report on results of a laboratory experiment;
r including all s and balance	<b>Short-cycle</b> graduates are able to understand the function of devices in the specialization for which they were trained. They can hold posts of heads of operating groups after attending training on specific tasks. Graduates are employable as qualified sales persons and marketing specialists as they are sufficiently educated in order to be able to communicate with general public about the parameters and the utility properties of machinery.
minology as well tation;	they can devise solutions to problems using scientific methods and present and defend proposed solutions in front of scientific community as well as discuss them in a foreign language.
ings of products efficient methods of	The basic qualification of graduates includes bachelor's degree in materials or mechanical engineering. The aim and purpose of bachelor's programme is usually to allow students' transfer between schools on the basis of comparable education system and prepare them for master's study, but there are bachelor's degree programmes that focus more on practice and bring up "specialists" - bachelors.
method of carrying ing, packaging and	Graduates of <b>Bachelor's study programmes</b> can pursue professional activities in operation with the possibility of future development of knowledge and expertise in relation to the equipment entrusted. Graduates of <b>bachelor's degree</b> programmes have the potential to carry out activities that rank among medium-qualified professional activities, authorizing for the management of component parts of contracts and resolving partial issues; as the length of practice increases, selected capable graduates can also gradually step up to positions that rank among highly-qualified professional activities. Graduates are employable as qualified sales persons and marketing specialists as they are sufficiently educated in order to be able to communicate with general public about the parameters and the utility properties of machinery.
engineering olutions to issues in	they are able to work independently and effectively in such way as to communicate devising new solutions;
ysis of machinery they are able to al solutions;	Graduates of <b>Metallurgy</b> are experts in blast production of pig iron and in alternative iron-making, in producing, processing and casting of steel in metallurgy and they are employable in design organizations in engineering and manufacturing positions.
means and their achinery and accordance with a get capacity;	they can test new methods of production, cooperate in the implementation of technological changes and innovation activities;
anical supervision pliance with	Graduates of <b>Engineering Technology</b> are employable in production facilities in mechanical engineering and other industries, in the departments of preparation and organization of production, in the design and construction of technological facilities, tools and products, in the design and construction of technological operations and maintenance departments.
lement and compile tory experiment;	Graduates of <b>Manufacturing Machinery and Design</b> are employable in design, construction and modernization of engineering production machinery and facility, or as operators of these facilities.
ical preparation of l introduce new	Graduates of <b>Hydraulic and Pneumatic Machinery and Facilities</b> are employable both in technical positions in operation facilities and factories using hydraulic and pneumatic equipment, holding the post of universal designer with a special focus on hydraulic and pneumatic equipment. Graduates are employable as technicians and managers at lower to mid-level positions ensuring installation, commissioning, operation, maintenance, renovation, repair, measurement and diagnosis of hydraulic and pneumatic equipment, they become sales persons and dealers, they hold the posts of maintenance technicians, they often have established their own companies providing installation, maintenance and repair of hydraulic equipment. However, they may also work in related fields, such as tribotechnics (lubrication technology), transport of liquids and gases, pumping equipment, water management, hydraulic and pneumatic pipe transport, pipelines in chemical industry, energy sectors, etc.
production, tion of novation activities;	Graduates of <b>Applied Mechanics</b> are employable at technical and operational posts in engineering companies as engineers or in computation, or as workers in testing, development departments and diagnostic centres. Graduates are employable in related engineering fields too.
method of quality operate on	

## 2.29 MINING AND MINERAL PROCESSING

### A BRIEF DESCRIPTION OF THE CHARACTER, THEMATIC SCOPE AND HISTORY OF THE FIELD

The Faculty of Mining and Geology at the Technical University of Ostrava was established in early 1950s, it continued the tradition of Mining Academy founded in the 19th century, which is associated with the first training capacity for educating mining officers established in 1716 in the town of Jáchymov. The fundamental socio-economic changes in the last decade of the 20th century induced a significant structural change of mining industry connected with the negative public perception of mining as well as decrease in interest in the study of classical mining disciplines. The Faculty of Mining and Geology used the link between science and technology disciplines to develop in particular the programme of study *Mineral Resources* which encompassed and further developed the preceding programmes of study based on the classical mining disciplines.

Programme of study *Mineral Resources* educates graduates who have a strong knowledge of the basics of natural and technical science and are employable in the fields of environment, economics and management, automation of technological processes as well as other fields related to the mineral resource complex.

### PRIMARY FIELDS

The **classic** mining and geology study fields include:

geology and other natural sciences,  
mining and other technical fields.

Fields of study related to raw materials industry can be classified as follows:

**environmental** (e.g. Environmental Engineering, Waste Processing and Disposal, Mineral Biotechnology);

**economic** (Economics and Management in Mineral Resources, Commercial Engineering in Mineral Resources);

**informatic** (Automation and Computers in the Raw Material Industry, Information and System Management, etc.).

### DEFINITION OF THE OBJECTIVES OF EDUCATION

Graduates study the basis of natural science in order to be able to master the patterns of occurrence, distribution, modification and use of natural resources, the technical base for assessing the conditions of accessing and exploitation of mineral resources, environmental baseline to be able to assess and mitigate the consequences of accessing and processing mineral resources, as well as economic base to make their decisions in the aforementioned areas acceptable from a business perspective.

Aspects of legislation and working with people are included in their training since they are expected to master leadership of teams. Practical training aims at familiarizing students with the activity under the specific conditions of mining and mineral processing.

## GENERAL PROFILE OF GRADUATES

Graduates of **bachelor degree programmes** are able to work independently in order to perform subtasks in mining, geology, general industrial practice, especially at lower levels of management, as they demonstrate an extensive knowledge of scientific, technical, economic and information disciplines including knowledge of their mutual ties. They are able to analyse the situation in operation and make use of less complex methods of scientific research. Their qualification is broad enough for practical use, however, with the depth corresponding to this level.

Graduates of **master's degree programmes** are able to work individually in order to plan and execute complex tasks in mining, geology, general industrial practice throughout a structure of an organization based on the application of routine and innovative methods, as they demonstrate an extensive knowledge of scientific, technical, economic and information disciplines that enable them to implement analytical-synthetic activities making use of a wide range of scientific methods. A broad education is as deep as industry practice requires.

Graduates of **doctoral degree programmes** are able to perform executive and management activity in the field of scientific research and solve complex problems of industrial practice based on the knowledge of scientific, technical, economic and information disciplines including the knowledge of at least one foreign language. The knowledge of the nature and application of scientific methods enable them to work innovatively in order to devise solutions to problems of industrial practice with respect to ties and connections relating to the acquisition and processing of mineral resources.



# EDUCATION DESCRIPTORS

Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates		
<p>they demonstrate the essential broad knowledge of scientific, technical, economic and information disciplines and understanding of these disciplines and their relations, for example in mining, they demonstrate the knowledge of mineralogy and petrography, mining, mechanics of soils and rock, geology, mining geomechanics, mining of reserves, mining works, mine surveying, mine ventilation, mining risks and rescue, mining law and safety regulations, remediation and reclamation of mining activities, treatment of disused mines, effects of undermining, blasting works, in the field of geodesy and cartography, they demonstrate a perfect knowledge of both lower and higher geodesy, engineering, special geodesy, issues concerning land registry, in mine surveying disciplines, they demonstrate the knowledge of the use of special instruments (gyrotheodolite), measurement of movements and deformations of the Earth's surface, knowledge of factual issues in mining disciplines;</p> <p>they demonstrate a broad and deep theoretical knowledge and understanding of theories, concepts and methods corresponding to the current state of knowledge in the discipline and enabling them to perform</p>	<p>they demonstrate a broad and deep knowledge and understanding of the scope of a discipline corresponding to the current state of knowledge including knowledge of border disciplines and other disciplines, for example in mining, they demonstrate the knowledge of mineralogy and petrography, mining, mechanics of soils and rock, geology, mining geomechanics, mining of reserves, mining works, mine surveying, mine ventilation, mining risks and rescue, mining law and safety regulations, remediation and reclamation of mining activities, treatment of disused mines, effects of undermining, blasting works, in the field of geodesy and cartography, they demonstrate a perfect knowledge of both lower and higher geodesy, engineering, special geodesy, issues concerning land registry, in mine surveying disciplines, they demonstrate knowledge of the use of special instruments (gyrotheodolite), measurement of movements and deformations of the Earth's surface, knowledge of factual issues in mining disciplines;</p> <p>they demonstrate a broad and deep knowledge of theories, concepts and methods corresponding to current state of knowledge in the discipline and enabling</p>	<p>they demonstrate a deep and systematic theoretical knowledge in the discipline as well as its scope corresponding to the current state of knowledge allowing for communication not only within a particular discipline, but also with representatives of disciplines at the intersection as well as other disciplines, they demonstrate understanding of this knowledge, for example in the field of geodesy and cartography in the case of the field of Engineering Geodesy, they demonstrate a perfect knowledge of lower and higher geodesy, specialized engineering geodesy and mining geodesy, in the case of mine surveying, they demonstrate knowledge of own field as well as related fields, especially those related to mining; they demonstrate a deep and systematic theoretical knowledge of latest theories, concepts and methods in the discipline internationally allowing for a conceptual and planning activity in practice and in the field of scientific research, they demonstrate understanding of these theories, concepts and methods, for example in the field of geodesy and cartography, they demonstrate a theoretical knowledge and practice to perform control and operational jobs, lead</p>

Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates		
<p>executive posts in the operating area, implementing analysis and synthesis of practical issues, for example, in the field of geodesy and cartography, they demonstrate theoretical knowledge as well as practical skills to perform executive posts in geodesy, including the post of executive mining surveyor, after meeting required conditions, they can gain authorization for verifying results of land/building surveyor activities, hold management posts in cadastral offices;</p> <p>they demonstrate understanding of the possibilities and conditions for, and limitations on, the use of knowledge in related disciplines for devising solutions to practical problems.</p>	<p>them to perform executive posts in the operating area, implement analysis and synthesis of practical issues, they demonstrate understanding of these theories, concepts and methods, for example in the field of geodesy and cartography, they demonstrate theoretical knowledge as well as practical skills to perform executive posts in geodesy, holding the post of leading mining surveyor, after meeting required conditions, they can gain authorization for verifying results of land/building surveyor activities, hold management posts in cadastral offices;</p> <p>they demonstrate understanding of the possibilities and conditions for, and limitations on, the use of knowledge in related disciplines for devising solutions to practical problems.</p>	<p>research teams, after meeting the required conditions, they can gain authorization to verify the results of land/building surveyor activities;</p> <p>they demonstrate understanding of the system of science and research problems at the intersection of disciplines enabling an interdisciplinary collaboration in areas such as control of industrial systems, they demonstrate the knowledge of economic and related disciplines as well as the field's technological base.</p>

## PROFESSIONAL KNOWLEDGE

# EDUCATION DESCRIPTORS

## PROFESSIONAL SKILLS

Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates		
<p>making use of theoretical and practical specialist knowledge, they are able to work independently in order to identify creatively devise solutions to theoretical and practical problems, including geological, mining, surveying and mine surveying practice, for example in the field of mining, they can manage mining activities safely and professionally or perform mining activities at the mine or mining quarry producing more than 500 thousand tonnes a year, they are able to produce documentation, design and manage activities in the anti-shake segment, manage mine ventilation during mining activity, design objects and devices related to mining activity under Decree No. 298/2005 Coll., in the field of geodesy and cartography, they can perform complex measurements in terms of geodesy and mine surveying verification, they may gain authorization to verify the results of surveying activities and are able to hold management posts in cadastral offices;</p> <p>they can work independently and creatively in order to devise solutions to complex problems making use of selected theories, concepts and methods of a discipline as well as to process a complex analytic and synthetic</p>	<p>drawing on their specialist knowledge, they are able to work independently in order to identify and creatively devise solutions to theoretical and practical problems, for example in the field of mining, they can manage mining activities safely and professionally or perform mining activities at the mine or mining quarry producing more than 500 thousand tonnes a year, they are able to produce documentation, design and manage activities in the anti-shake segment, manage mine ventilation during mining activity, design objects and devices related to mining activity under Decree No. 298/2005 Coll., in the field of geodesy and cartography, they can perform complex measurements in terms of geodesy and mine surveying verification, they may gain authorization to verify the results of surveying activities and are able to hold management posts in cadastral offices;</p> <p>they can work independently and creatively in order to devise solutions to complex problems making use of selected theories, concepts and methods of a discipline as well as to process a complex analytic and synthetic works across an enterprise;</p> <p>they can make use of some of the advanced</p>	<p>they are able to propose and use advanced research methods in the discipline in such a way as to extend the existing knowledge in the discipline through original research in order to devise solutions to problems of operational practice and research issues;</p> <p>they are able to develop and evaluate theories, concepts and methods in the discipline including the demarcation of disciplines or their extension into broader areas aiming at interdisciplinary co-operation;</p> <p>they are able to implement applied research, verify hypotheses in practice, or propose a practical use for the research findings.</p>

Bachelor's study programme	Master's study programme	Doctoral study programme
works across an enterprise; they can make use of some of the advanced research methods in the discipline in such a manner as to obtain new and original information from practice, including geological, mining, surveying and mine surveying practice.	research methods in the discipline in such a manner as to obtain new and original information from practice.	

PROFESSIONAL SKILLS

# MINING AND MINERAL PROCESSING

## CHARACTERISTIC OCCUPATIONS AND RELEVANT REGULATED OCCUPATIONS

Graduates of classical mining disciplines are able to hold posts in accordance with the Decree of the Czech Mining Office No. 298/2005 Coll. of 12 July 2005, defining the requirements for professional qualifications and expertise in mining activity or activity performed in mining manner - for example mining quarry producing less than 500 thousand tonnes/year (bachelor's degree programme), pit mining or quarry mining under 500 thousand tonnes/year (master's degree programme), an enterprise technician, safety engineer, mining engineer, etc.

Following fulfilment of special conditions, graduates of *Geodesy and Cartography* may gain authorization for verifying results of land/building survey activities, holding the post of main mining surveyor or holding posts in cadastral offices. Graduates of other programmes of study are able to hold posts in operation of industrial enterprises, in state and local government institutions, and in research organizations.

## RELATIONS TO OTHER SUBJECT AREAS

Conventional mining disciplines are closely related to legal segment (Mining Act, Water Act, etc.), i.e. there is a close relation with the field of *Law*, specialized technical fields are associated with the issue of work safety, i.e. with the subject area *Security Studies*, economy-focused fields are connected to relevant financial legislation, i.e. subject areas *Economics* and *Law*. There are close ties with the subject area *Civil Engineering*.

In the fields of economy, informatics, geology and others, there is a strong relation between these disciplines and the knowledge of technical basis of organizations where graduates find jobs. This fact is reflected in a quicker incorporation and higher quality of work of graduates of the aforementioned disciplines with regard to continuity of the aforementioned fields in connection with technical basis.

## 2.30 MANUFACTURING INDUSTRY

### A BRIEF DESCRIPTION OF THE CHARACTER, THEMATIC SCOPE AND HISTORY OF THE FIELD

Transformation of natural resources into a useful form and their further refinement using the work and instruments for the fulfilment of material needs of a man is one of the major features of history of a mankind. Since the processing of various types of raw material and production of useful tools moved from workshops into factories, manufacturing industry became a resource of material culture en masse. Manufacturing industry launched the industrial epoch of a mankind and has largely contributed to the attainment and maintaining of material standard in the context of our civilization.

Manufacturing industry in the Czech Republic is one of the key resources of gross domestic product as well as the defining force of foreign trade. Thanks to its diversity, variety of qualification requirements and workforce as well as differences in the degree of value added, the individual fields of manufacturing industry react differently to the overall development in economy as well as to various stimuli by which it is influenced. As a whole, this industry provides for diversification within the overall strategy of economic development.

It is one of the broadest areas of national economy in terms of range and diversity. It includes not only a large number of scientific disciplines in their applied form, but also technology in traditional industrial areas, and, multidisciplinary is becoming increasingly important, which is a response to contemporary technological and material requirements. Manufacturing industry builds on other industries - agriculture, chemical industry, metallurgy, mining etc., whose products are the feedstock for further transformation.

Manufacturing industry includes the mechanical, physical or chemical transformation of materials or components into new products (goods). Materials, substances and raw material that is used as input for manufacturing industries include the products of agriculture, forestry, fisheries and aquaculture, mining, quarrying stone, sand and clay, as well as products of other manufacturing activity. A substantial transformation, renovation or reconstruction of products is generally regarded as production of goods and is classified as part of manufacturing industry. The result of the manufacturing process are either finished products designed for use or consumption or semi-finished products intended for further manufacturing or processing.

Processing techniques require specific knowledge and combination (multidisciplinary) of knowledge that is not applied in other fields, which needs to be reflected in designing the education. The fundamental function of tertiary education in the subject area "Manufacturing Industry" is to educate skilled graduates who are able to demonstrate their creative potential. This requires a good quality theoretical knowledge in technical science, as well as flexibility and ability to continue in further education and communicate in a particular discipline. This requires appropriate level of knowledge of foreign language as well as the ability to use information sources and apply them. The wide range of fields of manufacturing industry implies a large number of engineering studies that are necessarily specialized. Yet all fields share the common classical basics in mathematics and physics, measurement and control, materials science as well as the general effort to apply practically-oriented engineering approach to problem solving, including the legislative, economic and managerial aspects.

### PRIMARY FIELDS

The primary fields under the subject area Manufacturing Industry include:

- Food and beverage manufacturing,
- Textiles and textile product manufacturing,
- Clothing production, dressing and dyeing of fur,
- Tanning and dressing of leather, manufacture of luggage, handbags, saddlery and footwear,
- Woodworking and products of wood, cork, wickerwork and straw products excluding furniture,
- Manufacture of fibre, paper and paper products,
- Publishing, printing and reproduction of recorded media,
- Manufacture of coke, nuclear fuel, refinery processing of crude oil,
- Manufacture of chemical substances, chemical products, medicinal products and man-made fibres,
- Manufacture of rubber and plastic products,
- Manufacture of other non-metallic mineral products,
- Manufacture of basic metals and metallurgical products,
- Manufacture of metal structures and fabricated metal products (except machinery and equipment),
- Manufacture and repairs of machinery and equipment,
- Manufacture of office machinery and computers,
- Manufacture of electrical machinery and apparatus,
- Manufacture of radio, television and communication equipment and apparatus,
- Manufacture of medical, precision, optical instruments, watches and clocks,
- Manufacture of motor vehicles, trailers and semi-trailers,
- Manufacture of other transport vehicles and equipment (e.g. motorcycles),
- Manufacture of furniture,
- Recycling of secondary raw material.

These fields produce using almost all kinds of available material, energy resources and technologies. Also, this wide range adds a number of combinations which lead to innovations as well as to developing new manufacturing specializations. The field of physical engineering and the emerging nanotechnology is represented to a small extent in the Czech Republic. Recycling is defined separately, mainly at agriculture universities, where it is introduced as a discipline focused on organic waste management. In the context of the subject area Manufacturing Industry, recycling is always considered as an addition to a particular field.

## DEFINITION OF THE OBJECTIVES OF EDUCATION

Education under a particular area must cover the necessary theoretical areas, develop creativity and communication skills of students and at the same time prepare them for efficient and prompt problem solving in engineering practice.

The objective of education is to educate graduates who will get an occupation and be able to hold a specialist post in a particular field of industry. Graduates should be able to handle the managerial aspect of their position, as well as hold management or specialist administration posts.

Graduate profile must be balanced between expertise of the highest quality and specialization on one hand and universality and subsequent flexibility on the labour market on the other.

## GENERAL PROFILE OF GRADUATES



Graduates demonstrate the knowledge of relevant process technologies, depending on the level of study. They are able to apply knowledge and skills in their approach to problem solving, i.e.:

- they can obtain, analyse and process information from their discipline,
- they can devise solutions to problems based on abstraction and ability to select what is important and what is insignificant,
- they can anticipate consequences of a proposed solution and its compliance with the objectives defined,
- they are able to assess the advantages and disadvantages of different approaches to problems,
- they can communicate about an issue with field experts as well as others,
- they are ready for teamwork, or team leadership,
- they take into account the economic and environmental aspects of their activity in any decision-making.

Graduates of **short cycle** demonstrate specialist knowledge in scientific, technical, economic and informatics disciplines, they demonstrate technical knowledge of a certain focus based on materials engineering, chemical and physical processes, they demonstrate their ability to control technological sections and transfer knowledge and experience to other workers, when presented with a specific task, they are able to draw on their specialist knowledge in order to devise solutions to common practical problems, implement efficient business practice with expert guidance, they can collect and compile the relevant information under the assigned tasks.

Graduates of **bachelor's degree programmes** demonstrate a broad knowledge of scientific, technical, economic and information disciplines and understanding of their mutual relations, they are able to collect data and use this data for problem analysis, as well as perform technical and control positions. When presented with a broadly specified tasks, graduates are able to draw on their specialist knowledge in order to devise solutions to practical issues at lower management levels as well as employ selected basic research principles common in the discipline when devising solutions to practical problems in field practice.

Graduates of **master's degree programmes** demonstrate a broad and deep knowledge of the area of study and the scope of the field corresponding to the current state of knowledge adding knowledge of interdisciplinary and other disciplines, enabling them to hold executive posts in operation and implementation of analysis and synthesis of practical issues. Drawing on their specialist knowledge, they are able to work independently in delimiting, naming and, in a creative manner, devising a solution for a theoretical or practical problem in the discipline, making use of some of the advanced research methods in the discipline in such a manner as to obtain new and original information.

Graduates of **doctoral degree programmes** demonstrate a broad and systematic knowledge and understanding of the area of study and of the scope of the field corresponding to the current state of knowledge allowing for communication not only within their own field, but also with interdisciplinary representatives and representatives of other disciplines, demonstrate a deep and systematic understanding of the latest theories, concepts and methods in the discipline internationally enabling conceptual and planning activities in operational practice and in the field of scientific research. Furthermore, they demonstrate understanding of the system of science and research problems at the intersection of disciplines enabling an interdisciplinary collaboration, they are able to propose and use advanced research methods in the discipline in such a way as to extend the existing knowledge in the discipline through original research in order to devise solutions to problems of operational practice and research issues, they are able to carry out applied research, test hypotheses in practice, or propose practical use for the research findings.

# EDUCATION DESCRIPTORS

PROFESSIONAL KNOWLEDGE			
Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
<p>they demonstrate expertise and specialist knowledge of scientific, technical, economic and informatics disciplines such as technological knowledge of a certain focus based on materials engineering, chemical and physical processes,</p> <p>they demonstrate the knowledge of methods required for the exercise of independent professional activities connected to practical activity in specific manufacturing sectors,</p> <p>they demonstrate an overview of the theories and concepts underlying the area of study and the means of putting them into practice, for example, in the field of testing, they demonstrate the knowledge of selected areas of testing methods as well as the ability to work independently in order to evaluate selected parameters in practice, and in merchandise, they demonstrate the ability to identify</p>	<p>they demonstrate a broad knowledge of scientific, technical, economic and information disciplines including knowledge of their mutual relations, such as process engineering knowledge in selected specializations, materials engineering, construction and influence of processing parameters on end products, in the area of testing, they demonstrate knowledge of testing methods in selected specializations and are able to apply them in practice,</p> <p>they demonstrate a broad knowledge of theories, concepts and methods in the discipline enabling for data collection and analysis of problems, performance of technical and management positions, for example, in areas such as merchandise, they demonstrate the ability to identify quality parameters of products in certain manufacturing sectors,</p>	<p>they demonstrate a broad and deep knowledge and understanding of the area of study and of the scope of the field corresponding to the current state of knowledge combined with the knowledge of disciplines at the intersection of disciplines at the process engineering for more technological specializations in relation to materials engineering, construction of machines, moulds and jigs, physical and chemical aspects of processes, in the area of testing, they demonstrate the knowledge of different testing methods and the ability to apply them in practice, they are able to present and evaluate complex processes and boundary conditions during a product's life,</p> <p>they demonstrate a broad and deep knowledge of theories, concepts and methods corresponding to the current state</p>	<p>they demonstrate a deep and systematic knowledge and understanding of the area of study and the scope of the field corresponding to the current state of knowledge allowing for communication not only in their own discipline, but also with interdisciplinary representatives and representatives of other disciplines, for example in the field of manufacturing, they demonstrate an excellent technical knowledge including aspects of materials engineering, nanotechnology, chemical and physical processes, construction, work safety, they are able to introduce major innovative changes in selected manufacturing sectors including legislative and economic evaluation,</p> <p>they demonstrate a deep and systematic knowledge of the latest theories, concepts and methods in the discipline internationally enabling conceptual and planning activity in</p>

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
qualitative parameters in selected groups of products and deal with complaints.	they demonstrate an understanding of the possibilities and conditions for, and limitations on, the use of the theories, concepts and methods of the discipline in practice.	<p>of knowledge enabling them to hold top executive posts in operating area, implement analysis and synthesis of practical issues, in areas such as merchandise, they demonstrate the ability to identify qualitative parameters of products in a broader context in relation to manufacturing fields (e.g. the effect of substances on health), legal and economic aspects, they demonstrate understanding of the possibilities and conditions for, and limitations on, the use of knowledge in related disciplines for devising solutions to practical problems.</p>	operational practice and in the field of scientific research, for example the knowledge of testing methods, certification in relation to structure of materials, physical and chemical properties including nanostructures, amorphous, crystal and heterogeneous phases, they demonstrate an understanding of the system of scholarly and scientific disciplines and research problems at the intersection of disciplines enabling an interdisciplinary co-operation.

# EDUCATION DESCRIPTORS

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
<p>drawing on their specialist knowledge, they are able to devise solutions to common practical problems in a discipline when presented with a specific task, carry out working practice with expert guidance, such as manage technological sub-sections, including the introduction of new production processes, they can manage adjustment of production processes and removal of production failures, they are able to process operational documentation, they are able to collect and further use the relevant information within the assigned tasks, for example in testing, they are able to evaluate selected properties of materials, semi-finished products and finished products. They are able to set the parameters of manufacturing processes based on evaluation of raw materials and finished products, they demonstrate the ability to control technological sections</p>	<p>drawing on their specialist knowledge, they are able to devise solutions to practical problems in a discipline when presented with a broadly specified task, for example, they are able to manage technological operations at lower management levels in certain manufacturing sectors, including production planning, they can control different segments of operation and can teach other workers methods of fulfilling the necessary tasks, in the field of testing, they can manage the test section, input and output controls in context, they can explain and teach other staff members methods of fulfilling the necessary tasks, they are able to retrieve, organize and interpret information which is relevant to the specified practical issue in practice, for example in merchandising, they can identify and document parameters of goods,</p>	<p>using their expertise, they are able to draw on specialist knowledge in order to work independently in delimiting, naming and, in a creative manner, devising a solution for a theoretical or practical problem in the discipline, for example, in areas such as manufacturing they can manage technological processes including related sections, they have the ability to introduce innovative technological changes to operations, in testing, they can manage quality sections in several professional specializations, they are capable of comprehensive assessment, including legislative and economic aspects, they can work independently and creatively in order to devise solutions to complex problems making use of selected theories, concepts and methods and in the discipline of manufacturing, they are able to process</p>	<p>they are able to propose and use advanced research methods in the discipline in such a way as to extend existing knowledge in the discipline through original research in order to devise solutions to problems of operational practice and scientific research, for example in the area of merchandise, they are able to perform highly specialized activities related to the introduction of new and innovative products in a broad context, they are able to develop and evaluate theories, concepts and methods in the discipline including the demarcation of disciplines or their extension into broader areas aiming at interdisciplinary co-operation, for example, in the field of manufacturing, they are able to design and employ new manufacturing methods, they are able to implement applied research, verify hypotheses in practice, or propose</p>

## CHARACTERISTIC OCCUPATIONS AND RELEVANT REGULATED OCCUPATIONS

Graduates are employable in a wide range of areas - in the actual manufacturing process in companies or institutions, state administration and local government bodies, in the management of private and public companies as well as in research organizations. They are able to further educate and monitor developments in their discipline, both in their mother tongue and in a foreign language.

**Short-cycle** graduates are able to understand the function of devices in the specialization for which they were trained. They can hold posts of heads of operating groups after attending training on specific tasks. Graduates may get jobs of qualified sales persons and marketing specialists as they are sufficiently educated in order to be able to communicate with general public about the parameters and the utility properties of machinery.

Graduates of **bachelor's degree programmes** can pursue professional activities in operation with the possibility of future development of knowledge and expertise in relation to the equipment entrusted. Graduates of bachelor's degree programmes have the potential to carry out activities that rank among medium-qualified professional activities, authorizing for management of component parts of contracts and resolving partial issues; as the length of practice increases, selected capable graduates can also gradually step up to positions that are classified as highly qualified. Graduates of bachelor's degree programmes are employable as qualified sales persons and marketing specialists as they are sufficiently educated in order to be able to communicate with general public about the parameters and the utility properties of machinery.

Graduates of **master's degree programmes** are employable in engineering, manufacturing and management posts. Several years of practical experience is an essential prerequisite mainly for team leaders. After completion of teacher education, they are able to teach specialized courses at technical secondary schools.

**Doctoral study** is a preparation for highly qualified professional research activities. The subject area Manufacturing Industry includes basic research, which needs to be developed at a world-class level by postgraduate students and graduates, researchers at faculties, in the academy of sciences and resort research institutes. Graduates are employable as scientific researchers or university teachers in their respective fields. After completion of teacher education, they are able to teach specialized courses at technical secondary schools, or universities.

## RELATIONS TO OTHER SUBJECT AREAS

This area includes a range of traditional engineering specializations as well as interdisciplinary studies including emerging disciplines. Individual disciplines intersect with each other just like basic science disciplines intersect these days. Individual fields of study do not develop in isolation.

The common language of engineers is mathematics and physics which is always connected to manufacturing. If a particular field includes transformation of materials in terms of their chemical composition, the common base includes chemistry too. If a processing of materials includes the use of living organisms, biology study is necessary, i.e. subject areas biology and ecology. Technical disciplines intersect with each other, which is sometimes due to the degree of generality of object, such as measurement, control and automation, sometimes due to the need to connect machines and processes, which is, for example, in chemical engineering. Therefore, there is also a connection with subject area mechanical engineering and materials.

The training in environment, legislation, economy and management must be taken into account in the preparation of graduates for manufacturing industry. This implies continuity with the subject areas

biology and ecology, law and economics.

Education required in this area is not implemented only at technical universities, but also under applied fields at universities, where students gain a master's degree, however, the aforementioned applies to them to full extent.



## 2.31 AGRICULTURE

### A BRIEF DESCRIPTION OF THE CHARACTER, THEMATIC SCOPE AND HISTORY OF THE FIELD

The function of education in subject area Agriculture is to gain knowledge of biological laws relevant to the targeted growing of plants and breeding of animals, understanding and optimization of systems of their production, processing and use, as well as the use of non-productive potential of organisms, understanding of the links between agriculture, natural resources, landscape and environment aiming at their sustainable use and formation, to educate for responsible, professional, but also economically efficient regulation of these activities at the level of individual or company business activity in local and state government, and giving due importance to the social dimension of activities in the field of agriculture and forestry for rural areas.

Education in subject area Agriculture can be characterized as extensive application of knowledge, especially in scientific and technical fields, but also in economic and social fields, developed in long-term in the distinctive areas such as animal breeding, growing plants, production and utilization of their non-productive potential, from primary agriculture production up to settlement and landscaping intervention and care for landscape and urban vegetation, care for land resources, water resources, renewable natural resources and the environment of economically exploited landscape in general, or the development of rural areas closely tied to agricultural activity and economic exploitation of the landscape.

The studies in this subject area have undergone major differentiation in the last twenty years and currently goes beyond the traditional agricultural framework offering education applicable in a number of related fields or in biology-technical sector in general. While initial focus of agricultural fields was more or less exclusively on production (in accordance with the economic and social requirements of the time), environmental and social aspects play an important role these days, in accordance with the principles of sustainable development and environmental responsibility. The basis of education in the subject area Agriculture is to educate professionals and develop scientific disciplines focused on agricultural production (both crops and livestock). However, at the same time, it is necessary to pay attention to the connection between this production and the environment - whether in terms of sustainable use of natural resources (including the production of energy crops), the potential negative impacts of agricultural activity on the environment (especially in connection with waste production and the possible influence on landscape ecosystems) or the creation and maintenance of cultural landscape and its ecological balance. On the other hand, good quality agricultural production would be impossible without a link to manufacturing industries such as the food industry, etc. The care for the health of farmed animals or cultivated crop is an important aspect of agriculture. While in animal farming, this is professionally secured by veterinary medicine and the breeders' task is to establish and maintain a responsible "partnership", plant health ranks among traditional agricultural fields. Also, the social demand for specialists in the field of pet animals as well as in the established area of landscape architecture cannot be ignored. Modern methods in plant growing and animal breeding require development of biotechnological methods and procedures. The potential of model research for the needs of human medicine is at game in the case of animal biotechnology.

The need for qualified management at the level of business entities and government bodies necessarily leads to the development of disciplines combining primary fields of this subject area with administrative and economic fields. The need for full utilization of economic potential of agricultural sector requires devoting adequate space to the development of complementary activities, such as



agrotourism. Close ties between agricultural activities with the formation of both the countryside and the society has led recently - as in many other developed countries - to forging a new direction focused on the development of rural areas as a whole.

The process of globalization and the Czech Republic's involvement in development programmes in the third world countries is then reflected in the increasing share of study in English language and the focus of selected study programmes on the application of knowledge in the above-mentioned areas in the conditions of developing countries, or countries located in tropical and subtropical climates.

The institutionally independent higher education in the field of agricultural sciences began in 1906 by establishing the Agricultural Department at the Czech Technical University (ČVŠT). In 1920, the Agricultural Department at the Czech Technical University (ČVŠT) transformed into University of Agriculture and Forestry Engineering at the Czech Technical University, an independent University of Agriculture in Prague was established in 1952, since 1995, it is the Czech Agricultural University in Prague. In 1919, the University of Agriculture in Brno was established which continued as the Mendel University of Agriculture and Forestry in Brno since 1994 and as the Mendel University in Brno since 2010. The Business and Economics Faculty of Agriculture with Prague's Czech Technical University was established in České Budějovice in 1960, since 1991, it has continued as the Faculty of Agriculture of the University of South Bohemia in České Budějovice.

The specialization of individual disciplines has led to diversification at all aforementioned universities, somewhere they transformed into independent programmes of study, or separate faculties were established in some cases. Gradually, in addition to the separate field of forestry, other individual directions emerged including agricultural economics, agricultural engineering, food industry is largely based on agricultural production too. In terms of the National Qualifications Framework of Tertiary Education, this development was taken into account by joining areas of agricultural economics with economic sciences and agricultural technology with technical sciences. Forestry and Food Industry are defined as separate subject areas under agricultural, forestry and veterinary sciences.

## PRIMARY FIELDS

The aforementioned development and the gradual specialization has led to splitting the original profile of agriculture as a versatile agricultural primary production of plant and animal products with the soil being the basic production tool into several interrelated, but relatively specific fields, that form the pillars of education in the subject area Agriculture:

**phytotronics**, covering the field of growing plants ranging from traditional agricultural crop up to the production of energy crop, related agricultural technology, nutrition, protection, breeding and production as well as non-production utilization;

**zootechnics**, dealing with the issue of animal breeding, their housing, disease prevention, nutrition, breeding, reproduction, targeted utilization in production, training, working or in leisure time activity;

**horticulture and landscaping**, characterized by the knowledge of growing plants ranging from traditional horticultural crops (vegetables, fruit trees or vines) up to ornamental plants, their nutrition, protection, breeding and reproduction, and their production as well as non-production utilization, care for landscape and urban vegetation, designing and implementation of residential and landscaping works and restoration;

**natural resources**, dealing with the care for land resources, water resources and natural renewable resources, including recycling of waste materials and issues of ecological balance of economically utilized landscape in general;

**rural development**, focusing on complex view of issues related to balanced and sustainable development of rural areas closely tied to agricultural activity and landscape protection,

including specific economic and social conditions.

Individual primary fields are characterized mainly by the subject of specialized interest, which, to a large extent, defines the place, the circumstances, the purpose and the nature of individual professional activities. The close proximity and mutual interdependence of primary fields is the essence of defining the entire subject area Agriculture. However, even within primary fields, there are always many different activities based on diverse theoretical disciplines. As the level of education increases, the knowledge about the nature and influenced processes deepens including the possibilities of successful application of this knowledge on a particular subject of interest, however, at the same time, a significant specialization begins to occur – first in the subject area, and later within individual primary fields. Contemporary university programmes of study are therefore characterized by strong differentiation towards individual primary fields starting at short-cycle bachelor's degree programmes and, for example, at the doctoral degree level, the cycle virtually does not produce graduates who would be able to encompass the entire issue of the respective primary field.

## DEFINITION OF THE OBJECTIVES OF EDUCATION

The basic objective of education in various agricultural programmes is to provide graduates with theoretical and practical education enabling creative work in selected professional disciplines as well as other areas of practice. General objectives can be characterized as an effort to develop:

- general as well as field-specific knowledge and skills,
- theoretical and critical thinking, problem-focused analysis and synthesis,
- ability to formulate and defend one's own opinion,
- ability to communicate and work in a team,
- ability to perceive problems in context and devise solutions to them with respect to the principles of ethical, environmental, social and economic responsibility.

Agricultural programmes of study educate students for work in managerial and professional positions in primary production, breeding of organisms, trade, consultancy and specialized services, professional and interest organizations in professional positions in the financial sector (insurance companies, banks ...), local and state government, control and inspection institutions, specialized research and education, particularly in the fields of:

- market gardening, fruit growing, floriculture, orchard sector, viticulture and wine production, seed production,
- production of conventional crops, as well as industrial and speciality crops,
- feed industry, food industry,
- implementation and maintenance of greenery at sports venues, urban and landscape green spaces and related preservation,
- breeding of livestock and pet animals, fishing and fish farming, zoos, animal protection, using animals in sports and in assistance and rehabilitation activities,
- plant nutrition and plant protection,
- plant and animal biotechnology, reproductive biotechnology,
- ecological and alternative primary agricultural production,
- waste treatment and recovery,
- landscape management, land resources, and other natural and renewable resources and their utilization,
- administration of territories subject to special protection regime,
- resolving issues of land property, economic and technical adjustments,
- technical organization of rural revitalization, increasing economic activity of rural areas.

## GENERAL PROFILE OF GRADUATES

Graduates will acquire industry-specific knowledge (theoretical and methodological knowledge) as well as the ability to apply them in both traditional professional work in the field and generally in their management and organizational activity, all including the ability to respond to social changes and the changing market conditions. At the same time, they gain broad theoretical overview in biotechnology enabling interdisciplinary application. Graduates should be capable of analytical, evaluation, implementation, administration and review activity, teamwork, decision-making and management activity at management level corresponding to the level of qualification (bachelor's, master's, doctoral degree programmes) and of design activity at an adequate level.

At the level of **short-cycle programmes**, graduates are educated to perform an independent professional activity in their chosen discipline (livestock breeding, cultivation of crops, regional or local government in rural areas). At the level of short cycle - with regard to theoretical intensity - the establishment of study programmes focused on the primary field of natural resources is not expected.

**Bachelor's degree programmes** primarily provide broader theoretical basis for gaining industry-specific as well as wide-ranging knowledge and skills. Therefore, a direct progression from short-cycle study programmes into bachelor degree programmes would be problematic. Bachelor's degree programmes are designed either as direct preparation for performing professional and management position at the operational or corporate middle management level with emphasis put on practical use of acquired knowledge and skills, or, on the contrary, accentuates the depth of theoretical training for master's studies.

Graduates of **master's degree programmes** demonstrate a comprehensive high-level theoretical as well as practical knowledge in the chosen discipline. Graduates are ready to perform managerial and professional positions in senior corporate management. The composition of study subjects allows for deepening the knowledge of key science-based disciplines needed for the subsequent deeper understanding of industry-specific disciplines and helps students in getting familiar with the latest methodological procedures, equipment and technologies in the discipline. Simultaneously, the study puts more emphasis on the formation of general competencies such as the ability to independently retrieve information, make judgements, work in a team, etc.

**Doctoral degree programmes** are then characterized by a detailed knowledge and search for new specialized knowledge within the areas of activities and knowledge defined by primary fields.

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
<p>they demonstrate a basic overview of the life functions and the needs of living organisms;</p> <p>they demonstrate a basic knowledge of living organisms and the biosphere directly applied in animal breeding and cultivation of plants and their utilization by a man;</p> <p>they demonstrate a knowledge of the key technology currently used for the above-mentioned activities;</p> <p>they are familiar with the basic socio-economic and legal framework of the aforementioned activities;</p> <p>they demonstrate the knowledge of basic methods used in the cultivation of plants, their agricultural technology, nutrition, protection and propagation of their basic production or non-production utilization, ranging from production of field crops and horticultural crops to maintenance of residential and</p>	<p>they demonstrate a basic overview of a system of living organisms, of the physical, chemical and biological processes in biosphere and in living organisms;</p> <p>they demonstrate a detailed knowledge of living organisms and the biosphere applied directly in the care of biological entities, in their utilization by human activity, as well as in taking care of biosphere components affected by this activity;</p> <p>they demonstrate a knowledge of technological equipment currently used for the above-mentioned activities;</p> <p>they demonstrate a knowledge of technological processes characteristic for both intensive and extensive forms of farming, but also of procedures of non-productive use of biological entities, natural resources and related waste treatment;</p> <p>they know the methods used in farming or cultivation, breeding</p>	<p>they demonstrate a detailed knowledge of the physical, chemical and biological processes in biosphere and of the system, life functions and the needs of living organisms;</p> <p>they have an up-to-date knowledge of the properties and rules of functioning of living organisms and the biosphere, mainly focused on the needs of care of biological entities and their human use, as well as care of biosphere components affected by this activity;</p> <p>they are familiar with the traditional and newly introduced technological equipment for the above-mentioned activities;</p> <p>they are familiar with the socio-economic and legal framework of the aforementioned activities;</p> <p>they demonstrate a knowledge of traditional and modern technological processes characteristic for both the intensive and</p>	<p>they demonstrate an understanding of physical, chemical and biological processes in biosphere and in the living organisms themselves relevant to the topic of their research work;</p> <p>they demonstrate an up-to-date knowledge of living organisms and biosphere, especially focused on deepening and systematic sorting of knowledge of respective areas of expertise;</p> <p>they demonstrate an understanding of technological equipment used in specialized research;</p> <p>they are familiar with the economic and legal framework of research in the discipline;</p> <p>they demonstrate a deep and systematic knowledge of the latest theories, concepts and methods internationally leading to a development in the discipline in individual areas:</p> <ul style="list-style-type: none"> <li>- in animal husbandry, their nutrition, breeding and reproduction,</li> </ul>

## PROFESSIONAL KNOWLEDGE

# EDUCATION DESCRIPTORS

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
<p>landscape vegetation, or, in activities associated with animal breeding, their nutrition, reproduction and targeted use in production, in their training, working, or leisure time activity; they know the administrative duties associated to the performance of regional or local government in rural areas;</p>	<p>and reproduction of biological entities and their targeted utilization, as well as in the associated use of other natural resources and waste treatment; they demonstrate an overview of economic instruments limiting successful business in both traditional and non-traditional disciplines; they have the prerequisites for performing positions in the state and regional administration in the above mentioned areas; they understand the concept of sustainable development and its close links with agricultural areas; they understand the possibilities and conditions for, and limitations on, the use of the theories, concepts and methods of the discipline in practice with regard to the existing legal framework, the socio-economic aspects as well as the biological patterns of functioning of living</p>	<p>extensive forms of farming, but also of procedures of non-productive use of biological entities, natural resources or waste treatment; they know the latest methods used in farming or cultivation, breeding and reproduction of biological entities and their targeted utilization, as well as in the associated use of other natural resources and waste treatment; they demonstrate an overview of economic instruments relevant to successful business in the field; they have the prerequisites for performing executive positions</p>	<p>as well as their targeted use in production, in training, in business or leisure time activity; - growing of plants, their agricultural technology, nutrition, protection, breeding and propagation, production and non-production utilization, in the design and planning of residential and landscape units and their revitalization; - dealing with care of landscape, land resources, water resources and renewable natural resources in general, including recycling of waste material; - regional development and rural management and understanding of these theories, concepts and methods; they demonstrate an understanding of the system of scholarly and scientific disciplines and research problems at the intersection of disciplines such as biology and ecology, Earth sciences, veterinary science, food industry, biotechnology,</p>

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
	<p>organisms and plants as well as with regard to organic, ethical and aesthetic interconnection between animal husbandry, crop production, gardening and landscaping activity and the other above-mentioned activities with the food chain, the environment or the development of rural areas as a whole.</p>		

PROFESSIONAL KNOWLEDGE

# AGRICULTURE



# EDUCATION DESCRIPTORS

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
<p>they are able to solve common issues associated with the processing and preparation of planting areas, fertilization, sowing or planting, growing, harvesting or propagation of plants, protecting them against diseases and pests, as well as with maintenance of residential and landscape vegetation, or, associated with stabling and treating animals, their nutrition, reproduction, breeding, prevention of diseases, production or use of working animals, providing welfare, related to business in the fields connected with agricultural activities or to managing administration within development and administrative activities in terms of care of countryside and rural areas as a whole;</p> <p>they are able to retrieve information required for devising a solution to a specified problem in the above-mentioned areas.</p>	<p>they are able to predict the need for inputs required for proper functioning of entrusted department in a company corresponding to a certain specialization;</p> <p>they can provide organizational, material and technical management of an entrusted section of a company at the level of their field of specialization;</p> <p>they are able to carry out a qualified co-operation with professional and consulting service, as well as with state administration in the area of operations;</p> <p>they can estimate the effect of operational measures regarding performance and quality, economy, as well as health and safety risks of operations;</p> <p>they can evaluate the available data regarding the achieved values of basic production and quality indicators for future decision-making;</p> <p>they are able to find and utilize</p>	<p>they are able to predict the need for inputs required for the proper functioning of entrusted department in a company corresponding to a certain specialization;</p> <p>at the level of their specialization, they are able to control and manage the operation of enterprises in terms of organization, material and technical operation;</p> <p>they are able to provide professional services and consulting services, as well as state supervision in their specialization;</p> <p>they can assess the effect of an extensive operational innovation regarding performance and quality, economy, as well as health and safety risks of operations;</p> <p>they are able to draw complex conclusions from data regarding the achieved production values and quality indicators;</p> <p>they are pro-active in utilizing</p>	<p>within narrow specialization in any of the activities and knowledge areas defined by descriptors for lower levels of tertiary education in agriculture, they can propose and use advanced research methods in the discipline in such a way as to extend existing knowledge in the discipline through original research;</p> <p>they can develop and evaluate theories, concepts and methods in the discipline including the demarcation of disciplines or their extension into broader areas.</p>



Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
	<p>resources of expert information ranging from trade press, information database up to the existing consulting services;</p> <p>they demonstrate an understanding of expert texts or interpretation and are able to apply appropriately the knowledge gained under operating conditions;</p> <p>they are able to select the basic range of investigative techniques used to optimize processes;</p>	<p>resources of expert information ranging from trade press, information database up to the existing consulting services;</p> <p>they are able to organize, evaluate and use the acquired information and knowledge for example for introducing qualified modifications to utilized methods and procedures;</p> <p>they are able to locate and select appropriate diagnostic and analytical procedures in order to optimize utilized processes;</p>	

The existing programmes of study under the subject area agriculture are designed around much diverse primary fields - zootechnics, phytotechnics, horticulture, development of rural areas, including the field of natural resources (from bachelor's degree). The stated descriptors of knowledge and skills represent a framework of which the individual programmes of study cover only parts corresponding to particular disciplines.

## CHARACTERISTIC OCCUPATIONS AND RELEVANT REGULATED OCCUPATIONS

Depending on the level of the qualification attained and the completed programme of study, graduates are employable mainly in: managerial and professional positions in primary production, breeding, trade, consultancy and specialized services, professional and interest organizations in insurance sector, local and state government, control and inspection institutions, specialized research and education, particularly in the fields stated in the section "Defining the Objectives":

According to the position type card index of the MLSA of the CR, the subject area Agriculture includes:

Positions requiring master's degree programme:

- Fisheries Specialist
- Viticulture and Winemaker Specialist
- Horticulture Specialist
- Greenery Production and Upkeep Specialist
- Horticultural Production Specialist
- Agricultural Specialist
- Agricultural Specialist - Mechanician
- Agricultural Specialist - Zootechnician
- Agricultural Specialist - Agronomist
- Specialist - Zoologist

Positions requiring tertiary vocational education or bachelor's degree programme

- Independent Fisheries Technician
- Independent Horticultural Technician
- Independent Viticulture Technician and Winemaker
- Assistant in Zoology

Regulated occupations falling under subject area Agriculture:

- Plant Health Technician; Diagnostic, Testing and Consulting Activity in Plant Protection
- Authorized Person under the Breeding Act
- Accredited Agricultural Consultant
- Forensic Expert in Agriculture

Examples of regulated occupations under subject area agriculture independent of gaining a university degree:

- Insemination and Embryo Implant using Insemination Technique,
- Animal Transport.

## RELATIONS TO OTHER SUBJECT AREAS

The subject area Agriculture is closely linked especially to the following areas:

**Teaching (agricultural education)**

Economics (agricultural economics, business and management disciplines in agriculture, agrotourism, rural development)

Law (legal framework of educational disciplines under subject area Agriculture)

Social Work (assistance service utilizing animals, the social aspects of rural development)

Chemistry (agricultural chemistry, plant nutrition and protection, protection of natural resources)

Earth Sciences (geology, hydrology, soil science, meteorology, geography and cartography)

Biology and Ecology (zoology, botany, ethology, general and applied ecology)

Architecture and Civil Engineering (garden buildings, buildings for livestock or crop production)

Energetics (renewable energy resources)

Mechanical Engineering and Materials (agricultural machinery)

Manufacturing Industry (production of raw materials of plant and animal origin)

Forestry (landscape care, animal breeding, protection of soil and water resources)

Veterinary Medicine, Veterinary Hygiene (caring for animal health, food chain safety)

Food Industry (technology and quality of food)

Health Care (zoo-rehabilitation)

Transport and Transportation Services (transport of agricultural commodities, especially living animals)

## 2.32 FORESTRY

### A BRIEF DESCRIPTION OF THE HISTORY, CHARACTER AND THEMATIC SCOPE

**The first university lectures** in forestry sciences in the Czech lands were launched in the fall of 1848 - these were lectures by Křištof Liebich at the former Royal Estates University in Prague. A systematic tertiary education in this field was launched by establishing independent departments at the Czech Technical University (CTU) in Prague in 1918, or in 1919 when the Brno Agricultural University (VSZ) was established.

In 1920 in Prague, the agriculture department (established in 1906) at the Czech Technical University transformed into the College of Agricultural and Forest Engineering (with the CTU) and the aforementioned department moved there too. This college transformed into a separate Agricultural University in Prague (VSZ) in 1952, it was renamed as the Czech Agricultural University (CZU) in Prague in 1995. In 1952-1959, the Faculty of Forestry remained under the CTU and after a transitional period, when it moved under the administration of Agricultural University in Prague, it transformed into the Forestry Scientific Institute in 1964. The Faculty of Forestry relaunched its activity in 1990.

Forestry in Brno was taught in virtually unchanged form (four-year study) since its foundation in 1919 until the early 1950s. An independent Faculty of Forestry (LF) was established in 1950. In 1952, it was incorporated under the University of Civil Engineering in Brno and the study was extended to five years, in 1956, it moved back under the Agricultural University in Brno. In 1993, LF was renamed as the Faculty of Forestry and Wood Technology (LDF). In 1994, VSZ was renamed as the Mendel University of Agriculture and Forestry (MZLU) in Brno and as of 2010, it was renamed as the Mendel University (MENDELU) in Brno.

**Studies in this subject area** have undergone considerable differentiation in the last twenty years and exceed the original forest departmental framework offering training for the broadly perceived "forest based sector". Graduates are employable in a number of related areas or in biotechnological fields in general. While the initial focus of forestry was more or less exclusively on production (in accordance with the economic and social requirements of the time), environmental aspects play an important role these days, in accordance with the principles of sustainable development and environmental responsibility. Training in this area is currently featured by a more complex focus on the use of renewable natural resources, care of the forest areas and landscape as a whole, or on the performance of ecosystem services.

**Currently**, at the level of tertiary vocational education, students are educated in programmes aimed at forestry, woodworking and care of the countryside; at the bachelor's and the master's level in programmes aimed at: forestry, landscaping, timber, furniture production; at the bachelor's level in programmes aimed at: wood-based building, economic and administrative service in forest management, operation and management of hunting, natural resource management of tropical and subtropical areas and arboriculture; at the master's level in English language in programmes: European Forestry, Forestry, Water and Landscape management and Tropical Forestry and Agroforestry. At the doctoral degree level, it is a wide range of programmes of study developing all the above-mentioned programmes of lower education levels.

### FUNCTION

The current objective of education in the field of Forestry is mainly to provide cognition of biological wealth and the possibilities of its sustainable utilization. The aim is to educate top-quality graduates both professionally and in human terms, who demonstrate the knowledge and skills enabling further development in the area.

## PRIMARY FIELDS

Primary fields of subject area Forestry include:

- Forestry (care of renewable natural resources)
- Woodworking (timber, furniture manufacture, wooden building)
- Landscaping (care for landscape environment and its components)

### **Primary field forestry (care of renewable natural resources)**

Students of this primary field demonstrate specialist knowledge and skills in a wide range of disciplines related to woody plants and forest ecosystems including care and management. This knowledge and skills focus on sustainable utilization of renewable natural resources and optimization of ecosystem service roles played by forests or woody plants.

The field includes the following sub-disciplines:

**Temperate Zone Forestry (European Forestry)** - sub-discipline focused on comprehensive management in the temperate zone forests of Europe (especially the Czech Republic), i.e. management ensuring the production function of forests on one hand (sustainable timber production) as well as playing the non-productive role or ensuring ecosystem service on the

other. The sub-discipline includes ecological area, natural production area and its management as well as technical-technological and socio-economic areas.

**Tropical and Subtropical Zone Forestry** - this sub-discipline is designed to educate professionals in the field of management of natural resources of tropical and subtropical areas emphasizing practical management of biological, technical and socio-economic specifics of the geographic zones in question.

**Arboristics** -this sub-discipline focuses on comprehensive care of trees and vegetation, especially in urban environments, of solitary trees and planting of special importance in the landscape (memorable trees, important tree avenues, castle parks, etc.). Due to its scope ranging from the care of solitary trees up to a comprehensive view of the overall care of urban greenery, this specialization is often referred to as “Urban Forestry”.

### Primary Field Woodworking

Students of this primary field gain specialist knowledge and skills in a wide range of disciplines related to woodworking and related manufacturing, including product design. The field is characterized by the intersection of scientific knowledge (chemical and physical properties of wood, composition of wood etc.) with the technical knowledge and skills. The field includes the following sub-disciplines:

**Timber** -this sub-discipline focuses on timber technology, manufacture of wooden products, construction and joinery products, their construction and design.

**Wooden Buildings** - this sub-discipline focuses on the utilization of wood and wood-based materials in building.

**Furniture Manufacture** -this sub-discipline is focused on the manufacture of interior products, production-related issues, trade and utilization of furniture based on socio-economic expectations of individuals as well as groups.

### Primary Field Landscaping

Students of this primary field gain specialist knowledge and skills in a wide range of biological and socio-technical disciplines and are capable of applying this knowledge and skills in managing the natural and landscape environment emphasizing sustainability, multi-functionality as well as the need to apply variety of approaches. The aim of the study is to provide comprehensive preparation of specialists for pro-active care of the landscape environment and its components, management of nature conservation and landscape planning, landscaping, economy and legislation of the environment, as well as for landscape designing and implementation activities.

## DEFINITION OF THE OBJECTIVES OF EDUCATION

The basic objective of education in various forestry programmes is to provide graduates with theoretical and practical education enabling creative work in selected professional fields as well as other areas of practice. General objectives can be characterized as an effort to develop:

- general as well as field-specific knowledge and skills,
- theoretical and critical thinking, problem-focused analysis and synthesis,
- ability to formulate and defend one's own opinion,
- ability to communicate and work in a team,
- ability to perceive problems in context and devise solutions to them with respect to the principles of environmental, social and economic responsibility.

## GENERAL PROFILE OF GRADUATES

Graduates will gain knowledge and skills in a particular primary field as well as general competencies which are defined by education descriptors depending on the level of education.

Graduates will acquire industry-specific knowledge (theoretical and methodological knowledge) and will demonstrate the ability to apply them in both traditional professional work in the discipline as well as generally in their management and organizational activity, all including the ability to respond to social changes and changing market conditions. At the same time, they gain broad theoretical overview in biotechnology enabling interdisciplinary application. Graduates should be capable of analytical, evaluation, implementation, administration and review activity, teamwork, decision-making and management activity at management level corresponding to the level of qualification (bachelor's, master's, doctoral degree programmes) as well as of design activity at an adequate level.



# EDUCATION DESCRIPTORS

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
<p>they demonstrate a basic knowledge in subjects of biotechnical base of forestry (mathematics, botany, dendrology, chemistry, pedology, hydrology, ecology, technical basis, engineering, mechanics and descriptive geometry) especially in relation to a specialized occupation (short cycle is expected in the primary field of forestry), for example, in botany, they demonstrate a knowledge of botanical system as well as basic knowledge in morphology, physiology, a detailed knowledge of water operation and mineral nutrition of plants, they demonstrate a knowledge of ecological requirements of the most important species of forest plants,</p> <p>they demonstrate a specialized and detailed knowledge of the profile subjects of forestry, landscape and timber (depending on the primary field and the field of study, respectively, according</p>	<p>they demonstrate a broad knowledge in the disciplines of biotechnical base of forestry within the range conditioned by the focus of a primary field; a broad knowledge in disciplines related to trees and forest ecosystems, their care and management, wood processing and related manufacture, including product design, management of natural environment and landscape emphasizing sustainability, multi-functionality and differentiation of approaches, such as in botany (primary field Forestry), they demonstrate the knowledge of botanical system as well as a broad knowledge in morphology, organology, physiology, a detailed knowledge of water operation and mineral nutrition of plants, they are aware of ecological requirements of important species of forest plants,</p> <p>they demonstrate a broad knowledge of scientific and</p>	<p>they demonstrate a deep knowledge in the disciplines of biotechnical base of forestry in the scope conditioned by the focus of a particular primary field as well as broad knowledge in related disciplines developing this base; the objective of acquiring this skill is to gain the ability of a holistic view towards functionally integrated (multi-role) forest management, sustainable utilization and conservation of renewable natural resources, sophisticated use of wood in products (including buildings and furniture), for example, the basic level of knowledge in botany (primary field forestry) is further developed in the ecophysiology of forest trees, graduates demonstrate a basic knowledge of how trees respond to stress and exposure to major stressors, ontogeny, tree ring analysis, phenology etc.,</p> <p>they can detect the field's</p>	<p>they demonstrate a deep and systematic knowledge corresponding to the current state of knowledge in the discipline of biotechnical base of forestry and in the broad context of related disciplines developing this basis; the aim of mastering these skills is the ability to achieve a holistic view towards a creative development of functionally integrated (multi-role) forest management, development of sustainable utilization and protection of renewable natural resources, development of advanced technologies in the use of wood in products (including buildings and furniture),</p> <p>they demonstrate a deep and systematic knowledge of latest theories, concepts and methods of forestry, landscaping and woodworking internationally in their profile discipline (field of study),</p> <p>they demonstrate a knowledge</p>

PROFESSIONAL KNOWLEDGE

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
<p>to the profile of graduates in a particular field), for example, in geodesy (generally, in the department of forestry) they demonstrate the knowledge of coordinate systems, geometric plans and maps in forest economy, land registry, basic coordinate calculations, measurements of angles and distances, situation and set-out drawings, they are able to determine basic plant and animal species that are essential for a given occupation (edificator species, harmful species, economically important species ...), they can detect, quote and correctly use the field's basic legislative regulations (especially laws and key government regulations) and regulations of related fields, they can reproduce and explain the basic procedures for implementing main business activity (in cultivation, mining,</p>	<p>technical nature relating to trees, forest ecosystems, landscapes, properties of wood and wood processing (including furniture manufacture), for example, in primary field Forestry, they demonstrate a broad knowledge of trees, their functions in forest ecosystems as well as in non-forest landscape, their role as a significant determinant in the countryside and urban municipalities (sub-discipline arboristics); a broad knowledge of forest production and its sustainability; a broad knowledge of taxonomy and classification systems of biotechnical sciences; primary field woodworking: a broad knowledge of construction, operation and maintenance of woodworking equipment focusing on their mechanisms and technological capabilities; a broad knowledge of properties of wood and wood-based products; broad knowledge of properties of materials, production</p>	<p>essential legislative regulations (laws, decrees, government regulations, field regulation) and apply them correctly or propose amendments, they demonstrate a detailed knowledge, are able to explain and adequately select, evaluate and apply common and advanced procedures of implementation of common and specialized forestry, landscape and timber activities in manufacturing, legislative and administrative, economic, project-planning and organizational and management area, for example, in primary field forestry: the common and advanced procedures of implementing common and specialized professional activities in the field of cultivation, mining, economy, legislative and administrative control; for example, in terms of growing, it is the common and advanced procedures for obtaining seed,</p>	<p>of science and scientific method, i.e. scientific observation, analysis, synthesis, induction, deduction, description and comparison, they can identify interdisciplinary overlaps to forestry, landscaping and woodworking issues in question.</p>

## PROFESSIONAL KNOWLEDGE

# EDUCATION DESCRIPTORS

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
<p>economic, legislative, administrative and control area) or specific professional activities (e.g. hunting), for example, in terms of growing, they demonstrate the knowledge of basic procedures for obtaining seed, production of seed material, and methods of artificial restoration of vegetation,</p> <p>they can reproduce and explain the basic methods of retrieving, processing and recording data and other methods required for implementing common activity in the areas of forestry, landscape and timber, or for their routine planning and management at the lowest level, for example, in hunting, they demonstrate the knowledge of designing the hunting management plans,</p> <p>they can reproduce, explain and differentiate the basic theories and concepts of subjects of professional basis and specialized</p>	<p>techniques and technological processes of furniture manufacture (sub-discipline furniture manufacture), primary field landscaping: a broad knowledge in disciplines related to comprehensive care for the landscape and its components,</p> <p>they are able to identify a wider range of species of animals and plants (including their microscopic and macroscopic structures) that are essential for a particular primary field or its sub-disciplines (edificator species, harmful species, economically important species, etc.)</p> <p>they can detect, quote and correctly use the field's essential legislative regulations (laws, decrees, government regulations) and regulations of related fields,</p> <p>they demonstrate a knowledge of, and are able to select and adequately explain basic theories, concepts, methods and</p>	<p>planting material, cultivation, methods of vegetation restoration, afforestation of specific and extreme habitats, afforestation of agricultural and other non-forest lands, measures aimed at conservation of endangered genetic resources, knowledge of organization and operation of forest tree nurseries, primary field woodworking: basic instruments and technological procedures of wooden structure production, woodworking technology processes, methods of utilizing computer technology for timber production or designing wooden products (including special software), quality control procedures, methods and procedures of testing products and materials; procedures for determining quality of historic wooden structures, primary field landscaping: theories, concepts and methods associated with identifying the potential and limits of a defined landscape;</p>	

PROFESSIONAL KNOWLEDGE

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
professional subjects (see above), including methods of practical utilization, or in the relevant forestry, landscape and timber occupations, for example, they can reproduce and explain the principles of sustainable forest management, they demonstrate the knowledge of the basic thesis of nature-friendly forestry management etc.	implementation procedures associated with major forestry, landscaping and timber sectoral activities in the areas of operation, planning, project-structural area, legislative and administrative area, economic and management area, for example, in the primary field forestry, they demonstrate the knowledge of procedures for implementing main business activities in growing, mining, economic, legislative and administrative control or specific professional activity (e.g. hunting); in terms of growing, they demonstrate the knowledge of common procedures for obtaining seed, growing seed material and methods of vegetation renewal; fields aimed at tropics and subtropics forestry, basic theories, concepts and methods in the fields of geo-information systems, the potential of managing natural resources of tropical and subtropical regions, including	concepts and theories leading towards a varied, differentiated utilization of landscape features and components, allowing the use of a differentiated variant of stable and unstable landscape features and components; theories, concepts and methods related to preservation or creation of the so-called compromise utilization of ecosystems and multifunctional use of land, they demonstrate an understanding of theories, concepts and methods in the discipline as well as related disciplines based primarily on natural, technical, operational or economic conditions and the common practices in forestry, landscape and timber areas, they are able to explain them, measure, interpret and discuss the limitations and risks of their use, they understand the limitations and risks in the discipline as well as related disciplines based on the requirement of	

## PROFESSIONAL KNOWLEDGE

# FORESTRY

# EDUCATION DESCRIPTORS

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
	<p>the context of the protection of nature and landscape; the general international and regional political, business and socio-economic context, primary field woodworking; basic tools and methods of designing wood products (including buildings and furniture, depending on the field); basic procedures for dealing with art and design details of products; possibilities and methods of use of wood in construction; practices of designing manufacturing systems, surface finishing and joining, primary field landscaping; theories, concepts and methods associated with the identification of potential and limits of a defined landscape; concepts and theories leading towards varied differentiated utilization of landscape features and components, they understand and know how to explain the limitations on, and the risks of using</p>		

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
they are able to assess the relevance of mastered methods, procedures, concepts for devising solutions to practical problems in operation and organization problems in forestry, landscaping, timber, for example, in hunting: they are able to retrieve and analyse data concerning animals and utilize it for designing a hunting management plan, they are able to use selected methods or procedures for implementation of operational or other practical activity in forestry, landscape and timber industry, including their basic routine planning,	they can use their specialist knowledge in order to acquire managerial, socio-economic and technical skills in terms of principles of preparation and administration of economic-environmental and engineering projects of various scale; they are able to make use of this knowledge in order to master the basic methodological approaches required to implement these projects in areas of forestry, landscaping, timber,	they can work independently, making use of their expertise in forestry, landscape and timber sector, in order to devise solutions to problems (especially more complex or large-scale problems) using creative and innovative methods, for example in the primary field forestry, they can make use of their specialist knowledge in biological and technical limits of trees and forest ecosystems as well as knowledge of socio-economic legislative and technological limits for an independent control and project coordination activity, especially in dealing with complex and extensive problems associated with the organization of forest production, control of forests' health and professional management and maintenance of forests, care and maintenance of woody vegetation; for example in the sub-discipline forestry, this relates to the	they are able to use their deep knowledge for the research activity in the discipline as well as for interdisciplinary research activity, and are capable of analysis, synthesis and evaluation, they can use, combine, innovate and design advanced research procedures in such a way as to enable further development in the forestry, landscaping and timber sector, in case of primary field forestry, the following objectives maybe listed for the nearest future: the development of new methodologies for assessing health and development of forest ecosystems and their vitality, the application of new technologies for evaluation of the structure and condition of forests and their components, designing methodologies evaluating natural production and determination of procedures ensuring economic sustainability of production, diversification of strategies of managing forest

## PROFESSIONAL SKILLS



# EDUCATION DESCRIPTORS

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
	<p>of socio-economic, legal and technological limits for basic control, design and coordination activity, in particular in the event of resolving problems connected with the organization of forest production, control of forest health and professional management and maintenance of forests, care and maintenance of forest vegetation, in the sub-discipline of forestry, it is mainly about ensuring maintenance of forest management records, records of property and of its maintenance, the detection and reporting of forest pests and damage including timely application of remedial measures etc.; in case of arboriculture, it is mainly the diagnostics of primary disorders and diseases of trees, ensuring the restoration and preservation of trees, their stability etc., primary field woodworking: to design and assess elements of wooden structures based on</p>	<p>creation of forest management plans and monitoring of their implementation, development and evaluation of regional plans of forest development, forest management plans and forest management guidelines, designing construction, repairs and maintenance of forest roads and buildings, including the provision of project preparatory work, organizing growing activities in forests and in forest nurseries, organization of logging activity in forests, take actions against forest pests, ensuring state administration in the field of forestry, etc., primary field woodworking: making use of their knowledge in order to devise creative solutions to practical and theoretical problems in the technology of production of wooden structures, technology processes of wood processing, designing wooden products and production systems, quality control, testing of products and</p>	<p>ecosystems, analysing possibilities of a more complex utilization of forest products, finding solutions to social and economic aspects of forest management, developing the concept of richly structured forests etc., in case of primary field woodworking, the following objectives can be defined for the nearest future: the development of new practices in growing and harvesting raw material, development of new technologies for processing wood and wood-based materials (all types of processing ranging from energy up to the manufacture of composite materials), development of new woodworking technologies, development of recycling processes for these materials and products, development of new processes modifying properties of wood, development of new methodologies for assessing reliability and durability of structures made of wood, etc., in the primary</p>



Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
	<p>a broad specification; designing technological processes for manufacture of wood products; using the expertise to deal with the prevention of possible errors affecting the durability of wood from the design phase; using the expertise for designing and constructing wood-based buildings in terms of architectural requirements, applicable technical standards and sanitary regulations, while meeting the existing housing quality requirements, primary field of Landscaping: making use of their knowledge in order to devise solutions to simple or routine problems associated with pro-active care of landscape environment and its components, management of nature protection and landscape conservation, land management and planning, land consolidation, including implementation and designing</p>	<p>materials; for designing and assessing procedures of implementing recovery and care of historic wooden structures; primary field landscaping: making use of their knowledge in order to devise creative and innovative solutions to complex problems associated with the pro-active care of landscape environment and its components, management of nature conservation and landscape planning, land consolidation, including design and landscape implementation activity, they are able to work independently in order to retrieve, evaluate, organize, discuss, and make use of information from specialized books and journal literature (from a recognized primary and secondary literature, professional specialist periodicals, scientific refereed and peer-reviewed journals), from general and professional international web databases or</p>	<p>field landscaping, the following objectives can be defined for nearest future: the development of new procedures optimizing the utilization of ecosystems and landscape segments, devising solutions to issues associated with the identification of potential and limits of a defined landscape, developing processes and methodologies enabling differentiated and varied utilization of stable and unstable landscape segments and components, devising solutions to problems associated with the trend of compromise utilization of ecosystems, they are able to develop theories, hypotheses, concepts, formulate and test new, categorize and oppose in the field of forestry, landscaping and timber sector, they are able to include ideas from related fields in their profile area of forestry, landscape or timber.</p>

## PROFESSIONAL SKILLS

# EDUCATION DESCRIPTORS

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
	<p>activity,</p> <p>they are able to retrieve, evaluate, organize and make use of information from expert literature and journals (especially using a recognized independent secondary literature, monographs devoted to specific field-related issues and professional periodicals) as well as based on using available Internet databases or other Internet resources,</p> <p>they master and are able to</p>	<p>other Internet resources (electronic journals, specialized Web sites, institutional portals etc.),</p> <p>they are capable of independent work or teamwork in order to prepare economic-environmental and technical projects of various scales and of various nature, they are creative in participating on devising solutions to project-related problems and in their administration; they can make use of their knowledge for designing necessary methodologies needed to implement these projects in forestry, landscape and timber sector,</p>	

## CHARACTERISTIC OCCUPATIONS AND RELEVANT REGULATED OCCUPATIONS

In relation to the achieved level of education and the study programme, graduates will be employable in particular in:

various positions in the forest sector (in the Position Type Card Index (KTP) - KTP positions Independent Forestry Technician - Hunter, Independent Forestry Technician - Land Registration, Independent Forestry Technician - Forest Management, Independent Forestry Technician - Watercourse Management, Forest Engineer - Professional Forest Manager, Forest Engineer - Founder)

in various management position levels in forestry management, timber sector and furniture industry;

in specialized professional positions at all levels of state and municipal management of forests, greenery, conservation of nature and landscape and in related disciplines (in Position Type Card Index defined as Inspector specialist or Independent Inspector of Forest Protection, Inspector Specialist or Independent Inspector of Nature and Landscape Protection and Forest Manager Specialist, Independent Forest Manager in a National Park, Landscape Specialist or Independent Landscape, Specialist or Independent Worker for Plant Protection Products, Independent Nature Guardian)

in non-profit organizations focusing on nature protection or conservation (professional care and restoration of historic wooden structures);

in professional positions in the countries of the tropical and subtropical zones in the fields of forestry, nature conservation and landscape management;

as technological workers, planners, researchers, operational and administrative staff, business executives in woodworking (Position Type Card Index positions Independent Timber Technician - Dispatcher, Independent Timber Technician - Engineer, Independent Timber Technician - Quality Controller, Independent Timber Technician - Operations Manager, Independent Timber Technician - Quality Controller, Independent Timber Technician - Technologist, Independent Timber Technician - Researcher, Timber Engineer - Controller, Timber Engineer - Designer, Timber Engineer - Quality Controller, Timber Engineer - Technologist, Timber Engineer - Researcher), i.e. in timber and furniture manufacturing, design and trade organizations;

as designers of wooden parts and components of manufacture and residential units in civil engineering;

as furniture designers (Furniture Designer according to the Position Type Card Index)

in private mensurational, arboristic and advisory organizations.

In accordance with the relevant provisions of the applicable Forest Act, graduates of forestry programmes can gain professional qualification of professional forest manager following the fulfilment of applicable legal conditions. In accordance with the authorization act and related legislation, graduates of programmes in timber sector may, after meeting statutory conditions, gain authorization "Chartered Engineer and Authorized Technician" awarded by the Czech Chamber of Chartered Engineers and Technicians (ČKAIT).

## RELATIONS TO OTHER SUBJECT AREAS (INCLUDING BOUNDARY FIELDS)

Subject area Forestry is closely linked especially to the following subject areas:

Economics and Economy

Biology and Ecology

Physics

## 2.33 VETERINARY MEDICINE, VETERINARY HYGIENE

### A BRIEF DESCRIPTION OF THE HISTORY, CHARACTER AND THEMATIC SCOPE

France is the cradle of European education in the field of veterinary medicine and veterinary hygiene (formerly called animal medicine). The first veterinary school is considered to be a Lyon-based school established in 1762. This date is regarded as a landmark separating the development of knowledge in veterinary medicine based on non-university foundations from the development of veterinary medicine based on university system of education and science. This first school of veterinary medicine focused mainly on diseases of horses, because horses were used in the military and their health and fitness were regarded as a matter of national interest. Following the example of the Lyon veterinary school, the second veterinary school in Europe was founded near Paris, in Charenton, France, in 1765.

In 1767, an institute for military farriers was established in Vienna, which was of great significance for the later establishment of veterinary schools enabling the establishment of veterinary science significant also for the Czech lands. Other veterinary schools were founded in the 18th, the 19th and the 20th century. 37 veterinary schools were established in the Western, Central and Southeastern Europe until 1918.

The College of Veterinary Medicine in Brno was founded in Czechoslovakia in 1918. The College of Veterinary Medicine in Brno was established by Act No. 76/1918 Coll. of 12 December 1918, on the establishment of the Czechoslovak "College of Veterinary Medicine in Brno" and became the first college established by the independent Czechoslovak Republic.

Veterinary education at the College of Veterinary Medicine in Brno developed in compliance with the traditional concept of European veterinary education focusing in particular on livestock. This was due to conditions of utilization of animals for economic purposes and the need to care for their health, prevent disease and infections in farm animals, the need to provide treatment for farm animals, and combat diseases. However, even then, veterinary inspection in animal slaughter was at a relatively high level including inspection of quality of meat, milk and other material, including food products of animal origin. Education in the field of food safety was much highlighted next to the traditional clinical approach in university veterinary studies.

The long-term strengthening of university veterinary education both in clinical area, especially concerning livestock, as well as in the area of safety of food and raw material of animal origin, led to the establishment of two separate veterinary programmes of study at the University of Veterinary Medicine in Brno in 1975, namely the General Veterinary Medicine programme and the Veterinary Hygiene programme. The programme of study General Veterinary Medicine focused on traditional clinical veterinary medicine with the assumption of graduates' employability especially in clinical veterinary practice, especially focused on livestock. The programme of study Food Hygiene focused on veterinary medicine in the field of health of raw material and foods of animal origin with the assumption of graduates' employability especially in the control and supervision authorities controlling raw material and food of animal origin.

The Czech Republic has seen a rapid and substantial development in pet animal breeding after 1990, especially dogs, cats, horses and exotic animals which created many opportunities for employability of graduates in veterinary practice focused on pet animals. For this reason, the

Veterinary Medicine programme of study focused on clinical veterinary medicine intensified training in veterinary medicine focused on pet animals.

Also, the area of safety of raw material and food of animal origin has seen major changes in the Czech Republic after 1990. Business in the area of food production, processing, transportation, storage, distribution and sale has developed quickly, including the need for veterinary control and supervision of the safety of raw materials and food of animal origin. This created additional potential for employability of graduates in veterinary control and supervision of raw materials and food of animal origin, including animal husbandry, animal feed and waste. The programme of study Veterinary Hygiene focused on veterinary medicine in the field of health and safety of raw material and foods of animal origin further reinforced the training in the field of control and supervision of raw materials and foods of animal origin, including control and supervision of livestock, feed and animal waste.

The European Agreement establishing an association between the Czech Republic on one hand and the European Communities and their states on the other was adopted by signing the Final Act of 4 October 1993 in Luxembourg. The agreement created a space for negotiating the conditions for entry into the European Union. In order to harmonize their veterinary programmes of study with the standard of veterinary education for Europe's veterinary universities, the veterinary education at the Veterinary and Pharmaceutical University Brno joined the European Association of Establishments for Veterinary Education (EAEVE) through its programme of Veterinary Medicine (in 1993) and Veterinary Hygiene and Ecology (in 1996). The membership of both fields of study in the EAEVE created conditions for comparing the European standard for veterinary education with both veterinary programmes of study at the University of Veterinary and Pharmaceutical Sciences Brno, created conditions for the entry into the system of international evaluation organized by the EAEVE, the pro-active monitoring of European trends in veterinary education at individual veterinary universities in Europe as well as at the level of the European Union as a whole, and furthermore, the positive participation of veterinary programmes at the University of Veterinary and Pharmaceutical Sciences Brno in the development of veterinary education in Europe.

The prestigious European list of evaluated and approved institutions providing higher veterinary education was established in 2001 (List of Evaluated and Approved Institutions by EAEVE); based on successful evaluation, this list first included the veterinary medicine and later also the veterinary hygiene and ecology at the University of Veterinary and Pharmaceutical Sciences Brno.

The accession process relating to the preparation of the Czech Republic's joining the European Union included also verifying the readiness in education and competence to perform specific regulated occupations, in this case veterinary medicine, and mutual recognition of qualifications as of the moment of the Czech Republic's entry in the European Union. An EU expert team, established and operating pursuant to the European Commission's guidelines, conducted this review in the states joining the European Union. Based on international evaluation, the programmes of study Veterinary Medicine and Veterinary Hygiene and Ecology remained listed on Europe's prestigious list of evaluated and approved institutions providing tertiary veterinary education.

The European Directive No. 78/1027/EEC, which provided for minimum requirements for the scope and content of higher veterinary studies for member countries of the European Community, was in effect until 20 October 2007 and significantly influenced European as well as Czech legislation concerning the scope and the content of veterinary education. Requirements for the content of veterinary education contained in Directive 1027/78/EEC were embedded in the CR's generally binding legal regulation, as well as in amendment to the Act No. 166/1999 Coll. on veterinary care and amending certain related acts (the Veterinary Act), and in the Act No. 131/2003 Coll. amending the Act No. 166/1999 Coll. on veterinary care and amending certain related acts (the Veterinary Act), as amended, and certain other acts. The Act No. 131/2003 Coll. became effective on 1 July 2003. The Act No. 131/2003 Coll., incorporated veterinary education specifically defined by groups of subjects

and individual subjects of teaching in Czech legislation, including mandatory framework of attained veterinary education defined by areas of knowledge required to obtain veterinary education, i.e. in veterinary medicine or hygiene.

Since 20 October 2007, the Directive No. 2005/36/EC on the recognition of professional qualifications has newly defined the scope and the content of veterinary education in Europe. In terms of requirements for the scope and the content of higher veterinary studies, the directive determined that the total period of training in veterinary medicine includes at least five years of full-time theoretical and practical training at a university in subjects listed in the Annex to this Directive. The directive defines the requirement that the knowledge and experience is acquired in a manner which enables veterinary surgeons to perform all the varied activities. The Directive No. 2005/36/EC subsequently acknowledged in its annex that a diploma attesting the completion of studies in the programme of study Veterinary Medicine (Doctor of Veterinary Medicine, DVM.) and the diploma attesting the completion of Veterinary Hygiene and Ecology programmes (Doctor of Veterinary Medicine, DVM.) constitute a proof of qualifications as veterinary surgeons in the Czech Republic. This Directive required EU Member States to adjust their national and administrative regulations accordingly as of 20 October 2007. This harmonization has been carried out by amending the Act No. 166/1999 Coll. on Veterinary Care as well as amending certain related acts (the Veterinary Act), as amended.

Besides the programme of study veterinary medicine and the programme of veterinary hygiene and ecology, a new programme of study focusing on food quality and safety was developed in 2001 under the veterinary hygiene and ecology (programme of study veterinary hygiene and ecology). This programme of study is closely linked to the protection of public health, especially in terms of control and supervision of foods focusing on their healthy origin, hygiene and quality parameters.

## CHARACTERISTICS OF THE SUBJECT AREA

Education in the field of veterinary medicine, veterinary and food focuses on veterinary medicine and veterinary hygiene, which is a medical subject, and it is closely related with medicine in connection with food industry. It is based on animal health (health maintenance, disease prevention and treatment of animal diseases) as well as veterinary protection of public health (health maintenance and disease prevention among people in relation to foods) and food safety and quality (production, processing, storage, distribution, control and surveillance of food in terms of health and hygiene and quality parameters).

## THE THEMATIC SCOPE OF THE SUBJECT AREA

The thematic scope of the area of veterinary medicine and veterinary hygiene under the veterinary medicine section consists of the health of animals, ranging from the knowledge of basic sciences which can be used for veterinary medicine, through the knowledge of animal husbandry, pre-clinical knowledge, up to veterinary clinical knowledge (knowledge of non-infectious and infectious diseases of animals, especially in terms of diagnosis, therapy and prevention), with an impact on healthy origin of raw material and foods based on this material of animal origin and knowledge of the regulatory environment of Veterinary Medicine, emphasizing (differentiation) individual clinical disciplines especially diseases of dogs and cats, birds, reptiles and exotic animals, equine diseases, diseases of ruminants and swine diseases.

The thematic scope of the section of veterinary hygiene consists in the scope of knowledge ranging from basic sciences utilized for veterinary hygiene, knowledge of animal husbandry, in particular livestock, pre-clinical knowledge, veterinary clinical knowledge concerning livestock, and knowledge



in the field of production, processing, storage, distribution, control and surveillance from the perspective of health of raw material and foods based on this material of animal origin as well as the knowledge of regulatory environment of veterinary hygiene, with an emphasis (differentiation) put on hygienic industries especially hygiene and technology of meat and meat products, hygiene and technology of milk and milk products, hygiene and technology of refrigerated fish products, hygiene and technology of preparations, eggs and honey and veterinary protection of public health and food-borne diseases.

## THE FUNCTION OF THE SUBJECT AREA

The function of the area of Veterinary Medicine is to protect the health and treat diseases of animals as individuals, as well as the health of herds and flocks of animals and combating mass disorders and diseases, and from this point of view, it includes also the protection of human health against diseases transmitted from animals to humans, as well as foodborne diseases of people based on foods of animal origin following the principle of providing health in farm animals and controlling the production, processing, storage, distribution and management of foods of animal origin and ensuring productive, technological, environmental, and analytical food safety and quality in their production, processing, storage, distribution and sale within the surveillance and control of foods of vegetable and animal origin.

## PRIMARY FIELDS IN SUBJECT AREA (CHARACTERISTIC FOR A PARTICULAR SUBJECT AREA)

The primary fields in veterinary medicine and hygiene include

**Veterinary Medicine** - animal nutrition, animal husbandry, hygiene, welfare and protection of animals, anatomy, histology, physiology, biochemistry, pharmacology, toxicology, pathology, microbiology, immunology, genetics, parasitology, diagnostic imaging, surgery, orthopedics, obstetrics, diseases of dogs and cats, poultry diseases, diseases of birds, reptiles and exotic animals, equine diseases, diseases of ruminants and swine diseases, foods hygiene and technology, infectious diseases and epizootiology, veterinary legislation,

**Veterinary Hygiene** - inspection of slaughter animals, hygiene and technology of meat and meat products, hygiene and technology of milk and milk products, hygiene and technology of refrigerated and fish products, hygiene and technology of preparations, eggs and honey, veterinary protection of public health, veterinary legislation, animal nutrition, animal husbandry, hygiene, welfare and protection of animals, anatomy, histology, physiology, biochemistry, pharmacology, toxicology, pathology, microbiology, immunology, genetics, parasitology, diagnostic imaging, surgery, orthopedics, obstetrics, diseases of ruminants, swine diseases, diseases of poultry, birds, reptiles and exotic animals, equine diseases, diseases of dogs and cats, infectious diseases and epizootiology.

## OBJECTIVES OF THE SUBJECT AREA

The objective of education in the area of Veterinary Medicine and Hygiene in the veterinary medicine section is to provide theoretical knowledge, practical experience and skills in order for the graduates to become qualified veterinarians in all areas of veterinary medicine in compliance with the requirements of European veterinary education and the requirements for a regulated occupations in the field of veterinary medicine (in accordance with Directive 36/2005/EC) with a deepened training



(differentiation) in the field of clinical veterinary medicine including the ability to perform practical veterinarian posts in private veterinary practice or in the state veterinary service immediately after graduation.

The objective of education in the veterinary hygiene section is to provide theoretical knowledge, practical experience and skills in order for the graduates to become qualified veterinarians in all areas of veterinary medicine in compliance with the requirements of European veterinary education and the requirements for a regulated occupation in the field of veterinary medicine (in accordance with Directive 36/2005/EC) with a deepened training (differentiation) in the field of veterinary hygiene including the ability to perform posts in state veterinary administration focused on surveillance over animal husbandry as well as food safety and furthermore in private veterinary practice immediately after graduation.

#### GENERAL PROFILE OF GRADUATES IN THE SUBJECT AREA

The general profile of graduates in veterinary medicine and hygiene in the veterinary medicine section is based on the veterinary medicine programme of study, which offers all the required subjects of veterinary programme in the range ensuring that graduates of this programme of study are competent to perform practice in veterinary medicine in all areas of veterinary medicine. However, at the same time, it includes undergraduate specialization in the field of clinical veterinary medicine, i.e. it includes a more detailed training in clinical subjects, with the possibility of choosing a clinical focus of education that is even more specialized in dealing with individual animal species. Graduates of this programme of study are employable mainly as clinical veterinarians focusing on diagnosis, therapy, and prevention of animal diseases.

The general profile of graduates in veterinary medicine and hygiene in the veterinary hygiene section is based on the veterinary hygiene and ecology programme, which offers all the required subjects of veterinary programme in the range ensuring that graduates of this programme are competent to perform practice in veterinary medicine in all areas of veterinary medicine. Simultaneously, it includes undergraduate specialization focusing on food safety, i.e. it offers an enhanced training emphasizing veterinary control and supervision of raw materials and foods of animal origin with options of a deepened learning in some areas of technology and hygiene of foods of animal origin. Graduates of this programme of study are employable in particular in the supervision and control of food safety and quality in the State Veterinary Administration bodies, in other supervisory and food control institutions in the private sector focusing on production, distribution and sale of raw materials and food.

PROFESSIONAL KNOWLEDGE	
Master's study programme	Doctoral study programme
Study programme graduates	
<p>they demonstrate the knowledge of intracellular biological structure and cellular, tissue and organ structure and processes in individuals, groups and animal populations. At this level, they demonstrate the knowledge of biophysics, chemistry, biology and biostatistics, as well as anatomy and histology, biochemistry and physiology,</p> <p>they demonstrate the knowledge of agricultural production, animal feed and animal nutrition, breeding, and animal breeding standards, animal husbandry measures and animal treatment, animal husbandry hygiene,</p> <p>they demonstrate the knowledge of animal behaviour, requirements for treating animals and conditions of their protection against torture,</p> <p>they demonstrate the knowledge required to distinguish between animal health and diseases, to describe and explain physiological and pathological processes in animals and to describe and explain the causes, course and prognosis of disease in animals,</p> <p>they demonstrate the knowledge of animal pathogens. They master pathology, pathophysiology, parasitology, microbiology, immunology, genetics, toxicology and procedures of testing samples from animals and from the environment in which they are kept,</p> <p>they demonstrate the knowledge of diagnostic tools, instruments and equipment, necessary for treating them and assessment of results obtained based on their use. They master diagnostic procedures, differential diagnosis of animal diseases and the knowledge of disease manifestations in order to identify and determine animal diseases,</p> <p>they demonstrate the knowledge of medicinal substances and medicinal products, their effects, production and handling,</p>	<p>they demonstrate a deep and systematic knowledge in animal husbandry, including especially animal nutrition, animal husbandry, hygiene, behaviour and welfare, as well as in preclinical disciplines including especially anatomy, histology and embryology, biochemistry, physiology, pathomorphology and pathophysiology, parasitology, microbiology, immunology, genetics, pharmacology and toxicology,</p> <p>they demonstrate a deep and systematic knowledge of clinical disciplines including in particular diagnostic imaging, surgery, orthopedics and reproduction of animals and in fields related to diagnosis, therapy and prevention of animal diseases,</p> <p>they demonstrate a deep and systematic knowledge in the discipline of health of food preparations and foods of animal origin,</p> <p>they demonstrate a deep and systematic knowledge of veterinary legislation,</p> <p>they demonstrate a deep and systematic knowledge and understanding of the discipline of animal husbandry in the area of preclinical sectors internationally,</p> <p>in the specialization on clinical veterinary medicine, they demonstrate a deep and systematic understanding and knowledge of surgery, orthopaedics and diagnostic imaging techniques in animal reproduction, diseases of horses, ruminant diseases, swine diseases, poultry diseases, diseases of dogs and cats, diseases of birds, reptiles and small mammals, and in infectious diseases and epizootiology, including knowledge at international level,</p> <p>in the specialization on veterinary hygiene of foods, they demonstrate a systematic knowledge and understanding in the area of food</p>

# EDUCATION DESCRIPTORS

# EDUCATION DESCRIPTORS

PROFESSIONAL KNOWLEDGE	
Master's study programme	Doctoral study programme
Study programme graduates	
<p>they master methods of prescribing pharmaceuticals and medicinal products including procedures of their application,</p> <p>they demonstrate the knowledge of local anesthesia, partial anesthesia and general anesthesia and master the procedures of surgical, obstetrical, gynecological and andrological operations,</p> <p>they demonstrate the knowledge of animal disease treatment, therapeutic procedures and practices to prevent disease in horses, cattle, sheep, goats, and other ruminants, swine, rabbits, poultry and other birds, wild fauna, fish and bees, dogs and cats, small mammals, reptiles, amphibians and other exotic animals, they also demonstrate the knowledge of animal diseases and measures necessary to prevent their spread and means of combating them,</p> <p>they demonstrate the knowledge of slaughtering animals as well as inspection of slaughter animals' health including sampling of slaughter animals; they demonstrate the knowledge of technology and hygiene of slaughterhouses and other production plants handling animal products; they demonstrate the knowledge of meat, milk, eggs, honey and other animal products, their manufacture, processing, storage, transport and sale; they master the sampling of animal products collected at animal husbandry, slaughter and other food industry plants, they master procedures of their laboratory testing and master the knowledge required to assess results of testing; they demonstrate the knowledge needed to assess the quality of production plants and decide on health and quality of animal products and foodstuffs of animal origin,</p> <p>they demonstrate the knowledge of hygiene of plant operations and procedures related to disinfection, disinfestation, disinfection and</p>	<p>hygiene and technology, veterinary ecology and diseases of wild fauna internationally,</p> <p>in their specialization, they demonstrate a systematic knowledge and understanding in the area of veterinary public health and forensic veterinary medicine internationally,</p> <p>they demonstrate an understanding of scientific systems as well as interdisciplinary problems at the intersection of medicine, food industry, agriculture, pharmacy, science (life sciences), ecology, economics, management, marketing and law.</p>

PROFESSIONAL KNOWLEDGE	
Master's study programme	Doctoral study programme
Study programme graduates	
<p>deodorization and master sanitation procedures; they demonstrate the knowledge of carcass and animal waste, including disposal procedures and other handling,</p> <p>they demonstrate the knowledge of economics in veterinary activity, management and marketing in veterinary profession,</p> <p>they demonstrate the knowledge of legislation in the areas of veterinary care, animal protection, animal husbandry, foodstuffs, feed, pharmaceuticals, waste and related areas</p> <p>they demonstrate the knowledge of procedures of administration and administrative decision-making, including the knowledge of procedures of audits, inspections and surveillance activities within the scope of veterinary services; they demonstrate the knowledge needed for decision-making at the level of administrative authority and for imposing binding regulations, remedial measures and sanctions,</p> <p>they are familiar with ethics in veterinary profession, they demonstrate the knowledge of decision-making procedures in forensic veterinary medicine,</p> <p>they demonstrate the knowledge of other theories, concepts and methods in animal husbandry and in preclinical fields,</p> <p>within the specialization of clinical veterinary medicine, they demonstrate the knowledge of other theories, concepts, and highly specialized knowledge as well as complex procedures focused on diagnosis, therapy, and prevention of diseases in dogs and cats, diseases in birds, reptiles and small mammals, equine diseases, diseases in ruminants and swine, diseases in exotic animals as well as possible methods, conditions and limitations imposed by legislation in clinical</p>	

# VETERINARY MEDICINE, VETERINARY HYGIENE

# EDUCATION DESCRIPTORS

PROFESSIONAL KNOWLEDGE	
Master's study programme	Doctoral study programme
Study programme graduates	
<p>veterinary medicine,</p> <p>within their specialization on veterinary hygiene of foodstuffs, they demonstrate a highly specialized knowledge and understanding of the latest theories, concepts and practices focusing on hygiene and technology of meat and meat products, hygiene and technology of milk and milk products, hygiene and technology of refrigerated and fish products, hygiene and technology of food preparations, eggs and honey, including deepened knowledge of foodborne diseases as well as possibilities, conditions and limitations imposed by legislation in veterinary hygiene of foodstuffs,</p> <p>they demonstrate an extensive knowledge and understanding of theories and concepts and master methods in the area of veterinary public health and forensic veterinary medicine,</p> <p>they demonstrate an understanding of the possibilities and conditions for, and limitations on, the use of findings and procedures for the performance of varied veterinary activities in the entire discipline in relation to veterinary medicine and hygiene as well as related disciplines - medicine, food industry, agriculture, pharmacy, natural sciences (life sciences), ecology, economics, management, marketing and law.</p>	

PROFESSIONAL SKILLS	Master's study programme	Doctoral study programme
	Study programme graduates	
	<p>they can evaluate the biological processes occurring in individual animals at the organ, tissue, cellular and intracellular level as well as in the living environment of animals, i.e. in their populations and groups,</p> <p>they are able to assess the fitness, nutrition, husbandry quality and hygiene, and to determine whether it complies with the requirements of animals or whether it shows deficiencies, or whether it causes animal diseases, and can provide for measures to remedy the inadequate condition and to treat diseases of nutrition, breeding or animal zoohygiene,</p> <p>they demonstrate the knowledge of manufacture, storage, transport and distribution technology and sale of feed, feed additives and other ingredients of animal nutrition and are able to assess their hygiene and safety,</p> <p>they demonstrate the knowledge of registration procedures regarding feed, feed additives and other ingredients of animal nutrition,</p> <p>they are able to assess animal husbandry in terms of breeding as well as in terms of zoohygiene,</p> <p>they are able to perform breeding surgery on animals (animal identification, synchronization of oestrus, insemination, embryo transfers, births, castration, etc.),</p> <p>they are able to assess animal behaviour, animal welfare and compliance with requirements of animal protection and in case any deficiencies are found, they can treat disorders of animal behaviour, and establish measures to ensure animal welfare and steps against cruelty to animals,</p>	<p>they are able to make use of some of the advanced research methods in the discipline in such a manner as to obtain new and original information (through original research) in the fields of animal husbandry, pre-clinical disciplines, clinical disciplines, hygienic disciplines and fields of veterinary public health and forensic veterinary medicine, including their inclusion in broader contexts and areas.</p>

# VETERINARY MEDICINE, VETERINARY HYGIENE

# EDUCATION DESCRIPTORS

PROFESSIONAL SKILLS	Master's study programme	Study programme graduates	Doctoral study programme
	<p>they can make use of their specialist knowledge of pre-clinical disciplines in order to assess the health and disease in animals, to explain the physiological and pathological processes in their organisms, and to identify and explain the causes, course and prognosis of animal diseases,</p> <p>they are able to take samples for testing from healthy, sick and dead animals and make pathomorphological, pathophysiological, parasitological, microbiological, immunological, genetic, biochemical, toxicological testing and other examination based on which they can determine the cause of animal diseases; they can also perform animal autopsy, take samples for examination and based on the autopsy and examination of samples, they are able to determine the cause of death of an animal,</p> <p>they are able to determine diagnosis in animals using diagnostic procedures and diagnostic tools, devices and equipment, including imaging techniques,</p> <p>they can determine the appropriate method of treatment for a disease, identify the active substance, its form and method of application with regard to all the relevant processes in animal organism, the interaction of substances and drug resistance; they are able to apply the appropriate drug or medicine,</p> <p>they master the technology of production, processing, storage, distribution, supply and sale of veterinary medicines and medicinal products, and are able to assess these in terms of their quality,</p> <p>they demonstrate the knowledge of procedures of registration of veterinary medicine and medicinal products,</p>		



PROFESSIONAL SKILLS	Master's study programme	Doctoral study programme
	<p>Study programme graduates</p> <p>they can prescribe drugs, medicines and medicinal products, they can perform local, partial and general anesthesia in animals. They can perform selected tasks, operations, and therapeutic practices in the fields of orthopedics, surgery, obstetrics, gynecology and andrology. They demonstrate the knowledge of therapy and prevention of equine diseases, diseases in cattle, sheep, goats, and other ruminants, swine diseases, diseases in rabbits, poultry and other birds, and wild fauna, fish and bees, dogs and cats, small mammals, reptiles, amphibians and other animals, including exotic species. They can detect epidemics, examine their causes, determine measures to prevent their spread and identify steps for their control. If necessary, they can slaughter an animal or animals.</p> <p>they can evaluate animal breeding from the perspective of production of meat, milk, eggs, honey and other animal products. They are able to assess transport vehicles designed for animals and animal transport. They are able to assess slaughter plants. They are able to perform animal slaughter and inspect slaughter animals as well as take samples of meat, organs and tissue for examination of health of animals and their products. They are able to assess plants designed for the production of milk, eggs, honey and other animal products, they are able to assess the hygiene and technology of production, processing, storage, transport and sale of livestock products and foodstuffs of animal origin and to take samples for assessment of such plants and can assess eligibility of food plants. They are able to perform laboratory tests and other examination of samples. They can decide on health and quality of products and foodstuffs of animal origin.</p> <p>they master methods of disinfection, disinsectionization, deodorization</p>	

# EDUCATION DESCRIPTORS

PROFESSIONAL SKILLS	Master's study programme	Doctoral study programme
	Study programme graduates	
	<p>and other sanitation. They are able to perform activities related to carcass and animal waste, including their disposal, processing, storage, transport, distribution and sale of their products, they are able to assess these plants and decide on their quality.</p> <p>they can apply economic principles and management and marketing practices. They are able to implement legislation in the areas of veterinary care, animal protection, animal husbandry, foodstuffs, feed, pharmaceuticals, waste and related areas. They demonstrate the knowledge of administrative and management procedures and actions in the area of veterinary health care. They are able to conduct audits, inspections and supervision within the scope of authority of veterinary health care bodies, make decision at the level of administrative authority, impose binding regulations, remedial as well as other measures and penalties,</p> <p>they are able to implement ethical principles of veterinary profession, they demonstrate the knowledge of forensic veterinary procedures, assessment and decision-making,</p> <p>they can solve complex problems related to the field of animal husbandry as well as preclinical disciplines,</p> <p>within their specialization in clinical veterinary medicine, they can devise solutions to complex problems related to animal health and diseases and carry out complex specialized actions and procedures focused on the diagnosis, therapy, and prevention of diseases in dogs and cats, diseases in birds, reptiles and small mammals, equine diseases, diseases in ruminants and swine, diseases in exotic animals and apply legislation in clinical veterinary medicine,</p>	

## RELATIONS TO OTHER SUBJECT AREAS (INCLUDING BOUNDARY FIELDS)

The area of veterinary medicine and hygiene is closely tied to following subject areas:

physics,  
chemistry,  
medicine,  
food industry,  
agriculture,  
pharmacy,  
biology and ecology,  
economical sciences,  
law.

The boundary fields are particularly sectors in which the veterinary medicine and hygiene intersects with other subject areas:

medicine - anatomy, histology, physiology, biochemistry, pharmacology, toxicology, pathology, microbiology, immunology, genetics, parasitology, diagnostic imaging, surgery, orthopedics, obstetrics, internal diseases, infectious diseases, epidemiology, forensic medicine, public health protection,  
food industry - food chemistry, food microbiology, sensory analysis of food, food hygiene and technology, food technology, food legislation,  
agriculture - agricultural production, animal nutrition, animal husbandry, hygiene, ethology, fishing, hunting, beekeeping, food technology, food analysis, food technology,  
pharmacy - pharmacology,  
biology and ecology - chemistry, biology, zoology, botany,  
economic fields and law.

## 2.34 FOOD INDUSTRY

### CHARACTERISTICS OF THE SUBJECT AREA

Education in the field of food industry in its character focuses on food safety and quality (production, processing, storage, distribution, control and supervision of food).

### THE THEMATIC SCOPE OF THE SUBJECT AREA

The thematic scope of food industry includes basic knowledge in fields ranging from production, processing, storage, distribution, as well as control and supervision of raw materials and foodstuffs of animal and vegetable origin up to the knowledge of legal environment in the food industry emphasizing hygiene and food technology, food analysis, management, economics and food legislation.

### THE FUNCTION OF THE SUBJECT AREA

The function of education in food industry is to convey knowledge related to production, processing, storage, distribution, monitoring and control of foodstuffs of vegetable and animal origin, as well as management, economics and legal environment in the food industry discipline and their creative development.

### PRIMARY FIELDS

Primary fields in the area of food industry include

**food industry** - food chemistry, food biochemistry, food microbiology, food analysis, human nutrition, technology and hygiene of food of vegetable origin (grain mill products and bakery products and pasta, potatoes, rice and products made from them, pulses, oilseeds and fats of vegetable origin, sugar, sweets, sweeteners, salt, spices, seasonings, mustard, dehydrated products, tea, coffee and coffee substitutes, beverages, fruits, vegetables, dry fruits, mushrooms and mushroom-based products), technology and hygiene of food of animal origin (meat and meat products, milk and dairy products, poultry, venison and venison-based products, fish and other aquatic animals and products, refrigerated products, eggs, semi-finished products and fats of animal origin, bee products), management and marketing, legislation and food control.

### OBJECTIVES OF THE SUBJECT AREA

The aim of education in the subject area food industry is to provide theoretical knowledge and practical skills including competence enabling graduates to become a qualified personnel in food industry focused on animal as well as vegetable origin ready to work in food companies, distribution companies, in the field of food sales as well as in food analysis and food inspection institutions, e.g. the state agricultural and food inspection or in corresponding state administration bodies as well as in research and development institutions.

## GENERAL PROFILE OF GRADUATES IN THE SUBJECT AREA

The general profile of graduates in food industry is based on programmes of study focused on food, including knowledge, experience and skills in the production, processing, storage, distribution, analysis, monitoring and control of foodstuffs for the needs of food businesses and state control authorities. Graduates of this programme of study are employable in private sector focused on production, distribution and sales of raw material and foodstuffs as well as in the area of food analysis and control in institutions under the State Agricultural and Food Production, State Veterinary Administration bodies and other institutions of supervision and control of food quality including research and development.

# EDUCATION DESCRIPTORS

Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates		
<p>they demonstrate the knowledge of agricultural crop and biology of food-producing species.</p> <p>they demonstrate the knowledge of agricultural crop needed to diversify health and disease of agricultural crop grown for food production,</p> <p>they demonstrate the knowledge of animal feed, husbandry and hygiene of animal breeding, requirements for treating animals and conditions of their protection against torture,</p> <p>they demonstrate the knowledge needed to distinguish health and disease in food-producing species,</p> <p>they demonstrate the knowledge of acquisition, production, processing, storage, distribution and sale of foodstuffs,</p> <p>they demonstrate the knowledge of composition, structure, chemistry, microbiology and processes in food,</p> <p>they demonstrate the knowledge of quality and hygiene of food,</p> <p>they demonstrate the knowledge in the area of analysis and control of food,</p> <p>they demonstrate the knowledge of legal</p>	<p>they demonstrate the knowledge in the area of human nutrition,</p> <p>they demonstrate the knowledge and understanding in the area of technology of meat and meat products, milk and milk products, poultry and venison and products based on them, fish and other aquatic animals, refrigerated products, eggs, semi-finished products and fats of animal origin, bee products, grain mill products and bakery products and pasta, potatoes, rice and products made from them, pulses, oilseeds and fats of vegetable origin, sugar, sweets, sweeteners, salt, spices, seasonings, mustard, dehydrated products, tea, coffee and coffee substitutes, beverages, fruits, vegetables, dry fruits, mushrooms and mushroom-based products,</p> <p>they demonstrate a deep knowledge and understanding of the character and composition of food and the processes taking place in them,</p> <p>they demonstrate a deep knowledge and understanding in the field of chemical, microbiological and other food analysis,</p> <p>they demonstrate a deep knowledge of quality, hygiene and safety of foods, except</p>	<p>they demonstrate a deep and systematic knowledge in the areas of food technology and food hygiene,</p> <p>they demonstrate a deep and systematic knowledge in terms of food composition and food analysis,</p> <p>they demonstrate a deep and systematic knowledge of food quality, hygiene and food safety, except veterinary-medical issues,</p> <p>they demonstrate a deep and systematic knowledge of legal regulations and control in the area of food industry,</p> <p>they demonstrate a deep and systematic knowledge of theories, concepts and methods in the food industry internationally,</p> <p>they demonstrate an understanding of science and research problems at the intersection of areas related to food industry, including veterinary medicine and hygiene, medicine, agriculture, pharmaceuticals,</p>

Bachelor's study programme	Master's study programme	Doctoral study programme
<p>regulations, economics, management and marketing of food,</p> <p>they demonstrate the knowledge of theories, concepts and methods in the discipline of food technology, quality and hygiene as well as food analysis and control as well as in the area of legislation, economics, management and marketing of food,</p> <p>they demonstrate the knowledge enabling understanding of the possibilities and conditions resulting from the level of knowledge, organizational and legal limitations on the use of theories, concepts and methods in the food industry in practice.</p>	<p>Study programme graduates</p> <p>veterinary-medical issues, they demonstrate a deep knowledge in the field of food control,</p> <p>they demonstrate a deep knowledge of legal regulations, economics, management and marketing of food,</p> <p>they demonstrate the knowledge of theories, concepts and methods of hygiene and technology of food, processes occurring in foods, in the area of food quality analysis, hygiene and food safety, except for veterinary-medical issues, in the area of food control and the area of legislation, management and marketing of foods,</p> <p>they demonstrate the knowledge enabling understanding of the possibilities, conditions and limitations on the use of knowledge in disciplines related to food industry, including in veterinary medicine and hygiene, medicine, agriculture, pharmaceuticals, in science (life sciences), ecology, as well as economics and law.</p>	<p>science (life sciences), ecology, business fields and law.</p>

## PROFESSIONAL KNOWLEDGE

# FOOD INDUSTRY



# EDUCATION DESCRIPTORS

Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates		
<p>they are able to apply their technological knowledge concerning acquisition, production, processing, storage, distribution and sale of foods; they can apply technologies and procedures to control hygiene in food industry plants,</p> <p>they are able to take samples of food as well as in the food industry environment, including their examination and interpretation of test results in terms of quality and health parameters,</p> <p>they are able to apply the knowledge of food,</p> <p>they are able to employ methods of food analysis,</p> <p>they are able to monitor and assess foods in terms of their quality and hygiene,</p> <p>they are able to apply legislation in food industry,</p> <p>they are able to apply economic and management principles and marketing practices in food industry.</p> <p>they can creatively apply relevant information to devise solutions to specified practical problems in food processing technology, in food analysis and control, as well as in</p>	<p>they are able to make use of their knowledge and creatively devise solutions to complex technology-related problems concerning acquisition, production, processing, storage, distribution and sale of food,</p> <p>they are able to employ complex procedures of controlling technology of meat and meat products, milk and milk products, poultry and venison and products based on them, fish and other aquatic animals, refrigerated products, eggs, semi-finished products and fats of animal origin, bee products, grain mill products and bakery products and pasta, potatoes, rice and products made from them, pulses, oilseeds and fats of vegetable origin, sugar, sweets, sweeteners, salt, spices, seasonings, mustard, dehydrated products, tea, coffee and coffee substitutes, beverages, fruits, vegetables, dry fruits, mushrooms and mushroom-based products,</p> <p>they are able to take samples of food as well as take samples in the food industry environment, carry out their examination and provide creative interpretation of test results in terms of quality and health parameters,</p> <p>they are able to work creatively in order to</p>	<p>they are able to propose and use advanced research methods in the discipline in such a way as to extend existing knowledge in the areas of technology and food hygiene, food composition, food analysis, quality and hygiene of food and food safety, with the exception of the competence held by veterinary medicine, as well as in the area of legal regulation and food control,</p> <p>they are able to develop and evaluate theories, concepts and methods in the discipline of food industry including their extension into a broader context.</p>

Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates		
<p>assessing the quality and hygiene of foods including the legal, economics, management and marketing areas in the food industry, they are able to employ basic research procedures to the extend needed for devising solutions to practical issues in food industry.</p>	<p>apply complex knowledge related to foods they are able to apply complex methods of food analysis,</p> <p>they are able to carry out a high-level review and assessment in terms of food quality and hygiene,</p> <p>they are able to assess foods in terms of health, with the exception of competence held by veterinary medicine,</p> <p>they are able to employ legislation related to food industry in a creative manner,</p> <p>they are able to apply economic and management principles and marketing practices in food industry in a creative manner,</p> <p>they are able to devise creative solutions to complex problems in food processing technology, in food analysis and control, as well as in assessing the quality and hygiene of foods including health and quality of foods, with the exception of competence held by veterinary medicine, and also in the legal, economics, management and marketing areas in the food industry,</p> <p>they can make use of some of the advanced research methods in the discipline in such a manner as to obtain new and original</p>	

## RELATIONS TO OTHER SUBJECT AREAS (INCLUDING MARGINAL FIELDS)

The subject area Food industry is closely related to the following subject areas:

physics,  
chemistry,  
veterinary medicine and hygiene,  
medicine,  
agriculture,  
pharmacy,  
science (life sciences),  
biology and ecology,  
economical sciences.

The boundary fields include particularly sectors in which the veterinary medicine, veterinary hygiene and food industry intersect with other subject areas:

veterinary medicine and veterinary hygiene - food chemistry, food microbiology, food analysis, hygiene and technology, food technology, food legislation,  
medicine - human nutrition, microbiology, toxicology,  
agriculture - agricultural production, animal nutrition, animal husbandry, hygiene, ethology, fishing, hunting, beekeeping, food technology, food analysis, food technology,  
pharmacy - nutraceuticals,  
statistics,  
biology and ecology - zoology, botany,  
economics, management, marketing and law - economics, management, marketing and law.

## 2.35 GENERAL MEDICINE AND DENTISTRY

### SUB-DISCIPLINE GENERAL MEDICINE

#### A BRIEF DESCRIPTION OF THE CHARACTER, THEMATIC SCOPE AND HISTORY OF THE FIELD

Programmes of study focused on general medicine are based on tradition which dates back to the 16th - 18th century when training focused on surgical competencies. After the establishment of independent Czechoslovakia, medical education was based on knowledge of morphological disciplines as well as on a broad understanding of biological, physiological and functional context, including corresponding therapy knowledge at that time. Other changes in the curriculum occurred after the World War II, including classification of primary branches into various specialized sectors. The studies of general medical underwent other qualitative changes after the 1989 reflecting both the international development in medicine-related fields as well as the fact that some topics were ignored in socialist Czechoslovakia mainly for political reasons. Therefore, the Czech medical schools still provide a routine training in genetics, oncology, but also ethics, communication in medicine, preventive medicine, family medicine and other subjects. At the turn of the millennium, all Czech medical faculties gradually adopted the concept based on acquisition of credits (ECTS), which, as a unit of workload, play both the cumulative role in the formal evaluation of study and the transfer role in case of a study abroad. Some medical schools teach general medicine focused on devising solutions to problems (problem-based teaching), however, most medical schools continue the traditional tuition methods.

The four-year postgraduate doctoral study in the Czech Republic is currently accredited at seven medical schools offering undergraduate study in general medicine (First Faculty of Medicine, Charles University in Prague, Second Faculty of Medicine, Charles University in Prague, Third Faculty of Medicine, Charles University in Prague, Faculty of Medicine, Masaryk University Brno, Faculty of Medicine, Palacký University Olomouc, Faculty of Medicine, Charles University in Hradec Kralove, Faculty of Medicine in Pilsen, Charles University in Prague). The doctoral degree programme consists in an individual study plan taking place under the guidance of a supervisor. The study is completed by passing the state doctoral examination and defending a dissertation thesis, which demonstrates the ability of independent work in research or development as well as the capacity to perform this activity. Graduates of doctoral degree programmes are awarded the academic degree "Doctor" (abbreviated to "Ph.D.", which is used behind a person's name). The corresponding departmental councils, composed of eminent experts, mostly professors and associate professors, are responsible for the quality of doctoral theses in terms of content as well as the level of expertise. Doctoral Study Boards for individual fields of study were established at all Czech medical faculties outside Prague. Selected postgraduate dentistry courses were included under the joint board for "experimental surgery" at the three medical faculties under the Charles University in Prague.

The European Union lacks an integrated system of postgraduate scientific training in general medicine. When comparing the individual Member States, it seems that there are more differences than common features. The Berlin Communiqué (2003) reflecting the Bologna Process emphasizes the importance of research activity as an integral component of tertiary education. The inclusion of doctoral degree programmes in the education process is expected to strengthen the connection between science, research and tertiary education. To facilitate this process, it is necessary to define general standards for postgraduate research training as well as remove legal

and other obstacles to cooperation between EU countries.

## THE FUNCTION OF THE SUBJECT AREA

The objective of **undergraduate education** is to prepare theoretically educated, competent and qualified physicians capable of undergoing training upon graduation and after receiving the field attestation exam, capable of assuming full responsibility for the quality, safety and effective care of a patient's health.

The objective of **doctoral degree programmes** is to train highly skilled professionals with deep theoretical knowledge and methodological skills including prerequisites for independent work at an interdisciplinary as well as international level. They are employable in research and development in medical, biomedical and pharmaceutical sciences as well as related disciplines. The programme of study offers interdisciplinary education.

The subject and the objective of **undergraduate education** in general medicine is to educate specialists focusing on patients' healthcare across the full range of possible pathologies. Part of the training of future general practitioners is also gaining knowledge in a wide range of disciplines of general medicine, which is necessary for good future cooperation with specialists from other fields.

Graduates of **general medicine**, as opposed to graduates of dentistry, must undertake specialized postgraduate training in a required length (different for individual disciplines) in order to be offered the opportunity to work independently at a clinic or a hospital. This is why practical as well as theoretical training of students for future employment is emphasized in the course of undergraduate study.

**Doctoral degree programmes** in the field of general medicine focus on scientific research and independent creative activity in the field of researching the causes and the course of disease as well as developing new diagnostic and therapeutic procedures. A successful completion of a master's degree programme in general medicine is the precondition for acceptance in the doctoral degree programme. The multidisciplinary character of studies is reflected in a wide range of related biological, chemical and medical disciplines. The aim is to train scientists capable of independent creative activity and of verbal as well as written presentation of results. Deepening the knowledge in a wide range of specialized disciplines depending on the focus of a particular field is part of training.

## PRIMARY FIELDS

**Undergraduate as well as doctoral degree programmes** in the field of general medicine consist of three basic parts, whose mutual integration and clinical application is the main focus of study.

Master's study programme

**Theoretical disciplines** are common for general medicine as well as dentistry. They are based on the knowledge of molecular and cellular biology and biochemistry. Their practical application is subsequently used in the study of anatomy and physiology as well as preclinical disciplines.

**Preclinical disciplines** prepare graduates for studying clinical disciplines, explain the origin, development and diagnosis of diseases in all respects. These include pathology, pathological physiology, microbiology, pharmacology, radiology - imaging techniques, social medicine and other disciplines. A successful completion of studying these disciplines is required for continuing in further studies.

**The clinical and technical aspects of general medicine** educate future physicians in providing healthcare in the broadest concept of all medicinal disciplines. The main emphasis is put on prevention

of diseases. Students acquire the ability to specify a reasonable treatment schedule as well as to implement it independently. Students must be ready to treat patients who are disabled or mentally handicapped. Over the course of studies, students acquire the skills of independent application of treatment methods that are part of the practitioner job. Students are also introduced to the theory of more complex therapeutic procedures which are in the hands of specialists.

### **Doctoral degree programmes**

The **theoretical disciplines** studied in doctoral degree programmes under general medicine include anatomy, histology and embryology, physiology and pathophysiology, medical biophysics, medical biology, molecular and cellular biology and biochemistry, and medical ethics. Their study, as well as deep and systematic knowledge, is the basis for carrying out interdisciplinary cooperation in science and research.

In **preclinical disciplines of doctoral degree programmes**, scientific knowledge is retrieved and processed in the fields of pathology, pharmacology, medical microbiology, radiology - imaging techniques, social medicine and hygiene, preventive medicine and epidemiology.

Clinical fields of **doctoral degree programme** include the following disciplines: anesthesiology, intensive medicine and pain management, oncology, social medicine, dermatology, gynecology and obstetrics, surgery, neurology, ophthalmology, otorhinolaryngology, pediatrics, psychiatry, internal medicine, neuroscience, general medicine - cardiology, experimental surgery and others. Students gain the ability of independent scientific work, the skills of retrieving scientific information as well as the knowledge of research methodology of scientific work. In interdisciplinary study, students gain the ability to integrate scientific issues from various disciplines.

## **DEFINITION OF THE OBJECTIVES OF EDUCATION**

Graduates of **master's degree programmes** acquire theoretical and practical knowledge of biophysics, biology, biochemistry, microbiology, pharmacology, morphology and physiology of human body in normal as well as pathological condition. Graduates are perfectly capable of identifying life-threatening condition and can provide qualified assistance. They master the basic methods of medical examination and communication as well as of basic medical and nursing care and treatment of serious health disorders. They demonstrate the knowledge of the rules of primary and secondary prevention and health promotion, including application, and are familiar with the organization of healthcare in the Czech Republic including basic legal aspects. They understand the social and economic determinants of health, treatment and consequences of disease. They are able work independently making use of information on relevant topics, are familiar with the methodology of scientific work including the basics of statistical evaluation of clinical data. They demonstrate a basic knowledge of foreign languages as well as Latin terminology.

The **basic objectives of doctoral degree programmes** include:

mastering broad and systematic theoretical knowledge required for independent scientific work, high quality of research projects within the basic sub-specialization in general medicine, as mentioned above;

utilization of interdependence among medical, biomedical and general medicine-related disciplines when devising solutions to research projects;

active involvement of graduate students in research projects, lecturing and publishing activity, efficient control of conditions required for successful completion of postgraduate studies.

**The Objectives of Education include:**

gaining a broad and deep knowledge, practical skills and professionalism with regard to the need to provide a high standard of patient care in all circumstances;

high quality of theoretical and practical training including possibility of unassisted employment of selected clinical procedures;

interdependence and continuity of theoretical and clinical disciplines and practical training over the course of study;

promoting active involvement of students in the learning process (the opportunity to ask questions, hold discussions with teachers, getting familiar with alternative therapies and scientific hypotheses, the possibility of pro-active participation in scientific activity);

acquisition of theoretical knowledge and practical skills required for unassisted performing of the job of postgraduate practitioner and outpatient specialist;

over the course of undergraduate training, efficient control of fulfilment of theoretical as well as practical requirements of successful completion of studies.

## GENERAL PROFILE OF GRADUATES

### Graduates of **master's degree programme**

Completion of studies in the discipline of General Medicine is to ensure competence to pursue medical occupation (preventive, diagnostic, therapeutic and rehabilitation activity and dispensary care under the supervision of a qualified physician). Graduates are trained to continue their education and obtain qualification of a specialized physician. Graduates of master's degree programme "General Medicine" shall have broad academic and medical education allowing them to work in all medical sub-disciplines, they are properly trained for the occupation in terms of professional theory, are able to co-operate with other health care specialists; must be skilled in communication, be ready to continue in lifelong vocational training and continue professional development, be able to solve technical problems in professional context using a deep theoretical knowledge and practical skills.

### Graduates of **doctoral degree programme** must

- demonstrate broad academic and medical education,
- be properly trained for pursuing occupation,
- be able to co-operate with other specialists in the healthcare sector,
- have good communication skills,
- be prepared for lifelong vocational training and continuous professional development,
- be able to master methodology of scientific research work and as well as advanced research methods to extend existing knowledge in the discipline.



PROFESSIONAL KNOWLEDGE	
Master's study programme	Doctoral study programme
Study programme graduates	
<p>demonstrate a deep knowledge of biomedical basis in the discipline (anatomy, physiology, medical biology, chemistry and microbiology, genetics;</p> <p>acquire a broad knowledge of pathology, pathophysiology and pharmacology;</p> <p>demonstrate a knowledge of the composition, indications, mechanism of effect of drugs used in medical practice, including drug treatment of pain and anxiety, the issues of drug side effects and drug interactions;</p> <p>acquire knowledge of principles of good communication with patients;</p> <p>demonstrate a deep knowledge of disease processes, particularly on the basis of infection and inflammation, immune system disorders, degenerative changes, diagnosis and treatment of tumours, metabolic and genetic diseases at the level of existing knowledge;</p> <p>master the principles of first aid in sudden general disorders, as well as practices of cardiopulmonary resuscitation;</p> <p>demonstrate a broad knowledge of diagnostic and therapeutic procedures used in all medical areas (at the level of existing knowledge);</p> <p>master the hygienic-epidemiological precautions;</p> <p>demonstrate knowledge of organization and the system of providing health care in general medicine;</p> <p>demonstrate knowledge of the principles of medical ethics, legal standards in relation to medical profession, organization of work and occupational safety principles.</p>	<p>demonstrate a deep and broad knowledge of biomedical basis in the discipline (anatomy, physiology, medical biology, chemistry and biochemistry, medical biophysics);</p> <p>gain a broad knowledge of the causes of diseases and pathological conditions including major systemic diseases (pathology, pathophysiology, microbiology);</p> <p>demonstrate a deep and broad knowledge of the problems and hypotheses related to devising a solution to a research problem including the ability of their critical evaluation;</p> <p>demonstrate a very good orientation in professional literature, including specialized computer databases.</p>

# EDUCATION DESCRIPTORS

# EDUCATION DESCRIPTORS

PROFESSIONAL SKILLS	
Master's study programme	Doctoral study programme
Study programme graduates	
<p>when examining a patient, they are able to determine correct medical history, work independently in order to make decisions on indicating appropriate additional testing and interpret testing results;</p> <p>within their occupation, they are able to work independently in order to perform a wide range of clinical examinations, treatment and measures in disease prevention;</p> <p>are able to communicate with patients, their relatives or persons accompanying them as well as with experts and other specialists in other medical disciplines;</p> <p>are able to continue in training and to work creatively in such a way as to apply modern diagnostic and therapeutic procedures in practice;</p> <p>are able to use the current methods of electronic communication and modern information systems.</p>	<p>master advanced research practices in such a way as to extend existing knowledge in the discipline;</p> <p>are able to critically evaluate and synthesize acquired knowledge;</p> <p>are able to practically use the newly acquired knowledge in the fields of etiology, diagnosis, prevention and disease treatment;</p> <p>are able to develop methods and learning theories concerning interdependence in general medicine.</p>

## CHARACTERISTIC OCCUPATIONS AND RELEVANT REGULATED OCCUPATIONS

Graduates of **master's degree programme** will be fully trained for pursuing medical occupation in clinical settings of all types, with the option of specialized continuing professional education in any field of medicine. Graduates are employable as

practitioners for children and adolescents,  
practitioners,  
after successful completion of specialist training in all specializations.

Graduates are also offered other employment opportunities, outside clinical settings (theory-focused medical disciplines, research, pharmaceutical industry, etc.). Graduates may also continue their studies in doctoral degree programmes.

Graduates of **doctoral degree programme** are employable as

researchers in specialized research centres,  
university teachers working at theoretical or specialized clinical departments of medical faculties.

## RELATIONS TO OTHER SUBJECT AREAS

The common theoretical base and the knowledge of the relationship between systemic and oral health is shared with the subject area Dentistry. There are close ties with the areas of Health Care and Pharmacy. In general terms, there is a connection with natural sciences, in particular with subject areas Biology and Ecology, Physics and Chemistry.

## SUB-DISCIPLINE DENTISTRY

### A BRIEF DESCRIPTION OF THE CHARACTER, THEMATIC SCOPE AND HISTORY OF THE FIELD

The first mention of dentistry as a separate field dates back to the 18th century (monographs of French physician Pierre Fauchard "Le surgery dentists" published in 1728). The first professional dentistry company in the world was founded in the U.S. in 1834 (Society of Surgeon Dentists of the City and State of New York). The first textbook on dentistry was published in Prague in 1886 (Mořic Baštyř: Zubní lékařství). The Association of Czech dentists was established in 1897.

According to the Austrian government regulation of 1810, dentists (Zahnartz) were required to complete a two-year study of healing course including graduation exam. In 1889, the study of dentistry in Germany was extended to 6 semesters, in 1919 to 8 semesters including the entitlement to use the Dr.Med.Dent. degree.

Independent "dental schools" were established in many countries in Western Europe and in the U.S. in the 19th century; these schools educated specialists in dental and oral cavity care, usually without direct relation to a medical faculty. This situation has remained largely unchanged to these days, although it is often subject to criticism. Radical reforms of study were repeatedly prepared but were never implemented.

The pregradual study of dentistry was based on a different philosophy in Czech context. Clinical departments were founded at the newly established medical faculties (Brno, Bratislava) in Czechoslovakia in the interwar years. The first dental hospital was established at the Dentistry Department of Faculty of Medicine, Charles University in Prague in 1922. The first research institute - the National Institute of Dental Medicine in Prague - was established in the same year. The status of experts in the field of dental care was governed by the Act on Dentistry and Dental Technology (303/1920 Coll.), which defined the qualifications of specialist dentist, dental technician and tested dental technician). Dentists were graduates of General Medicine with postgraduate specialization in dentistry. A similar education system existed in Austria or Italy. The curricula were amended only after the Second World War, when the Act. No. 58/1950 Coll. on universities introduced a four-year study specializing in dentistry, which was later extended to 5 years. The Act No. 170/1950 Coll. repealed the occupation of a dentist as well as the one of tested dental technician. Simultaneously, the number of medical schools providing dentistry study in former Czechoslovakia increased from three to seven in 1946 - 1947 (Prague, Brno, Pilsen, Hradec Kralove, Olomouc, Bratislava, Kosice). Additional amendments to the undergraduate curriculum were introduced in 1990, when the study of dentistry was extended to six years at three medical schools (Prague, Olomouc, Brno) in the Czech Republic out of the total of five. The five-year study remained unchanged at the Faculty of Medicine in Hradec Kralove, studies consisting of eleven semesters remained unchanged at the Faculty of Medicine in Pilsen. Amendments to the curriculum were largely based on the idea that oral health is an integral part of the general health of individuals and that dentistry is a specialized medical discipline, which means that during their studies, dentists need to gain similar basic knowledge as specialists in any other field of medicine.

In connection with the accession of the CR to the European Union (as of the 2004/05 academic year) and based on the recommendation of the European Commission, as well as pressure by the Czech Dental Chamber and the decision of the Accreditation Commission, the undergraduate study was reduced from 6 years back to 5. The title of the programme of study changed from "Stomatology" to "Dentistry", specialized dental disciplines were reinforced in the programmes of study, general healthcare fields were reduced and state exams in internal medicine and general surgery were

eliminated at most faculties. Graduates of master's degree programme Dentistry are awarded the degree of "Doctor Medicinae dentalis" (MDDr.). On the contrary, some European countries extended the length of study from five to six years (the Netherlands), others retained the six-year programmes (France, Slovakia, Slovenia, Portugal, Iceland), the German model of studying eleven semesters is a compromise. The reason for extending the length of study is mainly the ageing of population as well as the increased number of physically handicapped patients who are being treated by dentists.

Dentistry is now defined as a separate occupation within the spectrum of medical services. The EU Directive of 1995, which is binding for all Member States, defines the occupation of dental practitioner as "a specific profession distinct from general medicine ... Member States are required to ensure that the education of specialists is focused on prevention, diagnosis and treatment of anomalies and diseases of teeth, mouth cavity, jaws and surrounding tissues. The profession of dental practitioner must be exercised by holders of the qualification, obtained pursuant to this Directive." The minimum five-year regular university study is the prerequisite for gaining this qualification.

The first scientific and research activity of Czech dental practitioners dates back to 1901, when the third Congress of Czech Dentists and Natural Scientists took place, including a separate section focused on dentistry. 29 lectures were presented to 50 stomatologists at that time. This meeting of dental section was declared the first Scientific Congress of Czech Dental Practitioners. The first issue of specialized journal Dental Medicine dates back to 1900; this journal became a professional forum for the presentation of scientific and research publications. It changed its title to Czech Stomatology in 1936 and has been in production until today.

In interwar Czechoslovakia, the postgraduate education took place mainly at three university departments (Prague, Brno, Bratislava). Postgraduate scientific and research activity were the prerequisites for successful habilitation and professorship qualification procedures. The first dental research institute - the National Institute of Dental Medicine in Prague - was established in former Czechoslovakia in 1922. Professors Jesenský, Kostečka (jaw surgery) and Wachsmann (orthodontics) ranked among the most significant personalities whose scientific fame went beyond the borders of former Czechoslovakia.

In the years of political normalization, scientific training at universities was governed by Decree No. 64/1977 Coll. The Czech Commission for Scientific Degrees based in Prague became the overarching authority for the Czech Republic. Inspired by the Soviet model, the postgraduate education was construed as a two-stage training (Candidate of Sciences, Doctor of Sciences). The decisive power was held by the Commission for the Defence of Candidate/Doctoral Dissertation Thesis. A time-consuming political training, testing the knowledge of Marxism-Leninism as well as the knowledge of Russian language became a mandatory part of postgraduate scientific education in the 1970s and the 1980s.

The four-year postgraduate doctoral study in the Czech Republic is currently accredited at five medical schools offering undergraduate study in dentistry (First Faculty of Medicine, Charles University in Prague, Faculty of Medicine, Masaryk University Brno, Faculty of Medicine, Palacky University Olomouc, Faculty of Medicine, Charles University in Hradec Kralove, Faculty of Medicine in Pilsen, Charles University in Prague). The doctoral degree programme consists in an individual study plan taking place under the guidance of a supervisor. The study is completed by passing the state doctoral examination and defending a dissertation thesis, which demonstrates the ability as well as the readiness to carry out independent work in research or development. Graduates of doctoral degree programmes are awarded the academic degree "Doctor" (abbreviated to "Ph.D.", which is used behind a person's name). The corresponding departmental councils, composed of eminent experts, mostly professors and associate professors, are responsible for the quality of dissertation theses in terms of content as well as level of expertise. Doctoral Study Boards for the study of dentistry were established at all Czech medical faculties outside Prague. The postgraduate dentistry study is

included under the joint board for "experimental surgery" at three medical faculties under the Charles University in Prague.

The European Union lacks an integrated system of postgraduate scientific training in dentistry. When comparing the individual Member States, it seems that there are more differences than common features. The Berlin Communiqué (2003) reflecting the Bologna Process emphasizes the importance of research activity as an integral component of tertiary education. The inclusion of doctoral degree programmes in the education process is expected to strengthen the connection between science, research and tertiary education. To facilitate this process, it is necessary to define general standards for postgraduate research training as well as remove legal and other obstacles to cooperation between EU countries.

## THE FUNCTION OF THE SUBJECT AREA

The subject and the objective of **undergraduate education** in dentistry is to educate specialists focusing on oral care and oral health of patients. As oral health is an integral part of the overall health of an individual, pathological changes in oral cavity maybe manifesting serious general diseases and vice versa. Therefore, the training of future dentists includes also gaining general knowledge in a wide range of disciplines of general medicine, which is necessary for good future cooperation with specialists from other fields. Unlike graduates of general medicine, future dentists must be capable of unassisted performance of their occupation immediately after graduation. This is why practical training of students for future employment is emphasized in the course of undergraduate study.

**Doctoral degree programme** in the field of dentistry is focused on scientific research and independent creative activity in the field of research or development. The programme of study organically builds on undergraduate master's study of Dentistry/Stomatology, whose successful completion is a prerequisite for admission in further scientific training. The aim is to train scientists in the area of dentistry capable of independent creative activity and of verbal as well as written presentation of results. As oral health is an integral part of the overall health of an individual, the postgraduate scientific training implies a broad knowledge in the areas of biomedicine, biophysics and general clinical medicine.

The objective of **undergraduate education** is to prepare theoretically educated, competent and qualified dentists capable of assuming full responsibility for the quality, safety and effective care of a patient's oral health.

The aim of **postgraduate doctoral study** in the field of dentistry is to educate experts demonstrating a deep and systematic knowledge as well as capacity to carry out independent scientific work at an interdisciplinary and international level.

## PRIMARY FIELDS

**Undergraduate programmes** in dentistry consist of three basic parts, whose mutual integration and clinical application is the main focus of study.

**Similarly to the undergraduate study of dentistry, the postgraduate doctoral programmes** in dentistry consist of three parts, whose mutual integration and clinical application is the basis for an independent scientific activity of students in doctoral degree programmes.

Biomedical **disciplines** are common for general medicine as well as dentistry. They are based on the knowledge of molecular and cellular biology and biochemistry. Their practical application is subsequently used in the study of anatomy, physiology, pharmacology, pathology and pathophysiology, microbiology, clinical medicine, epidemiology, psychology, sociology and medical ethics. Their study, as well as deep and systematic knowledge, is the basis for carrying out interdisciplinary cooperation in science and research.

**Oral and dental aspects of biomedical sciences** are focused on a deep knowledge of the structure and function of teeth and oral cavity organs, including associated structures of head and neck. The result of their study is a broad understanding of etiology, diagnosis, prevention and treatment of diseases of hard and soft tissues of oral cavity and the knowledge of the influence of general disorders on oral health. Research activity in this area focuses on the individual sub-specializations in the field of dentistry, including restorative dentistry and specifically endodontics, periodontics, pediatric dentistry, dental prosthetics, oral medicine, pathology and radiology, orthodontics, oral and maxillofacial surgery.

**Clinical and technical aspects of dentistry** prepare future dentists for providing dental care and care of oral tissues. The main emphasis is put on disease prevention as well as on protecting the health of teeth and their supporting structures. Students acquire the ability to specify a reasonable treatment schedule as well as to implement it independently. Students must be ready to treat patients who are disabled or mentally handicapped. Over the course of studies, students acquire the skills of independent application of treatment methods that are part of a dentist's job. Students are also introduced to the theory of more complex therapeutic procedures which are in the hands of specialists. Clinical and technical aspects of dentistry shall also form an integral part of scientific work. These include the utilization and verification of results of theoretical research in practice and their wide use especially in the prevention of disease conditions and the introduction of new treatments

## DEFINITION OF OBJECTIVES

The basic objectives of **master's study** in dentistry include in particular

- gaining a broad and deep knowledge, practical skills and professionalism with regard to the need to provide a high standard of patient care in all circumstances;
- high quality of theoretical and practical training including possibility of unassisted employment of selected clinical procedures,
- interdependence and continuity of theoretical and clinical disciplines and practical training over the course of study,
- promoting active involvement of students in the learning process (the opportunity to ask questions, hold discussions with teachers, getting familiar with alternative therapies and scientific hypotheses, the possibility of proactive participation in scientific activity),
- gaining competence for proactive cooperation with other occupations focused on the care of oral health (dental hygienist, certified dental technician),
- acquisition of theoretical knowledge and practical skills required for unassisted performing of the job of postgraduate dentist,
- over the course of undergraduate training, efficient control of fulfilment of theoretical as well as practical requirements of successful completion of studies.

**Doctoral degree programme** in the field of dentistry is focused on

- acquisition of broad and systematic theoretical knowledge required for independent scientific work,
- high quality of research projects within individual sub-specializations in the field of



dentistry, as mentioned above,  
utilization of interdependence among stomatological, biomedical and general medicine-related disciplines when devising solutions to research projects,  
active involvement of postgraduate students in research projects, lectures and publication activity,  
efficient monitoring of fulfilment of conditions required for successful completion of post-graduate studies.

## GENERAL PROFILE OF GRADUATES

Graduates of **master's degree programme** dentistry will be

able to demonstrate broad academic and stomatological/dental education enabling them to work in all sub-disciplines of dentistry,  
be properly trained for pursuing occupation,  
able to co-operate with other specialists in the dental and medical care; must have good communication skills,  
be prepared for lifelong vocational training and continuous professional development,  
able to solve job-related technical problems in a context making use of deep theoretical knowledge and practical skills.

Graduates of **doctoral degree programme** Dentistry will

have broad academic education in stomatology/dentistry,  
be properly trained for pursuing occupation  
able to co-operate with other specialists in the dental and medical care; must have good communication skills,  
be prepared for lifelong vocational training and continuous professional development,  
be able to master methodology of scientific research work as well as advanced research methods in dentistry to extend existing knowledge in the discipline.

PROFESSIONAL KNOWLEDGE	
Master's study programme	Doctoral study programme
Study programme graduates	
<p>demonstrate a profound knowledge of biomedical basis of the field (anatomy, physiology, medical biology, chemistry and biochemistry);</p> <p>acquire a broad knowledge of the causes of orofacial disorders including major systemic diseases (pathology, pathophysiology, microbiology);</p> <p>demonstrate the knowledge of composition, indications, mechanism of effect of drugs used in stomatological practice, including drug treatment of pain and anxiety, the issues of drug side effects and drug interactions;</p> <p>acquire knowledge of principles of good communication with patients;</p> <p>demonstrate a deep knowledge of disease processes, particularly on the basis of infection and inflammation, immune system disorders, degenerative changes, diagnosis and treatment of tumours, metabolic and genetic diseases at the level of existing knowledge;</p> <p>master the principles of first aid in sudden general disorders, as well as practices of cardiopulmonary resuscitation;</p> <p>demonstrate a broad knowledge of diagnostic and therapeutic procedures used in dentistry (at the level of existing knowledge);</p> <p>demonstrate the knowledge of the principles of healthy nutrition and the prevention of oral and systemic diseases;</p> <p>demonstrate the knowledge of hygiene regulations applicable in the field of dental surgery;</p> <p>demonstrate the knowledge of organization and the system of providing health care in dentistry;</p>	<p>demonstrate a deep and broad knowledge of biomedical basis in the discipline (anatomy, physiology, medical biology, chemistry and biochemistry, medical biophysics);</p> <p>acquire a broad knowledge of the causes of orofacial disorders including major systemic diseases (pathology, pathophysiology, microbiology);</p> <p>demonstrate a deep and broad knowledge of the problems and hypotheses related to devising a solution to a research problem including the ability of their critical evaluation;</p> <p>demonstrate a very good orientation in professional literature, including specialized computer databases.</p>

# EDUCATION DESCRIPTORS

# EDUCATION DESCRIPTORS

PROFESSIONAL SKILLS	
Master's study programme	Doctoral study programme
Study programme graduates	
<p>when examining a patient, they are able to determine correct medical history, work independently in order to make decisions on indicating appropriate additional testing and interpret testing results;</p> <p>within their occupation, they are able to work independently in order to perform a wide range of clinical examinations, treatment and measures in prevention of oral cavity diseases including oral cavity structures;</p> <p>are able to communicate with patients, their relatives or persons accompanying them as well as with experts and other specialists in other medical disciplines;</p> <p>are able to continue in training and to work creatively in such a way as to apply modern diagnostic and therapeutic procedures in practice;</p> <p>are able to use the current methods of electronic communication and modern information systems.</p>	<p>are able to use in practice the newly acquired knowledge in the fields of etiology, diagnosis, prevention and treatment of diseases of oral cavity tissues;</p> <p>are able to develop methods and learning theories concerning interdependence between systemic and oral health.</p>

## CHARACTERISTIC OCCUPATIONS AND RELEVANT REGULATED OCCUPATIONS

Graduates of **master's degree programme** dentistry are employable as:

- dentists-practitioners,
- specialists in orthodontics, oral and maxillofacial surgery, clinical dentistry (which is conditioned by passing the relevant qualification attestation),
- university teachers at medical faculties teaching Dentistry/Stomatology.

Graduates of **doctoral degree programme** Dentistry are employable as:

- researchers in specialized research centres,
- university teachers working at theoretical or specialized clinical departments of medical faculties.

## RELATIONS TO OTHER SUBJECT AREAS

There are close ties with the areas of Health Care and Pharmacy. In general terms, there is a connection with natural sciences, in particular with Biology and Ecology, Physics and Chemistry.

## 2.36 PHARMACY

### A BRIEF DESCRIPTION OF THE CHARACTER, THEMATIC SCOPE AND HISTORY OF THE FIELD

Pharmacy is a field of health care which requires college education as well as lifelong learning in the modern fields of biological science (especially healthcare fields), fields of chemical science, and basic knowledge of social and legal areas. The scope of knowledge, understanding and skills of graduates must be deep and of sufficient interdisciplinary nature for performing qualified activities that are associated with drugs, medicinal products, with biologically and pharmacologically active compounds and must be such as to enable graduates to collaborate with experts in other fields of healthcare and natural science. Graduates are prepared to deal with delivery of medical products, distribution, preparation and control of drugs used in the provision of pharmaceutical care in clinical settings as clinical pharmacists; are trained also for other professional and research activity in development, manufacture and control of drugs in research institutes and in pharmaceutical manufacturing companies.

Doctoral degree programmes in Pharmacy focus on scientific research and independent creative activity in the field of research, development and control of drugs with the aid of other related biological, chemical and social fields, including, inter alia, the emerging fields of molecular genetics, natural biologically active substances, biological active substances, biogeneric drugs, biotechnology products, as well as social pharmacy, including drug policy, pharmacoeconomics and related legal programmes of study. Pharmaceutical sciences are multidisciplinary; without mutual relation with the aforementioned fields as well as other fields, pharmaceutical sciences cannot solve fundamental problems related to the safety of biologically active structures, their maximum effect and minimum risk, their effect in the organism, tolerance and toxicity, favourable application and suppression of side effects, the relationship of structure and biological effect, the significance, research and efficient use of natural biologically active substances and products of biotechnology.

### HISTORY

Pharmacy is a traditional discipline associated with the Charles University since its inception in 1348. Pharmacists had to report to the Rector for approbation, for taking the oath and complying with lege artis. Activities carried out in pharmaceutical laboratories in the 18th and the 19th century resulted in isolating and describing a wide range of natural substances (alkaloids, glycosides).

As the hardware of pharmaceutical laboratories would not meet the new demands of scientific work, scientific research gradually began to shift from pharmacies to universities and pharmaceutical industry in the middle of the 19th century. Pharmacist Gustav Hell established production of galenics and fine chemicals in Komarov near Opava in 1883. This company continued as Galena after 1952. In 1930, the Benjamin Fragner factory (named after the founder of a Prague-based dynasty of pharmacists) launched production of pharmaceuticals as well as extensive research at that time. The factory became the basis for establishing national company Léčiva in 1958.

The newly established institutions played an important role in research and drug control: Research Institute for Pharmacy and Biochemistry (1951), Research Institute of Antibiotics and Biotransformation (1952), Research Institute of Medicinal Plants (1952), State Institute for Drug Control (1952), Research Institute of Immunology (1954), Research Institute for Biofactors and

Veterinary Drugs (1974). The professional scientific journal Czechoslovak pharmacy has been published since 1952. A systematic scientific training at universities was implemented in accordance with Government Regulation No. 60 Coll. as of 23 June, 1953. As of 1804, a regular pharmacy study was part of the medical faculty, since 1849, it was taught at the Faculty of Arts, and in between 1920-1950, it was taught at the Faculty of Science. The studies of pharmacy closed at the Charles University in Prague in 1950 and were transferred to Brno.

Pharmacy is linked to other medical and natural science disciplines in terms of its inception as well as training. A separate Faculty of Pharmacy was established with the Masaryk University in 1952. In 1969, the five-year study transferred to the Faculty of Pharmacy in Hradec Kralove, which is the youngest faculty of Charles University and in 2001, it moved to the Faculty of Pharmacy at the University of Veterinary Sciences in Brno.

The area of pharmacy is tied to some social and legal fields.

The large selection of attestations needed to implement further lifelong education in diverse fields of Pharmacy is a reasonable, useful and encouraging help.

## PRIMARY FIELDS

Education in the area of pharmacy is being implemented in accordance with the recommendations and the training system of pharmacists in the European Union. Pharmacy is related to a number of professional disciplines taught at faculties of medicine and natural science, it is tied to technological as well as legal fields which it uses as basis for building and developing pharmaceutical education since the first year of study.

The special, primary fields of pharmacy are included in other parts of study; in doctoral degree programmes, they are contained in a deeper extent focused on the objectives of the thesis: pharmacognosy, pharmaceutical chemistry, xenobiochemistry and pathobiochemistry, control of chemical and natural drugs, pharmacology, toxicology and radiopharmaceuticals, immunopharmacology, gene therapy and biological pharmaceuticals, medicinal plant production, clinical pharmacy and pharmaceutical risks, social interaction and communication, pharmacy, management. Technology fields such as technology of natural medicines, technology of synthetic drugs, drug formulations, technology of manufacturing pharmaceuticals, biotechnology are included in the last two years of study.

These disciplines compose the primary fields of Pharmacy for the master's and doctoral degree programmes and they are the basis for selecting topics for qualifying theses.

The primary fields of doctoral degree programme in the area of pharmacy consist of the aforementioned basic groups which penetrate across individual disciplines to varying degrees. All of them emphasize teaching professionalism and quality of outputs.

### Pharmaceutical Fields:

pharmaceutical botany, pharmaceutical chemistry, biochemistry - xenobiochemistry, pharmacognosy, pharmaceutical technology, clinical pharmacy, cytotoxicology, biopharmacy, drug formulations, technological evaluation of quality of drug formulations, molecular basis for the development of pharmaceuticals, biopharmaceuticals, pharmaceutical care, social pharmacy, EU legislation in pharmacy, the history of pharmacy.

### Chemical Fields:

organic chemistry, bioorganic chemistry, biochemistry, xenobiochemistry, physical chemistry, phytochemistry, determining the structure of organic pharmaceuticals, methods of nuclear analysis, selected analytical and separation methods.

### Biological Fields:

cell biology, molecular biology, molecular genetics, applied proteomics, plant biology, biosynthesis of secondary metabolites, plant explants, biotechnology.

### Health Care Fields:

pharmacology, toxicology, physiology, microbiology, immunology, pathophysiology, clinical pharmacokinetics, molecular bases of pharmacology and toxicology, gerontology, veterinary pharmacology, forensic toxicology,

### Technology Fields:

Technology fields such as technology of natural medicines, technology of synthetic drugs, drug formulations, technology of manufacturing pharmaceuticals, biotechnology.

One of the aforementioned fields is chosen for dealing with the issue of dissertation thesis, including a more profound focus and specification to fulfil the objectives of a thesis.

## DEFINING THE OBJECTIVES OF EDUCATION

The objective of education in Pharmacy (*master's degree programme*) is to prepare graduates for acquiring a versatile and specialized knowledge of medicinal products that lead to maximizing effects and minimizing risks. Their education includes training in consultancy, explaining the properties of drugs, their dosage and storage in a manner which is understandable to patients.

Graduates are employable also in professions and areas related to pharmacy: medical, chemical, biochemical, agricultural areas or in state administration and tertiary education. They gain their narrow specialization through attaining attestations (12 fields of specialization education) after graduation.

Graduates of **master's degree programme** make use of education, knowledge and skills:

- in individual pharmaceutical occupations such as pharmacist, head of pharmacy, clinical pharmacist; they make use of both the theoretical and practical knowledge of drugs in a broad context,
- in preparing the substances used in therapy and prophylaxis; they apply the knowledge of technological processes in producing drugs based on the knowledge of properties of substances,
- in explaining and applying methods of testing quality, safety, impact and effectiveness of drugs,
- they demonstrate the knowledge of metabolic profile of drugs and the effect of their metabolites, as well as the effect of toxic substances,
- in explaining how to use and store drugs,
- they apply the knowledge of ecological disposing of biologically active substances,
- they evaluate scientific data concerning medicines and drugs. Based on this knowledge, they provide appropriate information to patients, health professionals and the public,
- they work in Pharmaceutical Information Centres,
- they make use of the basic knowledge of legal and other requirements associated with pharmaceutical practice,
- they apply knowledge and skills in laboratories working on research and development of biologically active compounds (potential drugs), they make use of their knowledge as consultants in pharmaceutical companies, in education sector or in pharmaceutical manufacturing companies,
- they continue their further education as part of lifelong learning - through attestation in 12



fields of specialized education.

The ideal objective of **doctoral degree programmes** in the field of Pharmacy is to educate research and development professionals for selected areas of pharmaceutical sciences. This objective is achievable through:

attentive, responsible, systematic, unassisted scientific work on a research problem in the area of experimental or social disciplines,  
responsible interpretation of results and deciding on their use for the next stage of work related to the development and research of biologically active compounds (pharmacologically active toxic substances, xenobiotics from the environment) that could be beneficial or become a jeopardy to humans,  
contributing to understanding and determining the mechanism of effect of drugs (and generics) that are in clinical use already or new drugs (or modification of used drugs) to ensure their effect in small doses with minimal side effects,  
assessing pharmacologically active substances in preclinical studies so that the results were used for selecting for, or excluding from further testing,  
monitoring world literature, reviewing and evaluating own performance in comparison with the existing knowledge,  
gaining experience in getting involved in European and other grant projects in the field of pharmaceutical sciences as well as related sciences,  
engaging in lecture and publishing activity, gaining experience in presenting scientific results.

## GENERAL PROFILE OF GRADUATES

Based on the specific nature of the **master's degree programme**, *graduates are able to*:

carry out activities that rank among regulated occupations (EU Directive 2005/36/EC);  
apply basic pharmacological and pharmacotherapeutic knowledge for dispensing care, consultancy and information service in pharmacies;  
apply and demonstrate the skills and the knowledge of drugs and drug policy in communicating with patients, doctors, and co-workers, and the public;  
collaborate with other professionals in the field of biological and chemical sciences, psychologists and experts of the required fields of medical sciences;  
apply theoretical knowledge and practical experience to work in drug research and development, in control and clinical laboratories;  
evaluate and apply new scientific knowledge in own professional and scientific work;  
apply basic legal and economic knowledge in relation to their activity;  
apply knowledge in the job of pharmaceutical consultant for healthcare professionals, pharmaceutical companies, patients and the public.

Graduates of **doctoral degree programmes** are able to:

communicate and collaborate with experts from related fields of science based on continuous professional self-education: the area of new micro- and nano-biotechnology, fast-developing chemical and biological fields (genetic engineering, biogenerics), including new approaches to chemical syntheses (molecular modelling, combinatorial chemistry...);  
systematically manage modern instrumental methods of research, finding one's feet in new research directions and trends in research and development;  
make use of language skills for effective national as well as international cooperation;  
publish and present results at national and international level.

# EDUCATION DESCRIPTORS

PROFESSIONAL KNOWLEDGE	
Master's study programme	Doctoral study programme
Study programme graduates	
<p>demonstrate a broad and deep knowledge of pharmaceutical sectors based on the knowledge of pharmacology and veterinary pharmacology;</p> <p>on the knowledge of pharmacognosy and botany (composition and formation of biologically active natural substances of medicinal plants, growing and learning about medicinal plants),</p> <p>on the basic knowledge of molecular genetics;</p> <p>make use of the knowledge of delivery and control of drugs based on the knowledge of chemical fields such as bioorganic chemistry, pharmaceutical chemistry, biochemistry (xenobiochemistry and pathobiochemistry), analytical chemistry (evaluation and control of chemical and natural drugs),</p> <p>on the knowledge of composition, indications, dosages, mechanisms of action and the possibilities of interactions of concomitantly administered drugs, adverse effects;</p> <p>make use of and apply organizational and basic pharmacotherapeutic knowledge for dispensing care, consultancy and information service in pharmacies;</p> <p>make use of and demonstrate the knowledge of basic technological procedures in the preparation and storing of drugs (in pharmaceutical companies and small production plants);</p> <p>demonstrate specialist knowledge and specific knowledge in order to work in control analytical laboratories, in researching and developing biologically and pharmacologically active substances;</p> <p>demonstrate the knowledge as clinical pharmacists;</p>	<p>are able to carry out unassisted, systematic scientific work;</p> <p>are able to independently formulate scientific hypotheses and evaluate them;</p> <p>focus on scientific research and independent creative activity in the field of research, development, control and preparation of drugs, but also on other research issues of related fields of natural science, medicine, chemistry, biology, molecular biology, including the basics of genetics, basic social and legal sciences;</p> <p>acquire and plan resources needed for implementing scientific and research projects;</p> <p>apply their knowledge, ability and scientific orientation in multidisciplinary social as well as natural sciences;</p> <p>they are convinced that without relation to these aforementioned fields, they are unable to devise solutions to research programmes focused on biological systems as well as external and internal influences affecting these systems, such as research and control of pharmacologically active compounds focusing on their maximum effect and minimum risk, on researching their supportive and friendly drug formulations, the suppression of undesirable effects etc.;</p> <p>concentrate on researching the effect of the aforementioned substances and other xenobiotics in the body, their metabolism and mechanism of action, tolerance and toxicity;</p> <p>use social sciences and methods of social pharmacy to deal with pharmaceutical issues;</p> <p>systematically master the required modern methods in research activity;</p>

PROFESSIONAL KNOWLEDGE	
Master's study programme	Doctoral study programme
<p>Study programme graduates</p> <p>update and add the knowledge of new chemical, natural and biological drugs, and their use in accordance with the existing knowledge and anticipated development;</p> <p>make use of the knowledge of basic principles of communicating with patients, doctors, other health professionals and the public, legal and economic knowledge that is relevant to their work;</p> <p>apply the knowledge of work organization, teamwork and team management;</p> <p>use their knowledge of the mechanisms of action, the effect of drugs in the body, the method of their application or their toxicity and dangers of addictiveness, inform patients and doctors about this problem;</p> <p>use expertise to explain the advertising and misleading information that occur in the media.</p>	<p>gain experience in getting involved in European and other grant projects in the field of pharmaceutical sciences as well as related sciences;</p> <p>publish and present research results nationally as well as internationally.</p>

# EDUCATION DESCRIPTORS

PROFESSIONAL SKILLS	
Master's study programme	Doctoral study programme
Study programme graduates	
<p>make use of all the acquired specialized pharmaceutical knowledge and skills (in pharmacology, basic pharmacotherapy, organization, supervision, management) for all professional activities in pharmacies, for communication with patients, physicians, with experts and public about drugs, their use and abuse, correct storage and efficient use;</p> <p>quickly and effectively devise solutions to theoretical and practical problems, professionally justify their specialist and organizational proposals;</p> <p>make use of their laboratory habits and professional competence when working in clinical, control, development and research laboratories;</p> <p>make use of information technology in order to obtain new knowledge in the discipline as well as to achieve good organizational work and communication;</p> <p>apply laboratory knowledge and skills in preparing tailor-made medicinal products.</p>	<p>apply and make use of laboratory experience and skills including new modern methods, laboratory procedures for devising solutions to own research problems;</p> <p>demonstrate capacity to obtain up-to-date information in the discipline using specialized computer databases;</p> <p>compare and assess new knowledge with the solution to their research problem and assess the timeliness of their own results in the context of European and worldwide knowledge;</p> <p>interpret results of their work responsibly, honestly and in context with the current knowledge.</p>

## CHARACTERISTIC OCCUPATIONS AND RELEVANT REGULATED PROFESSIONS

Applies to the programme of study Pharmacy, which ranks among regulated professions and is closely tied to other regulated professions of human medicine, dentistry, veterinary medicine, etc.

Graduates of **master's degree programme** are employable mostly:

- as pharmacists (working in teams or holding executive posts),
- as clinical pharmacists in hospitals,
- as bioanalysts in medical laboratories,
- in laboratories for drug research and development and drug control,
- as university teachers.

Graduates of **doctoral degree programme** find employment mostly:

- as researchers in research and development laboratories of hospitals, universities, in the Academy of Sciences,
- as university teachers with the option of gaining additional scientific and educational qualification.

## RELATIONS TO OTHER SUBJECT AREAS

Pharmaceutical science is a multidisciplinary field, it relates to many chemical, biological disciplines, partly social, economic and legal fields. Dealt with in detail in preceding chapters.

## 2.37 HEALTH CARE

### A BRIEF DESCRIPTION OF THE CHARACTER, THEMATIC SCOPE AND HISTORY OF THE FIELD

The training of healthcare workers was taking place exclusively at secondary medical schools, mostly within four-year graduation courses or within a two-year extension study from the 1950s until the year 2004 (or 2008). The offer of higher education in medical science moved to fifteen medical schools offering three-year study programmes usually including graduation exam as of 1991. The amendment of 1995 to the Act 29/1984 Coll. on the System of Primary and Secondary Schools (the School Act) repositioned the study at tertiary vocational schools as an alternative to university studies. In 2004 and 2005, the Ministry of Health of the CR designed the basic legislative frameworks that significantly influenced the training of health workers (Act No. 96/2004 Coll. on Conditions for Earning and Recognition of Qualifications to Perform Paramedical Health Professions and to Perform Activities Relating to Health Care and on Amendments to Certain Related Acts (Non-medical Health Professions Act), Decree No. 424/2004 Coll., specifying the activities of health service professionals and other personnel, and Decree No. 39/2005 Coll., specifying minimal requirements on the study programmes for obtaining professional qualification for performance of a paramedical health-care profession). The number of study programmes offered by tertiary vocational schools decreased based on this legislation and the training of health workers moved to three-year bachelor's degree programmes at universities (there are some exceptions).

The health legislation generally defines the nature and the thematic scope of the area of health care. Health Care programmes educate health care workers (a natural person who performs medical profession depending on the acquired qualification) to perform medical profession, i.e. a sum of activities in providing health care. By studying medical disciplines, graduates acquire knowledge, skills and competencies enabling them to perform activity stipulated by a special legal regulation - professional competence to pursue a medical profession without expert supervision. From legal perspective, the common basic knowledge and competencies for all healthcare fields are defined in the *ethics of medical profession, in administrative activity in medical sector (keeping medical records), in organizing and managing health care, in the basics of promoting and protecting public health, in first aid and in providing health care in emergency and crisis situations, in legal context of providing health care*. Furthermore, specific subject areas are defined depending on graduate profile and field specializations - the main areas in which graduates of a particular healthcare field gain specialist knowledge and skills.

The function of the subject area is to prepare medical personnel capable of pro-active application of theoretical and practical knowledge and skills in order to pursue an occupation including expertise or specialized competence. The subject of cognition is the study of health sciences. The aim of cognition is to gain specialist knowledge or competence in a specific area/field of health sciences. Graduates are typically employable as health workers in clinical settings and/or in facilities providing health care to the extent defined by applicable legislation. Healthcare professionals practising their occupation in the health sector must be centrally registered in the Registry of Health Care Professionals Eligible for the Performance of a Medical Profession without Expert Supervision.

## PRIMARY FIELDS

Primary fields cannot be defined due to legal anchoring of health care. Generally, health care fields can be divided into two groups depending on their focus: Disciplines of Direct Health Care and Technical and Laboratory Medical Disciplines.

## DEFINITION OF OBJECTIVES

The aim of education is to provide students with adequate theoretical knowledge and professional skills with regard to their employability in medical practice in performing technical and/or specialized activity in specific fields (providing professional and specialized health care), to prepare graduates for obtaining expert and specialized eligibility of medical personnel in a relevant field and professional focus and for pursuing an occupation without direct guidance or expert supervision. Prepare graduates for postgraduate and continuing medical education.

## GENERAL PROFILE OF GRADUATES

In the **bachelor's degree programme**, students acquire basic and critical knowledge and skills for pursuing a medical occupation. Graduates of undergraduate health care fields are (competence of medical staff according to the Decree 424/2004):

- ready to provide professional and specialized medical care in accordance with legislation and industry standards,
- able to comply with hygienic-epidemiological regulation in accordance with specific legislation,
- able to keep medical records and other records as based on a special legislation,
- able to work with the information system of a clinical setting,
- able to provide patients with information in accordance with one's own professional competence,
- ready to participate in practical courses, student lectures and training courses in a particular occupational focus,
- ready to participate in defining the industry standards.

In the **master's degree programme**, students will gain a broader and deeper knowledge and specialized skills in the context of study focus/specialization.

In the **doctoral degree programme**, students acquire specific knowledge and skills for unassisted research and creative activity, methodological guidance and for implementing evidence-based practice.



# EDUCATION DESCRIPTORS

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
<p>demonstrate a contextual specialist knowledge of the outputs of primary disciplines in a particular medical profession;</p> <p>depending on the specialization, they demonstrate a knowledge of the current state of development in a particular medical occupation;</p> <p>demonstrate an understanding of normality and deviations in the studied area of a medical discipline;</p> <p>identify health needs of clients of all age groups;</p> <p>apply specialist knowledge of methods and techniques relating to the performance of professional activity;</p> <p>know the principles of</p>	<p>demonstrate a broad knowledge and understanding of key disciplines that form the basis for educating health care professionals;</p> <p>demonstrate an understanding of the structure, function and dysfunction of a human body;</p> <p>demonstrate an understanding of health and social policy and their overlaps into ethical practice and evidence-based practice;</p> <p>demonstrate an understanding of the roles of health professionals in promoting health and educating towards health;</p> <p>understand ethical principles, values, and moral concepts of medical practice;</p> <p>demonstrate an understanding of occupational and statutory codes of professional health care as well as of the basic principles of public health;</p> <p>demonstrate a knowledge of the principles of theoretical concepts</p>	<p>demonstrate a deep theoretical knowledge and understanding of the subjects of profiling specialization corresponding to the existing state of knowledge and involving critical issues and development trends;</p> <p>know the results of contemporary research and of the current state of knowledge profiling the specialization in international context and demonstrate understanding of these results;</p> <p>demonstrate knowledge and understanding of medical research methodology including application in practice;</p> <p>demonstrate a deep and detailed knowledge of medical practice based on evidence including the organization and management of health care in the context of their specialization;</p> <p>demonstrate a broad, deep and detailed knowledge and understanding of theories, concepts, methods and specific issues in</p>	<p>demonstrate a thorough knowledge of the current condition in a particular medical discipline gained through continuous monitoring of the existing national and foreign publications;</p> <p>demonstrate an overview of the history of their discipline and its position in the system of health sciences including overlaps to borderline fields;</p> <p>demonstrate an understanding of the standard methodology of scientific research, utilize theoretical frameworks in working with literature and clinical notes, are able to critically evaluate and integrate them into a wider framework of their field and integrate towards theory and practice;</p> <p>demonstrate a profound, specialized, systematic knowledge of the theories and concepts of health sciences internationally; have an overview of the</p>

PROFESSIONAL KNOWLEDGE

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
hygienic-epidemiological regulation and disease prevention; demonstrate the knowledge of first aid.	<p>and basic therapeutic methods and interventions and understand their use in practice in pursuing unassisted professional activity;</p> <p>know the principles of control and manipulation of medical devices and drugs;</p> <p>demonstrate an understanding of specific examination techniques and technical characteristics of medical devices and aids enhancing the quality of clients' lives;</p> <p>can justify the selection and application of preventive and therapeutic strategies and methods in case of an altered state of health of a client in the context of the evidence found, taking into account the particular conditions of practice.</p>	<p>relation to the profiling specialization in national and international context;</p> <p>are able to analyse clients' health condition and select appropriate therapeutic approach in the context of their specialization;</p> <p>demonstrate a profound and detailed knowledge of selected diagnostic and therapeutic methods and are able to develop them;</p> <p>flexibly respond to new information arising from contemporary biomedical research, analyse and implement this knowledge into practice as well as into the theory of a specific field;</p> <p>know, critically assess and apply knowledge from other disciplines in the context of their specialization.</p>	<p>contemporary professional literature related to a medical discipline including the different types of sources of technical information;</p> <p>understand the possibilities, conditions and the use of theories, concepts and methods in relation to research procedures in health science with regard to the specifics of a particular medical discipline;</p> <p>demonstrate an understanding of the system of sciences including the position of health sciences in this system;</p> <p>demonstrate an understanding of research topics of interdisciplinary nature relevant to medical disciplines;</p> <p>they master scientific methodology, thought processes, methods and methodological tools of medical research, they are able to bring new knowledge on the border of health sciences.</p>

## PROFESSIONAL KNOWLEDGE

# HEALTH CARE

# EDUCATION DESCRIPTORS

PROFESSIONAL SKILLS		
Short-cycle programme	Bachelor's study programme	Master's study programme
Study programme graduates		
<p>apply the principles of ethical practice while providing health care;</p> <p>apply the skills required for planning, providing and evaluating health care in a particular discipline;</p> <p>provide healthcare in accordance with legal regulations and standards of a particular discipline;</p> <p>conduct evidence-based medical practice;</p> <p>apply active health promotion and disease prevention;</p> <p>utilize information and communication technologies;</p> <p>are able to work in a multidisciplinary team.</p>	<p>when presented with a specified task, they are able to draw on their specialist knowledge, as members of multidisciplinary team, they are able to solve practical issues in a discipline at the level of operational management;</p> <p>based on theoretical knowledge in their field of occupation, they are able to conduct patient diagnosis without assistance, plan and implement appropriate interventions and evaluate efficiency of results;</p> <p>they master the basic practices and specific activity of a particular healthcare field, including the use of instrumentation and communication technologies;</p> <p>conduct basic methods of diagnosis proof and validation of diagnostic indicators;</p> <p>seek, classify and evaluate theoretical and practical</p>	<p>drawing on specialist knowledge, theories, concepts and methods of health sciences and related disciplines, they are able to work independently and creatively in order to define and devise solutions to theoretical or practical problems of professional specialization in the area of health needs of the population in the context of health promotion and disease prevention;</p> <p>using diagnostic methods of their specialization, they are able to work independently in order to carry out unassisted assessment of clients' health, interpretation of results of specific methodological procedures, application of appropriate preventive and therapeutic intervention including evaluation of their effectiveness;</p> <p>participate in the training of students of qualifying and specialized training courses organized under a specialization;</p>
		<p>are able to work independently in order to plan, design, organize and make use of advanced research methods in health sciences and related areas in order to extend knowledge in the discipline through original research;</p> <p>are able to work independently in order to incorporate the researched problem into a larger scientific text and apply it in a recognized publication form;</p> <p>are able to work independently in order to didactically process a particular field-related issue including presentation;</p> <p>are able to apply own methodological procedures in practice, and explain how to use them;</p> <p>are able to develop and evaluate theories, concepts and methods of medical disciplines, including defining professional specializations;</p> <p>monitor and evaluate new research procedures of related</p>

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
	<p>information relevant to resolving practical problems;</p> <p>retrieve clients' medical history and diagnose a specific practical problem in its wider context;</p> <p>are able to analyse the results of basic research activities and make use of conclusions of analysis in medical practice;</p> <p>make use of basic research methods in a specific discipline in order to devise solutions to specific issues related to medical practice;</p> <p>demonstrate an understanding of the acquired data and information including relevant interpretation;</p>	<p>specifically communicate and collaborate with clients, their relatives and with other health care professionals;</p> <p>work independently in order to retrieve, classify and critically evaluate theoretical and practical information relevant for finding a complex solution to health problems in a specialization and propose comprehensive recommendations for devising solutions to them;</p> <p>based on integrating theoretical and empirical methods in the discipline and with the aid of diagnostic procedures, they are able to work independently in order to devise solutions to health problems in the area of clients' medical needs and define indicators of health deviations;</p> <p>they are able to work independently in order to make use of the latest knowledge of modern technology and its systematic as well as creative introduction in</p>	<p>disciplines and apply them in a creative way or modify them in medical research;</p> <p>further develop theories, concepts and methods within their field of specialization and incorporate them into the existing system of health sciences.</p>

## CHARACTERISTIC OCCUPATIONS AND RELEVANT REGULATED OCCUPATIONS

General Nurse, Midwife, Physiotherapist, Occupational Therapist, Dental Hygienist, Paramedic, Dietitian, Radiology Assistant, Orthotist-Prothesist, Orthoptist, Optics and Optometry, Medical Laboratory Technician, Pharmacy Technician, Dental Technician, Biomedical Technician, Public Healthcare, Nursing, Intensive Care, Clinical Kinesiology and Kinesiotherapy, Protection of Public Health, Laboratory Methods Specialist, Public Health Protection Specialist, Medical Bioanalytics.

### Regulated professions (Czech Republic)

Assistant in Protecting and Promoting Public Health  
Dental Hygienist  
Occupational Therapist  
Pharmacy Technician  
Physiotherapist  
Dietitian  
Specialist in Protecting and Promoting Public Health  
Optometrist  
Orthotist-Prothesist  
Orthoptist  
Midwife  
Radiology Assistant  
General Nurse  
Medical Laboratory Technician  
Paramedic  
Dental Technician

### Regulated professions (EU Member States)

General Nurse  
Midwife

## RELATIONS TO OTHER SUBJECT AREAS

General Medicine (all medical disciplines)  
Dentistry (Dental Technician, Dental Hygienist)  
Physics (Radiology Assistant, Optics and Optometry)  
Electrical Engineering (Radiology Assistant, Biomedical Technician, Optics and Optometry)  
Chemistry (Medical Bioanalytics, Pharmacy Technician)  
Pharmacy (Medical Bioanalytics, Pharmacy Technician)

## 2.38 SECURITY STUDIES

### A BRIEF DESCRIPTION OF THE CHARACTER, THEMATIC SCOPE AND HISTORY OF THE FIELD

The term "security" originated from "sine cura," which means no worries, no problems, out of danger. In general, security is one of the fundamental properties of natural, technological or social systems. If a system has such a property, then it is in a non-contentious interaction (balanced condition) with its surroundings and with itself (demonstrating both external as well as internal stability). Under these circumstances, it is able to provide all functions and parameters for which it was created in the real and virtual world and is not a threat to itself or its surroundings. Security studies focus on a systematic study of this issue in the context of all links that lead to changing a non-contentious interaction into a contentious interaction and, at the same time, they determine procedures that allow for restoring non-contentious interaction.

From historical perspective, this subject area has existed since the beginning of development of traditional science disciplines focused on enhancing knowledge and understanding of the laws of behaviour of natural, technological or social systems. The level of interest in the development of knowledge and systematic study in the area of security studies has been fluctuating depending on the extent to which contentious interactions immediately reflected in the lives of people as real threats. Also, it did not matter whether the source of threats came from nature, the utilized technology procedures or materials, or any possible interactions arising from the interaction of the man - technology - environment elements. From a historical perspective, it is very important to mention that this subject area gradually became a tool for launching intentional and purposeful conflicting interactions by the man himself. This triggered the defining of a brand new category of threats originating from anthropogenic areas. The long-term experience has led to the fact that the state currently manages and supervises education in selected segments (army, police, government, etc.) of this subject area. It is obvious that in general, the state must take the responsibility for creating conditions for internal and external security of individuals and society as a whole.

Security studies represent the subject area which focuses on purposefully managed and implemented human activities which incorporate the issue of interaction of the system with its surroundings and itself, and initially lead to an unbalanced state. The general objective of knowledge in this subject area is to gain the knowledge of and be able to take steps of maintaining the system in a non-contentious interaction, i.e. prevent it from becoming a threat. On one hand, graduates must demonstrate the ability to predict, identify and preemptively eliminate conditions that may lead to contentious interactions. On the other hand, they must be able to analyse procedures and devise solutions to situations that allow random or conscious elimination of contentious interactions.

### PRIMARY FIELDS

The traditional scientific disciplines which are developed through application in the subject area "security studies" include natural sciences, social sciences, engineering sciences, medicine and the military. Primary fields form their superstructure, which is common for all fields of this subject area. They are represented by issues taught in disciplines such as security policy, security management in the public and private sectors, risk analysis methodology, security law and standards, social aspects of security, logistics in the field of security and applied informatics. The definition of the content of

these primary fields represents the minimum common educational basis for this subject area. The following chart includes this definition of the content at the undergraduate level. this corresponds to the appropriately reduced definition of content for short cycle as well as the extended defining of content (in terms of quantity as well as quality) for the master's as well as doctoral level of study. Education descriptors for subject area "Security Studies" that are indicated below correlate with the afore-menentioned definition of the content of primary fields. Graduates' ability to communicate in at least one foreign language (English language has the priority) is taken as a must, with regard to international dimension of this subject area.

Security policy:	The aim is to present students with a comprehensive idea of a state's security policy issues in the current security environment. Attention is being paid to the principles of security policy, basic values, interests, attitudes and aspirations of the Czech Republic in safeguarding its security, prevention and elimination of security threats and risks arising from them in order to ensure internal and external security, defence and protection of citizens and the state. Emphasis is put on the complexity of access to internal and external security, including defining security system, its structure, defining the duties, powers and responsibilities of its individual components. The area of study includes also introduction to the basic conceptual and strategic documents of the state, such as security strategy, sustainable development and other strategies.
security management in the public and the private sector:	The aim is to familiarize students with the basic knowledge of crisis management and its application in the field of security management, including understanding of the positioning and the role of entities in "emergency" and crisis management, co-operation between the main stakeholders in the planning and managing emergency and crisis situations. Attention is being paid to capacity to provide preventive measures to protect people and their property, apply the knowledge of crisis management in ensuring the protection of persons and property, internal security and public order, protection of economy and critical infrastructure and national defence, including the ability to make unassisted decisions and manage subordinate individuals and activities within a small team.



methodology of risk analysis:	The aim is to familiarize students with the terminology and classification aspects of risk, the importance and the positioning of risk analysis in the process of ensuring safety of processes, systems, companies and regions, including the formulation of principles in preparing the scope and objectives of risk analysis, presentation of general process of risk analysis, including basic methods used in collecting input data. Attention is being paid to the interpretation of the most common methods used to develop the registry of dangers, risk screening, case studies, modelling of scenarios of devising solutions to risks and assessing their acceptability in order to determine critical risks of a system, a company or a region, emphasizing practical applicability in the field of public administration, security services and security of information and communication technologies.
Law, legal and technical regulations and guidelines in security area:	The aim is to provide students with basic knowledge of legislation governing the principles of ensuring security in the Czech Republic in the field of civil protection, protection of society and public order, economy, critical infrastructure and state defence, including general terms and institutes of law in the areas of defence and security and the basic provisions concerning internal and external security of the Czech Republic. Attention is being paid also to the interpretation of nature and creation of legal and technical regulatory base in the field of security and its relation to international, contractual, regulatory and legal institutes.
social aspects of security:	The aim is to familiarize students with the protection of society especially in relation to social and societal issues, in relation to human rights, including human security, ensuring the sovereignty and territorial integrity of a political and democratic system and other rights and obligations in relation to protection of ecosystem, critical infrastructure and protection of the population. Attention is paid to understanding of the issues of protection of society as a whole, in relation to the protection of social relations, obligations and population, identification of approaches, principles and methods of development of individual and team professional competencies, the role and the function of security systems and security services in social environment.
logistics in security area:	The aim is to familiarize students with the knowledge of developing support resources in personnel, material, financial, communications and other support, economic theory, business administration and management, which serves for drafting proposals for implementation of logistics systems in security area. Attention is paid to assessing the level of functioning of logistics management of logistics chains in relation to ensuring the requirements, optimization of costs, fulfilment of logistics concepts related to the creation and utilization of resources, including handling material, allowing orientation in the management of logistics processes related to security.

### applied informatics:

The aim is to provide the required theoretical knowledge and practical skills in applied informatics, which is needed for performing the job of security and crisis manager, representing the superstructure of knowledge and skills, attained during the study of basic university course in computer science. Attention is paid to students' gaining the competence and skills of unassisted designing, evaluation and argument-based defence of fundamental information-security solutions in connection with the use of information and communication technologies and personnel information systems in the areas of their professional focus in the field of security management.

## DEFINITION OF OBJECTIVES

The subject and the objective of knowledge in subject area "security studies" include threats that represent jeopardy to the safety of a man and the society, originating in natural, technological and anthropogenic areas.

Changes in climate and the corresponding consequences such as floods, windstorms, but also other natural disasters, including earthquakes, tsunamis, volcanic eruptions etc., are becoming an increasing problem, often without any possibility of an exact location and definition. Technological accidents of various kinds represent serious threats too. These often include disruption of vital social infrastructure, such as interruption of electricity and gas supplies, cuts of power in communication and information networks etc., usually accompanied by both economic as well as political impact on the life of a society. The threats originating in anthropogenic areas include the increasing and intensifying international terrorism, the unresolved issue of ethnic minorities, resulting from the long-term and increasing migration, conflicts between the maladjusted ethnics with majorities, proliferation of weapons of mass destruction etc. Other threats to humans result from the man - machine interaction or the man - environment interaction in connection with a man's activity, in particular relating to the introduction of new technologies and the widespread use of many hazardous substances.

The man as an individual and the activity of the rigid as well as flexible security structures within the public as well as private sector, including prevention as well as repressive area, must adapt to these negative factors. This requires, among other things, a conceptual, purposeful and long-term approach to the education of all persons professionally involved in this discipline. Most European countries are fully aware of these facts and have developed, or are developing, a sophisticated system of education at all levels.

In the context of the aforementioned facts, we may say that the function of subject area "security studies" is based on the need to fulfil the provisions of the Charter of Fundamental Rights and Freedoms, other constitutional acts, generally binding legal regulations, guidelines, standards as well as a number of international treaties, to the fulfilment of which the Czech Republic has committed, and which reflect a much varied range of threats to a man as an individual or as a member of the human community.

From the perspective of human community, the objective of training in subject area "security studies" is to prepare university-qualified professionals who will be able to perform jobs in all sectors of security. This means both the traditional military and public sectors, as well as complementary sectors, such as economy, environment, social, energy, technological or cultural sectors.

From the perspective of an individual, the objective of training in subject area "security studies" is to

gain the competence of identification, prevention, prediction and elimination of the entire spectrum of security threats and risks as well as gain the skills of generalization of knowledge and experience for the development of theory and practice in the field of security.

Also, in that context, both in terms of community and in terms of individuals, graduates need to be educated in the spirit of patriotism, democracy, humanism and civic responsibility, including a political, legal, ethical and cultural outlook. The safety of people as individuals is emphasized in this extended concept of security. Enforcement of this concept in the society seems to be necessary.

## GENERAL PROFILE OF GRADUATES

Subject area "security studies" has a strong multidisciplinary character. The area is currently structured into three sub-disciplines, including "protection of persons and property", "health and safety at work" and "military and defence." This is why it appears necessary that graduates of individual study fields under the subject area "security studies" acquire a certain common "knowledge standard", which they will further extend depending on their expertise in specific security issues, defined by the studied field. This common "knowledge standard" is defined by the "Shared minimum training requirements for security experts", approved by the National Security Council on 3 July 2007, on the basis of which the aforementioned primary fields were defined. This shared "knowledge standard" is assumed to represent as much as one half of the studied field (for short-cycle programmes), or one third for bachelor's degree programmes and one fifth for the master's and doctoral programmes.

Overall, it should be borne in mind that the definition of the profile of graduates in the subject area "security studies" is problematic due to its multidisciplinary character. It is unrealistic to generate the so-called "universal worker" in the field of security. The graduate profile in a particular study field will need to be based on the subjects of the common curriculum base. In practice, this will mean that, for example, if a common scientific base curriculum is based on natural sciences, graduates will be employable especially in companies and institutions dealing with security issues in relation to emergency or crisis situations. If it refers to social science (for example the public administration area), graduates will be employable mainly in public administration. The same applies to technical, military, medical science etc.

From this point of view, the profile of graduates will focus on the knowledge which is applicable in professional posts wherever it is required to safeguard measures in relation to contentious interactions. Based on the acquired knowledge, graduates will be able to perform risk analysis, develop risk prevention and risk elimination programmes, as well as elaborate safety documentation. Also, graduates will be able to predict potential consequences, carry out analysis of development of contentious interactions and propose corresponding solution methods.

# EDUCATION DESCRIPTORS

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
<p>explain the positioning and the role of specialized bodies of crisis management (e.g. are familiar with the role of armed forces in the integrated rescue system),</p> <p>characterize crisis management (e.g. knowledge of the general principles of crisis management in the conditions of armed force),</p> <p>explain logistics in the area of security, tied in particular to the material, technical and financial solutions to emergency and crisis situations, disruption of internal order and security, including ensuring preparedness for these solutions (e.g. demonstrate knowledge of the rules and principles of implementation of logistic support in/out of the Sending State),</p> <p>know the possibilities of applied informatics required for the job of safety manager (e.g. basic knowledge of computer work</p>	<p>reproduce the security policy of a state, a company or of another unit, (e.g. demonstrate a deep and systematic knowledge of the structure of Czech Republic's security system, competence of its individual elements, or the state security policy, organization in the area of protection of critical infrastructure, property and persons, health and safety at work, fire safety, or the organization of topology of a security system, system characteristics of individual components and their interconnections, or Security Strategy of the Czech Republic, the Military Strategy of the Czech Republic),</p> <p>explain the issues of risk prevention and crisis management in the public or private sector (e.g. demonstrate prevention of risks in road and air traffic transport, or security of information and communication systems, or work safety, civil protection, fire safety,</p>	<p>reproduce and explain the security policy of a state, a company or of another unit, (e.g. demonstrate a broad knowledge of the structure of Czech Republic's security system, competencies of its individual elements, or the state security policy, organization in the area of protection of critical infrastructure, property and persons, health and safety at work, fire safety, or the organization of topology of a security system, system characteristics of individual components and their interconnections, or Security Strategy of the Czech Republic, the Military Strategy of the Czech Republic),</p> <p>explain and reproduce the issues of risk prevention and crisis management in the public or private sector (e.g. demonstrate broad knowledge of road and air traffic transport safety, or security of information and communication systems, or work safety, civil protection, fire safety,</p>	<p>are able to justify the security policy of a state, a company or of another unit, including business security system, system characteristics of its individual components and their interactions (e.g. demonstrate a profound and systematic knowledge of the structure of Czech Republic's security system, competence of its individual elements, or the state security policy, organization in the area of protection of critical infrastructure, property and persons, health and safety at work, fire safety, or the organization of topology of a security system, system characteristics of individual components and their interconnections, or Security Strategy of the Czech Republic, the Military Strategy of the Czech Republic)</p> <p>discuss and oppose issues related to risk prevention and crisis management in the public or private sector (e.g. demonstrate</p>

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
and possibilities of using word processors and spreadsheets, email and Internet in their job), explain the terminology and classification aspects of risk (e.g. demonstrate the knowledge of security and military risks), explain the importance and positioning of risk analysis in the process of securing crisis management and security, explain the general process of risk analysis, including basic methods of obtaining input data, clarify the principles of defining the scope and objectives of risk analysis (e.g. demonstrate the knowledge of the principles of creating varieties in the decision-making process), explain the safety system of the Czech Republic, its structure, definition of responsibilities, powers and obligations of individual components and elements (e.g. demonstrate the knowledge	industrial safety, or prevention and settlement of disputes and organizing and ensuring security in post-contentious areas, or prevention of risks arising from the use of military and security technologies), explain the general process of risk analysis, including the retrieval of input data (e.g. demonstrate the relevant knowledge of mathematics, statistics and methods of data collection, methods of data verification), describe the legal, regulatory and prescriptive regulations in the area of state security or in a company (e.g. constitutional laws, or acts and regulations relating to protection of persons and property, or regulations defining the principles of utilizing security technologies, or generally binding legal regulations, technical standards and internal rules of a company, or the laws	industrial safety, or prevention and settlement of disputes and organizing and ensuring security in post-contentious areas, or prevention of risks arising from the use of military and security technologies), express and interpret general procedure of risk analysis, including the collection of input data and the concept of security solutions in a particular sub-discipline depending on the focus on study (e.g. demonstrate a broad knowledge of mathematics, statistics, operations analysis and data collection methods, methods of data verification, or decision-making process of commanders in planning operations), explain the legal, regulatory and prescriptive regulations in the area of state security or organization (e.g. constitutional laws, or acts and regulations relating to protection of persons and	a profound and systematic knowledge of risk prevention and crisis management methods, including standard operating procedures, or methods of assessing prevention of attack to critical infrastructure in the event of a terrorist attack or vehicle accident, or methods of assessing prevention of risks arising from the use of military and security technologies), discuss and identify general procedures of risk analysis, including the collection of input data and the concept of security policy in accordance with a particular sub-discipline (e.g. demonstrate a profound and systematic knowledge of the possibility of using mathematical tools for modelling processes including a high degree of uncertainty, or self-manage the decision-making process of a commander in planning operations), interpret and discuss the legal,

## PROFESSIONAL KNOWLEDGE



# EDUCATION DESCRIPTORS

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
<p>of the positioning and the role of the armed force within the national security system),</p> <p>describe the interests, attitudes and ambitions of the CR to safeguard its security (e.g. demonstrate the knowledge of the CR's integration into international security organizations),</p> <p>define the prevention and elimination of security threats and related risks,</p> <p>reproduce the social aspects of security related to the issue of protecting society in relation to social issues and in relation to human rights, in particular the protection of population and the environment during emergencies, the protection of critical infrastructure and ensuring internal order and security (e.g. knowledge of practical application of security principles),</p> <p>reproduce legal regulations and standards for securing the CR's national security emphasizing</p>	<p>and regulations related to ensuring safety in the use of military technology),</p> <p>describe the psychological aspects of security and the principles of interpersonal communication (e.g. psychological effect on people affected by an emergency, or friends and relatives of the victims and rescuers, or psychological aspects of the use of technology to protect critical infrastructure, property and persons, or psychological aspects of work safety, or psychological aspects of the use of weapons and military equipment),</p> <p>define the elements of material, technical and financial support of responding to emergency and crisis situations, disruption of internal order and security, including preparedness for such a response (e.g. in coordination and administration of rescue works and disposal operations, or in ensuring the protection</p>	<p>property, or regulations defining the principles of utilizing security technologies, or generally binding legal regulations, technical standards and internal rules of an organization, or the laws and regulations related to ensuring safety in the use of military technology),</p> <p>explain the psychological aspects of security and the principles of interpersonal communication (e.g. psychological effect on people affected by an emergency, or friends and relatives of the victims and rescuers, or psychological aspects of the use of technology to protect critical infrastructure, property and persons, or psychological aspects of work safety, or psychological aspects of the use of weapons and military equipment),</p> <p>calculate and express elements of material, technical and financial support of responding to emergency and crisis situations,</p>	<p>regulatory and prescriptive regulations in the area of state security or organization (e.g. constitutional laws, or acts and regulations relating to protection of persons and property, or regulations defining the principles of utilizing security technologies, or generally binding legal regulations, technical standards and internal rules of an organization, or the laws and regulations related to ensuring safety in the use of military technology),</p> <p>identify and discuss the psychological aspects of security and the principles of interpersonal communication (e.g. psychological effect on people affected by an emergency, or friends and relatives of the victims and rescuers, or psychological aspects of the use of technology to protect critical infrastructure, property and persons, or psychological aspects of work safety, or psychological aspects of the use of weapons and military</p>

PROFESSIONAL KNOWLEDGE

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
	<p>of population, or in applying technologies for the protection of property and persons, in accidents, fires, floods, evacuations of workers and related activities and procedures, or in creating emergency plans, or standard operating procedures, or when using military equipment),</p> <p>describe software products to support risk analysis, prevention of risks and the management of communication and computer systems (e.g. demonstrate the knowledge of information systems and databases to support risk analysis and risk prevention, or hazardous substances or health and safety at work, or information system used by a task force, or legal information systems, or systems for computer-aided design of technology for protection of individuals and property, or military equipment, or knowledge management within an organization),</p>	<p>disruption of internal order and security, including preparedness for such a response (e.g. in coordination and administration of rescue works and disposal operations, or in ensuring protection of population, or in applying technologies for the protection of property and persons, in accidents, fires, floods, evacuations of workers and related activities and procedures, or in creating emergency plans, standard operating procedures, in managing technical aspect of security of environmental protection in emergencies, or when analysing crisis situations or in case of disaster recovery),</p> <p>explain and interpret software products to support risk analysis, prevention of risks and the management of communication and computer systems (e.g. demonstrate a broad knowledge of information systems and databases to support risk analysis and risk prevention, or hazardous</p>	<p>equipment),</p> <p>interpret and oppose elements of material, technical and financial support of responding to emergency and crisis situations, disruption of internal order and security, including preparedness for such a response (e.g. in coordination and administration of rescue works and disposal operations, or in ensuring the protection of population, or in applying technologies for the protection of property and persons, in accidents, fires, floods, evacuations of workers and related activities and procedures, or in creating emergency plans, standard operating procedures, in managing technical aspect of security of environmental protection in emergencies, or when analysing crisis situations or in case of disaster recovery),</p> <p>provide reasons for software products to support risk analysis, prevent risks and management</p>



# EDUCATION DESCRIPTORS

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
<p>describe the principles and concepts of security policy of a state, a company or another unit (e.g. demonstrate the knowledge of principles and concepts of effective use of security technologies to protect critical infrastructure, property and individuals, or management systems securing health and safety at work, or systems managing security categories within a company and their interactions, or basic doctrinal rules of the Army of the CR, the NATO, or military equipment in peace and wartime operations),</p> <p>define methods of risk prevention and concepts of crisis management in public or in private sector (e.g. a deep and systematic knowledge of methods of preventing risks in road and air transport, or methods of risk prevention using technology for the protection of persons and property, or crisis management theory, or theory and principles of national security or</p>	<p>describe the principles and concepts of security policy of a state, a company or another unit (e.g. demonstrate the knowledge of principles and concepts of effective use of security technologies to protect critical infrastructure, property and individuals, or management systems securing health and safety at work, or systems managing security categories within an organization and their interactions, or basic doctrinal rules of the Army of the CR, the NATO, or military equipment in peace and wartime operations),</p> <p>explain and interpret the principles and concepts of security policy of a state, a company or another unit (e.g. demonstrate a broad knowledge of principles and concepts of effective use of security technologies to protect critical infrastructure, property and individuals, or management systems securing health and safety at work, or systems managing security categories within an organization and their interactions, or basic doctrinal rules of the Army of the CR, the NATO, or military equipment in peace and wartime operations),</p> <p>explain and interpret methods of risk prevention and concepts</p>	<p>substances or health and safety at work, or information system used by a task force, or legal information systems, or systems for computer-aided design of technology for protection of individuals and property, or military equipment, or knowledge management within a company),</p> <p>explain and interpret the principles and concepts of security policy of a state, a company or another unit (e.g. demonstrate a broad knowledge of principles and concepts of effective use of security technologies to protect critical infrastructure, property and individuals, or management systems securing health and safety at work, or systems managing security categories within an organization and their interactions, or basic doctrinal rules of the Army of the CR, the NATO, or military equipment in peace and wartime operations),</p> <p>explain and interpret methods of risk prevention and concepts</p>	<p>of communication and computer systems (e.g. demonstrate a deep and systematic knowledge of SW products to support the development and design of technologies for protecting critical infrastructure, property and persons, or for managing systems of physical protection, or for supporting development and design of weapons and military equipment, or for monitoring and evaluating the reliability of military equipment in operation and managing its maintenance),</p> <p>know and discuss the principles and concepts of security policy of a state, a company, or a different unit in the context of the latest findings (e.g. demonstrate a deep and systematic knowledge of Security Strategy of the Czech Republic, or principles and concepts of effective use of security technologies to protect critical infrastructure, property and persons, or international aspects of state security policy,</p>

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
PROFESSIONAL KNOWLEDGE	<p>methods of prevention of risks arising from the use of military technologies),</p> <p>define the terminology and classification aspects of risk and risk factors (e.g. a systematic and deep knowledge of terminology and classification aspects of risks, including the strategies of selecting risk factors arising from the use of security technology depending on the focus of study, or methods of identifying security threats and security risks),</p> <p>describe the legal system of the Czech Republic in the field of security and the corresponding legislative or technical and regulatory procedures (e.g. demonstrate the knowledge of administrative law, or defense law, or the security or technical equipment),</p> <p>describe the methods of training and verification of knowledge in relation to social and societal</p>	<p>of crisis management in public or in private sector (e.g. a broad knowledge of methods of preventing risks in road and air transport, or methods of risk prevention using technology for the protection of persons and property, or the theory of all phases of crisis management, or theory and principles of national security or methods of prevention of risks arising from the use of military technologies),</p> <p>explain the terminology and classification aspects of risk and risk factors (e.g. a broad knowledge of terminology and classification aspects of risk, including the strategies of selecting risk factors arising from the use of security technology depending on the focus of study, or methods of identifying security threats and risks, or procedures for preparing, planning and implementing the decision-making process of a commander),</p>	<p>national defense, or principles and concepts of the effective use of military technology in war and peacekeeping operations),</p> <p>know and discuss methods of risk prevention and concepts of crisis management in public as well as private sector, possibly in the context of the latest findings (e.g. a deep and systematic knowledge of methods of preventing risks in road and air transport, or methods of risk prevention using technology for the protection of persons and property, or theory of all phases of crisis management, or theory and principles of national security or methods of prevention of risks arising from the use of military technologies),</p> <p>know and discuss the terminology and classification aspects of risk and risk factors in the context of recent findings (e.g. a deep and systematic knowledge of terminology and classification</p>

# SECURITY STUDIES

# EDUCATION DESCRIPTORS

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
	Study programme graduates		
	<p>issues in terms of human rights (e.g. master the basic methods of leadership),</p> <p>describe personnel policy of a company in the area of security based on the principles of business administration and management (e.g. a systematic and deep knowledge of the principles of personnel policy, or economy of national defense, or economy of the armed forces with regard to requirements of an organization's personnel security),</p> <p>explain the concepts and methods of applied informatics that may be useful in a management post,</p> <p>(e.g. demonstrate a broad knowledge of management informatics, or the possibility to use network-based work, or the issue of algorithms, or presentations, or some specific information systems used in the armed forces, or software products useful in designing and utilizing</p>	<p>explain and interpret legal system of the Czech Republic in the field of security and the corresponding legislative or technical and regulatory procedures (e.g. demonstrate a broad knowledge of administrative law, or defense law, or security of technical equipment) identify and explain the methods of training and verifying knowledge in relation to social and societal issues linked to human rights (e.g. demonstrate a broad knowledge of leadership methods),</p> <p>explain personnel policy of a company in the area of security based on the principles of business administration and management (e.g. demonstrate a broad knowledge of the principles of personnel policy, or economy of national defense, or economy of the armed forces with regard to requirements of an organization's personnel security),</p>	<p>aspects of risk, including the strategies of selecting risk factors arising from the use of security technology depending on the focus of study, or methods of identifying security threats and risks, or procedures for preparing, planning and implementing the decision-making process of a commander),</p> <p>know and discuss the legal system of the Czech Republic in the field of security and the corresponding legislative, or technical and regulatory processes in the context of recent findings (e.g. a systematic and deep knowledge of administrative law, or defense law, or the security of technical equipment),</p> <p>know and discuss methods of training and verification of knowledge in relation to social and societal issues in terms of human rights in the context of recent findings (e.g. a systematic and deep knowledge of leadership methods, or methods</p>

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
	Study programme graduates		
	<p>military technologies, or concepts and methods of applied informatics which may be used in managing technologies of protecting critical infrastructure, property and individuals),</p> <p>explain the international aspects of security, attitudes and aspirations of the Czech Republic (e.g. demonstrate a broad knowledge of requirements for ensuring security of critical infrastructure, property and personnel, or safety of ground and air transport, military equipment based on EU legislation and international standards or requirements for health and safety at work, product safety and safety of technical equipment under international treaties and conventions, or the involvement of the Czech Republic in international security organizations),</p> <p>define the positioning and the role of crisis management actors at different levels (e.g. are</p>	<p>justify the concepts and methods of applied informatics designed for utilization in a managerial post (e.g. demonstrate a deep knowledge of management informatics, or the possibility to use network-based work, or the issue of algorithms, or presentations, or some specific information systems used in the armed forces, or software products useful in designing and utilizing military technologies, or concepts and methods of applied informatics which may be used in managing technologies of protecting critical infrastructure, property and persons, differentiate and interpret international aspects of security, attitudes and aspirations of the Czech Republic (e.g. demonstrate a deep knowledge of requirements for ensuring security of critical infrastructure, property and personnel, or safety of ground and air transport, military equipment based on</p>	<p>of training soldiers in terms of their behaviour in crisis situations),</p> <p>know and discuss personnel policy of an organization for security area based on the principles of business administration and management in the context of the latest findings (e.g. a systematic and deep knowledge of the principles of personnel policy, or economy of national defense, or economy of the armed forces with regard to requirements of an organization's personnel security),</p> <p>know and discuss the concepts and methods of applied informatics which can be used in the job of a manager in the context of the latest findings (e.g. a systematic and deep knowledge of utilizing specific information systems and the possibility to use software applications to address security issues, or concepts and methods of applied</p>

## PROFESSIONAL KNOWLEDGE

# EDUCATION DESCRIPTORS

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
	<p>familiar with the activity of task force or individual workers in systems of protecting critical infrastructure, property and individuals, or enterprise crisis management especially in response to natural disasters, accidents and other emergencies, or elements of the Integrated Rescue System of the Czech Republic, or part of the state's armed force in ongoing operations under the authority of international organizations),</p> <p>explain the capacity and limits of risk assessment and prioritization in decision-making (e.g. specification of requirements for safety and reliability of technologies used for the protection of critical infrastructure, property and personnel, or the principles of preparation, planning and implementation of the decision-making process of a commander),</p> <p>explain general concepts and legal institutes in the area of</p>	<p>EU legislation and international standards or requirements for health and safety at work, protect safety and safety of technical equipment under international treaties and conventions, or the involvement of the Czech Republic in international security organizations),</p> <p>explain the positioning and the role of crisis management actors at different levels (e.g. demonstrate a broad knowledge of the activity of task force or individual workers in the systems of protecting critical infrastructure, property and people, or company crisis management especially in response to natural disasters, accidents and other emergencies, or elements of the Integrated Rescue System of the Czech Republic, or part of the state's armed force in ongoing operations under the authority of international organizations),</p> <p>express and identify the capacity and limits of risk assessment</p>	<p>informatics designed for utilization in the management of technologies of protecting critical infrastructure, property and personnel, or some specific information systems used in the armed force or concepts and methods of applied informatics designed for use in the management of technologies of protecting critical infrastructure, property and personnel),</p> <p>discuss and oppose international aspects of security, attitudes and aspirations of the Czech Republic (e.g. a deep and systematic knowledge of the activity of the EU bodies, the Czech Republic's involvement in international security organizations and associations),</p> <p>interpret the positioning and the role of crisis management actors at different levels (e.g. a deep and systematic knowledge of the activity of a task force, or emergency, flood and disease control committees at the central as well</p>

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
	Study programme graduates		
	<p>security and basic legislation governing internal or external security of the CR, of a company or another unit (e.g. the concept of security, crisis situation, emergency situation, what is the competence of public administration bodies or the rights and obligations of members of selected security bodies or the responsibilities of public authorities when defining security requirements for technical systems and monitoring their fulfilment, or legal regulations in the area of a state's internal and external security),</p> <p>explain the alternatives of the issue of protection of society in relation to social issues and in relation to human rights, in particular the protection of population and the environment during emergencies, protection of critical infrastructure and ensuring internal order and security (e.g. demonstrate the knowledge of possibilities of efficient use of</p>	<p>and prioritization in decision-making (e.g. specification of requirements for safety and reliability of technologies used for the protection of critical infrastructure, property and personnel, or the principles of preparation, planning and implementation of the decision-making process of a commander),</p> <p>interpret general concepts and legal institutes in the area of security and basic legislation governing internal or external security of the CR, of a company or another unit (e.g. the concept of security, crisis situation, emergency situation, what is the competence of public administration bodies or the rights and obligations of members of selected security bodies or the responsibilities of public authorities when defining security requirements for technical systems and monitoring their fulfilment, or the legal regulations in the area of a state's internal and</p>	<p>as regional level, or individual workers in systems of protecting critical infrastructure, property and personnel, or elements of the Integrated Rescue System of the Czech Republic),</p> <p>oppose the possibilities and limitations on risk assessment and prioritization in decision-making (e.g. specification of requirements for safety and reliability of technologies used for the protection of critical infrastructure, property and personnel, or the principles of preparation, planning and implementation of the decision-making process of a commander, including relevant links and connections),</p> <p>discuss general concepts and legal institutes in the area of security and basic legislation governing internal or external security of the CR, of a company or another unit (e.g. the concept of security council, public</p>



# EDUCATION DESCRIPTORS

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
	<p>modern technologies to protect critical infrastructure, property and individuals, or health and safety at work and safety of an enterprise, or threats and their impact on environmental safety, or contemporary military technology and the possibilities of its use),</p> <p>depending on the needs, explain the options, conditions and restrictions on the use of specific standards for logistics, financial and personnel management in a security organization (such as the use of economic measures for crisis situations, or elements of logistics chains and their ties, or safety of logistic chains, or financial standards of resource management),</p> <p>depending on the needs, explain the possibilities of, conditions for and limitations on the use of computer systems in assessing security threats and risks (e.g. compliance with the principles of computer safety in the area</p>	<p>external security),</p> <p>interpret the alternatives of the issue of the protection of society in relation to social issues and in relation to human rights, in particular the protection of population and the environment during emergencies, protection of critical infrastructure and ensuring internal order and security (e.g. demonstrate a broad knowledge of possibilities of efficient use of modern technologies to protect critical infrastructure, property and individuals, or health and safety at work and safety of an enterprise, or threats and their impact on environmental safety, or contemporary military technology and the possibilities of its use),</p> <p>depending on the needs, interpret the possibilities of, conditions for and restrictions on the use of specific standards for logistics, financial and personnel management within a security organization (such as the use of</p>	<p>administration and its relation to safety or international organizations in the field of security and their binding directives or recommendations, or the responsibilities of public authorities when defining security requirements for technical systems and monitoring their implementation),</p> <p>discuss the issue of the protection of society in relation to social issues and in relation to human rights, in particular the protection of population and the environment during emergencies, protection of critical infrastructure and ensuring internal order and security (e.g. a deep and systematic knowledge of possibilities of efficient use of modern technologies to protect critical infrastructure, property and individuals, or threats and their impact on environmental safety, or contemporary military technology, the possibilities of its use),</p> <p>depending on the needs, discuss</p>



Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
			<p>the possibilities of, conditions for and limitations on the use of specific standards for logistics, financial and personnel management in a security organization (such as the use of economic measures for crisis situations, or financial resources to deal with emergencies, or allocation of material resources, or elements of logistics chains and their ties, or safety of logistic chains, or financial standards of resource management),</p> <p>depending on the needs, discuss the possibilities of, conditions for and limitations on the use of computer systems in the assessment of security threats and risks (i.e. the assessment of security situation in accordance with the applicable national and international standards, or compliance with the principles of computer security in the area of infrastructure for crisis management, or reliability of information systems in terms of</p>

PROFESSIONAL KNOWLEDGE

# EDUCATION DESCRIPTORS

PROFESSIONAL SKILLS	Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
	Study programme graduates			
	<p>identify the hazards and risks at their job level in the designated and known contexts,</p> <p>master safety management when presented with a specified task (e.g. practical skills of managing communication in crisis situations),</p> <p>master the planning of measures and managing emergencies in designated and known contexts,</p> <p>apply preventive security measures and knowledge of crisis management in specific and familiar contexts,</p> <p>master the defining of the scope and objectives of risk analysis, determining methods of retrieving input data, establishing the registry of dangers, screening risks and assessing their acceptability in performing their job,</p> <p>design material, technical and financial support to responding in emergency and crisis situations, including preparedness for these solutions in compliance with the specified task,</p>	<p>determine security policy in their company (e.g. co-operate on the preparation of the plan of emergency preparedness, internal emergency plan or the policy of assuring physical protection and safety of persons and property in the use of security technologies, security system topology of a company, or the principles of protection and defense of units and the use weapons and military equipment),</p> <p>apply safety management in their company (e.g. participate on selecting technologies to protect critical infrastructure, property and persons, or the principles of deploying armed forces in the crisis region, or the principles of using military equipment),</p> <p>identify the hazards and risks in their company (for example, co-operate on determining methods of identification and assessment of risks arising from the use of technology designed for</p>	<p>analyse security policy in their company (e.g. are capable of unassisted preparation of the plan of emergency preparedness, internal emergency plan or policy of assuring physical protection and safety of persons and property in the use of security technologies, security system topology of an organization, or the principles of protection and defense of units and the use weapons and military equipment),</p> <p>test and plan safety management in their company (e.g. capable of unassisted involvement in planning technology to ensure the protection of critical infrastructure, property and persons, or planning measures to ensure safety in training, combat use and maintenance of weapons and military equipment),</p> <p>analyse the hazards and risks in their company (for example, are capable of unassisted analysis of risks arising from the use of</p>	<p>making use of original research, they oppose and create theories, concepts and methods of prevention and elimination of security threats including the corresponding risks in terms of internal as well as external security of a state, a company or a citizen (e.g. land use plans and regulatory plans in terms of ensuring security, or crisis, emergency, defense and civil emergency plans or measures to ensure safety of population, or theories, concepts and principles applied in assuring protection of individuals as well as property in using security technology, or topology of security system of a company, or risks in relation to health and safety at work, safety of technology equipment, serious accidents, eco-terrorism, or principles of protection and defense of military units, utilizing weapons and military equipment),</p> <p>by means of original research,</p>

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
<p>demonstrate knowledge of the appropriate legal and technical standards in relation to their post (e.g. Czech Defence Standard Material Handling in Field Conditions),</p> <p>analyse risks at their job level in the designated and known contexts,</p> <p>at their job level, master the information and communication technology and information systems for the information-security solutions,</p> <p>(e.g. use of computers for collecting, processing, retrieving, utilizing and transferring data at their job level).</p>	<p>the protection of critical infrastructure, property and persons, or from the use of weapons),</p> <p>apply and design relevant legal provisions and technical regulations and standards within their organizational unit in addressing security issues in the sub-discipline depending on the study focus using standard and non-standard procedures (e.g. participate on the drafting of relevant legal provisions, regulations and standards governing the use of security technologies),</p> <p>implement and manage training and education in security studies in their company (e.g. participate on education and training in the area of safe use of technology of protecting critical infrastructure, property and persons, or participate on the management and control in education and training in the area of safe use of weapons and military equipment),</p>	<p>technology designed for protection of critical infrastructure, property and individuals, or from the use of weapons),</p> <p>analyse and develop relevant legal provisions and technical regulations and standards within their organizational unit in addressing security issues in the sub-discipline depending on the study focus using standard and non-standard procedures (e.g. are capable of unassisted drafting of relevant legal and technical provisions, regulations and standards governing the use of security technologies),</p> <p>analyse and assess training and education in security studies in their company (e.g. are capable of unassisted implementation of education and training in the area of safe use of technology of protecting critical infrastructure, property and persons, or participate on management and control in</p>	<p>compare and create concepts and methods of ensuring safety assessment in relation to the general management theory of control systems as well as in relation to integrated security (e.g. concepts and methods of evaluating immunity of systems for the protection of critical infrastructure, property and individuals against effects of intentional and unintentional external influences),</p> <p>formulate research procedures allowing for extending knowledge in the discipline of methodology of risk analysis (e.g. procedures of identification and evaluation of hazards and risks arising from the use of technology for the protection of critical infrastructure, property and individuals, or from the use of weapons and military equipment and activities associated with their maintenance),</p> <p>formulate and justify research procedures extending</p>

## PROFESSIONAL SKILLS

# SECURITY STUDIES

# EDUCATION DESCRIPTORS

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
	<p>identify elements of logistics chains in the area of security within their company (for example, contribute to determining economic measures for crisis situations, or defining the elements of supply chains linked to securing systems of protecting critical infrastructure, property and individuals, safe use of weapons and military equipment),</p> <p>implement and manage the use of information and communication technologies in their company (for example, co-operate on using specific information systems and software applications to address security issues depending on the study focus),</p> <p>use information to address the prevention and elimination of security threats in their organization (for example, interpret the effect of natural disasters or the impact of exceptional events of anthropogenic nature on the possibility of occurrence of operational accidents),</p>	<p>education and training in the area of safe use of weapons and military equipment),</p> <p>analyse elements of logistics chains in the area of security within their company (for example, are capable of unassisted determining of economic measures for crisis situations, or defining the elements of supply chains linked to securing systems of protection of critical infrastructure, property and individuals, safe use of weapons and military equipment),</p> <p>analyse and evaluate the use of information and communication technologies in their company (for example, are capable of unassisted use of specific information systems and software applications to address security issues depending on the study focus),</p> <p>analyse and evaluate information for devising solutions to prevent and eliminate security threats in their organization</p>	<p>knowledge in the field and enabling the design of new methodologies, procedures and prescriptive and technical regulations in the field of security (e.g. methodologies, procedures as well as prescriptive and technical adjustments associated with the use of security technology depending on the field of study),</p> <p>formulate and justify research procedures when addressing security, sovereignty and territorial integrity, political and democratic governance, protection of ecosystem, critical infrastructure and of the population (e.g. research methods for modelling physical protection of critical infrastructures and the assessment of its effectiveness, or researching methods to enhance combat effectiveness and reliability of weapons and military equipment),</p> <p>formulate and justify research procedures, analyse and evaluate aspects of ensuring safety in</p>

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
	<p>use information to apply security management within their company (e.g. structure and interpret information from task force or emergency force, armed force units or private security agencies),</p> <p>use risk management to assess the hazard and risk in their company (e.g. structure predictive assessment of safety and reliability of applied security technology or military technology),</p> <p>categorize and propose legal or technical regulations or standards in their company (e.g. get involved in the interpretation of technical regulations or standards for the use of technology to protect critical infrastructure, property and individuals),</p> <p>apply and put in practice the means of communication in the area of crisis management within their company (for</p>	<p>(e.g. propose solutions concerning safety and protection of personnel, equipment and material),</p> <p>analyse and assess information to apply security management within their company (e.g. are capable of unassisted use of information from task force or emergency force, armed force units or private security agencies),</p> <p>propose and control risk management to assess the hazard and risk in their organization (e.g. are capable of unassisted implementing of predictive assessment of safety and reliability of applied security technology or military technology),</p> <p>apply and assess legal or technical regulations or standards in their company (e.g. are capable of unassisted interpretation of technical regulations or standards for the use of technology to protect critical</p>	<p>creating and managing elements of a logistics chain put in practice in the condition of international security environment (e.g. methods of researching evaluation of immunity of security systems in transport in terms of intentional or unintentional cuts in power supply or the influence of electromagnetic fields or application of deterministic and stochastic methods of managing inventory under the conditions of uncertainty),</p> <p>through original research, analyse and produce supporting information-communication tools of risk assessment, data analysis and prioritization supporting management of companies or teams (e.g. analyse and create information systems for monitoring and evaluating operational reliability of systems for protection of critical infrastructure, property and individuals, or weapons and military equipment, or propose management</p>

## PROFESSIONAL SKILLS

# EDUCATION DESCRIPTORS

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
	<p>example, they take part in utilizing radio and telecommunications equipment),</p> <p>apply and put in practice the principles and practices of logistics in the field of security in their company (for example, interpret the principles and practices of logistics for ensuring safety of systems of protecting critical infrastructure, property and individuals, or methods of risk diversification, deterministic and stochastic methods of inventory management),</p> <p>categorize and design the use of information and communication technologies in their organization (e.g. participate on the use of management informatics tools for collecting, processing, evaluating and presenting data, or the use of systems for computer-aided designing of technology for the protection of persons and property, weapons and military equipment and monitoring its reliability in operation),</p>	<p>infrastructure, property and individuals),</p> <p>analyse and assess the means of communication in the area of crisis management within their company (for example, are capable of unassisted use of radio and telecommunications equipment),</p> <p>analyse and assess the principles and practices of logistics in the field of security in their company (for example, are capable of unassisted use of principles and practices of logistics for ensuring safety of systems of protecting critical infrastructure, property and individuals, or methods of risk diversification, deterministic and stochastic methods of inventory management),</p> <p>apply and assess the use of information and communication technologies in their company (e.g. are capable of unassisted use of management informatics</p>	<p>systems for controlling systems of physical protection),</p> <p>assess and evaluate research procedures used to define the requirements for a security system, competencies, duties and responsibilities of its component parts among each other (e.g. evaluate procedures of specifying requirements for reliability, safety and immunity of systems of physical protection and their elements, or security of weapons and military equipment),</p> <p>oppose research procedures allowing for extension of knowledge in internal security and public order, protection of the economy, critical infrastructure and national defense in emergency and crisis situations (e.g. develop researching methods of detecting the movement or individuals within a perimeter, or researching the use of safety devices to limit the movement of equipment around elements of critical infrastructure),</p>



Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
	<p>examine the concepts of security policy for the prevention and elimination of security threats in their company (e.g. get involved in utilizing the concepts of security technologies designed to protect critical infrastructure, property and persons, or available weapons and military equipment),</p> <p>assess security management policy in their company (e.g. co-operate on synergy with the integrated rescue system, state administration bodies, or on command and management activity in the conditions of the armed force),</p> <p>compare the concepts of risk management to identify hazards and assess risks in their company (for example, participate on developing concepts of applying security technologies to protect critical infrastructure, property and persons, or manage risks of occupational safety, safety of technical</p>	<p>tools for collecting, processing, evaluating and presenting data, or systems for computer-aided designing of technology for the protection of persons and property, weapons and military equipment and monitoring its reliability in operation),</p> <p>analyse and propose concepts of security policies for preventing and eliminating security threats in their company (e.g. are capable of unassisted use of concepts of security technologies to ensure safety of critical infrastructure, property and persons, or of available weapons and military equipment, or emergency preparedness plans, internal emergency plans, or operating plans),</p> <p>analyse and propose security management practices in their company (e.g. are capable of unassisted implementation of procedures for protecting critical infrastructure, property and</p>	<p>justify and assess research methods in the area of methodology of risk analysis in its utilization for safeguarding security at the strategic level of government, security and rescue forces and security information and communication technologies (e.g. evaluate research procedures for assessing computer security in the area of infrastructure for crisis management, or for controlling systems for the protection of critical infrastructure, property and individuals, or research procedures for assessing the reliability of human-technology-environment system),</p> <p>assess and appreciate the aspects and impacts of legislation and legal standards in safeguarding security of the CR or institutions based on the international regulatory and legal institutes (e.g. evaluate aspects and impacts of legal and technical standards for utilizing technology for protecting critical infrastructure,</p>



# EDUCATION DESCRIPTORS

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
	<p>equipment, or concepts or the use of weapons and military equipment),</p> <p>compare practices arising from legal and technical regulations and standards in the field of crisis management in their company (e.g. take part in designing methods of using technology to protect critical infrastructure, property and individuals, or procedures of applied cryptography, or methods of using weapons and military equipment),</p> <p>examine the concepts of protection of society in relation to social issues and in relation to human rights within their company (e.g. procedures of logistic safety in the field of using weapons and military equipment),</p> <p>compare methods of ensuring logistic safety for the application of economic aspects of safety in their company (e.g. take part in sorting procedures of ensuring logistic safety in terms of</p>	<p>persons, or the tactics of using equipment at an increased risk), analyse and create concepts of risk management to identify hazards and assess risk in their company (e.g. are capable of unassisted implementing of concepts of utilizing security technologies of ensuring protection of critical infrastructure, property and persons),</p> <p>analyse and create practices arising from legal and technical regulations and standards in the field of crisis management in their company (e.g. are capable of unassisted implementing of methods of using technology to protect critical infrastructure, property and individuals, or procedures of applied cryptography, or methods of using weapons and military equipment),</p> <p>analyse and design concepts of protecting society in relation to societal issues and in relation to human rights in their company,</p>	<p>property and individuals, or weapons and military equipment in the Czech Republic in relation to international law),</p> <p>assess and appreciate the aspects and impacts of the man - security relation (e.g. develop research on the influence of human factors on the efficiency and reliability of technologies for the protection of critical infrastructure, or property and persons, or military equipment),</p> <p>justify and revise the broader context of application of logistics chains theory designed to optimize available resources and coordinate the activities of the team when eliminating security threats and minimizing the impact of security risks (e.g. evaluate concepts, methods and procedures of ensuring security in ground and air transport, or application of measures to eliminate terrorist threats or methods of identification, analysis and response to internal and</p>

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
	<p>protecting critical infrastructure, property and persons, or in identifying the level of security at the expense of available resources, or safety in the use of weapons and military equipment),</p> <p>examine the procedures of applied informatics within their company (e.g. participate on the use of software tools for crisis management, or for finding solutions to rescue and relief works, or the use of computer-aided design technology for the protection of persons and property including monitoring its reliability in operation, or the use of computer-aided designing of weapons and military equipment including monitoring its reliability in operation).</p>	<p>analyse and propose methods of ensuring logistic safety for the application of economic aspects of safety in their company (e.g. are capable of unassisted implementation of procedures of ensuring logistic safety in terms of protecting critical infrastructure, property and individuals, or in planning logistics support to military operations, or ensuring safety in the use of weapons and military equipment),</p> <p>analyse and propose procedures of applied informatics in their company (e.g. are capable of unassisted use of software tools for crisis management, or for finding solutions to rescue and relief works, or the use of computer-aided design technology for the protection of persons and the property including monitoring its reliability in operation, or the use of computer-aided designing of weapons and</p>	<p>external risks of logistic chains), oppose and valorize methods of applied informatics in the field of security management in unstable security environment (e.g. evaluate the use of systems for computer-aided designing of technology for the protection of individuals and property, or weapons and military equipment and monitoring its reliability in operation or systems for managing physical protection, or the use of tools of management informatics for devising solutions to job-related problems, including classification of algorithms).</p>

## PROFESSIONAL SKILLS

# SECURITY STUDIES

## CHARACTERISTIC OCCUPATIONS AND RELEVANT REGULATED OCCUPATIONS

These professions are listed in the table below. The data are compatible with the current terminology used in the classification of occupations (ISCO) maintained by the Czech Statistical Office and the database of regulated professions and activities in the Czech Republic maintained by the MEYS.

code	characteristic occupations
112	Senior government officials: 112 7 Executives in government authorities, administration authorities; 112 8 Senior officials in security;
114	Senior executives in political, special interest organizations and trade unions: 114 2 Senior executives in special interest organizations, trade unions and social organizations; 114 3 Senior executives in humanitarian and similar organizations;
115	Heads, secretaries and senior executives in district and municipal offices: 115 0 Heads (incl. Deputy Heads), secretaries and executives in district and municipal offices;
122	Senior executives in manufacturing and operations units of large institutions, businesses etc.: 122 9 Senior executives in units not listed elsewhere;
131	Executive officers and directors of small companies, organizations: 131 9 Executive officers, directors of small companies, institutions not listed elsewhere (education, culture, sports, healthcare etc.);
211	Researchers and experts in physics, chemistry and related fields: 211 9 Other researchers and experts in related fields not listed elsewhere;
212	Researchers and experts in mathematics, statistics and in related fields: 212 9 Researchers and experts in related fields not listed elsewhere;
213	Researchers and experts in computer technology: 213 9 Other experts dealing with computer technology not listed elsewhere;
214	Architects, designers, civil engineers and technicians and engineers (creative workers): 214 1 Head architects, architects and urban planners, city and town planners and transport network engineers; 214 2 Designers of buildings and premises, civil engineers; 214 3 Designers of electrical equipment, electrical engineers; 214 4 Designers of electronic systems and telecommunications networks, electrical engineers; 214 5 Designers and design engineers of machinery, mechanical engineers; 214 6 Chemical engineers, technologists; 214 7 Mining and metallurgy engineers, technologists, metallurgists; 214 9 Other architects, designers, design engineers and engineers not listed elsewhere;,,

code	characteristic occupations
231	Teachers - researchers and university teachers: 231 1 Teachers - researchers; 231 9 Other university teachers;
232	Secondary school teachers: 232 2 Teachers of vocational subjects; 232 3 Teachers of practical courses (not including masters - group 334);
233	Primary school and pre-school teachers: 233 1 Primary school teachers;
235	Teachers and teaching staff not listed elsewhere: 235 2 School inspectors; 235 9 Other qualified teachers not listed elsewhere;
315	Security, fire safety and final building acceptance technicians and health inspection and quality technicians: 315 1 Final building acceptance technicians and fire safety engineers, specialists in fire prevention and fire investigation (except firefighters - Grade 5); 315 2 Security technicians and health inspection and quality technicians;
322	Medical assistants, opticians and physiotherapists: 322 9 Paramedic;
343	Qualified administrative workers: 343 4 Workers in statistics and mathematics; 343 9 Other qualified administrative personnel not listed elsewhere;
344	Customs and tax officials and officials in related fields: 344 1 Customs officials;
345	Police inspectors and detectives: 345 1 Police inspectors, superintendents; 345 2 Investigators; 345 3 Detectives, Criminologists;
348	Professional athletes and sports professionals: 348 2 Coaches, trainers and officials in sports clubs and sports companies;
516	Security personnel: 516 1 Firefighters; 516 2 Workers in security authorities; 516 5 Security workers in transport; 516 9 Other security workers not listed elsewhere;
010	Members of the Army
code	regulated professions
69	International transport of nuclear waste under the scope specified by the implementing regulation
103	Fire safety technician
106	Special service technician of a company's fire safety unit
132	Technical and organization activity in fire safety
147	Providing services in the area of health and safety at work

code	regulated professions
157	Production of hazardous chemicals and hazardous chemical products and sale of chemicals and chemical products classified as very toxic and toxic
251	Processing risk assessment
297	Handling highly hazardous substances which can be misused to violate the prohibition of chemical weapons
407	Provision of technical services for the protection of persons and property
409	Surveillance of property and persons
458	Safety adviser for the transport of hazardous goods by road
459	Safety adviser for the transport of hazardous goods by rail
567	Safety adviser for the transport of hazardous goods
570	Control technician "ADR"
613	Purchasing and sale, lending, development, manufacture, repairs, adjustments, storage, transport, degradation and destruction of security material
615	Authorization for assessing hazardous properties of waste listed in Annex No. 2 to Act No. 185/2001 Coll. under the designation code H1, H2, H3-A,-B, H3, H12, H13 and H14
616	Authorization for assessing hazardous properties of waste listed in Annex No. 2 to Act No. 185/2001 Coll.
625	Health and Safety at Work Coordinator
650	Private Investigator Service

## RELATIONS TO OTHER SUBJECT AREAS

As we already mentioned, subject area "Security Studies" is characterized by its multidisciplinary. This fact has the effect that it is impossible to exclude any other subject area, which can be affected by Security Studies. The fields of study which fall under Security Studies often represent a special "superstructure" of other disciplines falling within other subject areas, but which are a significant complement to the area of security in terms of content as well as methodology. Currently, it is possible to find links to the following subject areas: economics, chemistry, earth sciences, civil engineering, electrical engineering, information technology and cybernetics, mechanical engineering and materials, mining and mineral processing, manufacturing industry, general medicine and dentistry, pharmacy, healthcare fields, transport and transportation services.

## 2.39 TRANSPORT AND TRANSPORTATION SERVICES

### A BRIEF DESCRIPTION OF THE CHARACTER, THEMATIC SCOPE AND HISTORY OF THE FIELD

Transport is a sector of national economy ensuring the movement of people and things. Transport allows for economic development of society as well as general increase in living standards. Transport service is required in manufacturing, commerce, it is provided to population and it is the most important component of mutually related activities in the production and circulation of goods (material flow) and in moving people. Transport plays a very important role as a linking component between production and consumers - end customers.

Transport can be generally defined as any moving of people or material goods, done either by using own power, or indirectly by using moving vehicles on roads. From economic perspective, transport maybe defined as a specific activity, comprising systematic relocation of people and material goods, which manifests in the socio-economic system of society through its (intangible) effects. The actual change of place, regardless of how it is done, is transportation, relocation or moving of persons and objects as a result of transport. Transportation is fully determined by the starting and the end point of the relocation process.

Logistics is closely related to transport and transportation service. The basic objective of logistics is to coordinate, synchronize and optimize all consecutive non-production activities, which are required for a flexible and economical achievement of desired effect. A logistics chain can be seen as a set of ongoing activities as the related consecutive elements of a process the aim of which is to achieve a flexible, cost-effective and timely compliance with the needs of customers standing at the final point of the chain. Customers provide the information and define the needs required to ensure supply of goods and related services. Transportation logistics is an integral part of logistics. Its subject of focus is to plan transport using transport networks. It coordinates and optimizes the movement of mail, deliveries and passengers (transportation elements) using transport networks.

The Prague Engineering School was founded in 1707 as the first public engineering school in Central Europe. In 1803, The Prague Engineering School was converted to a polytechnic school by the consent of the Emperor. The Prague Polytechnic existed under Prague University until 1815 when it separated. After the establishment of Czechoslovakia, the school was renamed as the Czech Technical University, from which the University of Railway Engineering in Prague separated in 1953 including its four faculties - the faculties of civil engineering, mechanical engineering, electrical engineering and transport engineering. Since 1960, the school moved to the town of Žilina changing its name to University of Transport and Communications in Žilina.

The idea of establishing a faculty of transportation sciences in the Czech Republic was receiving support from university teachers teaching at the University of Transport and Communications in Žilina. As the expected emergence of new transport faculties in Prague and Pardubice would not fully satisfy the demand in studying transportation sciences coming from Moravia and Silesia, there was a concept of future study of these disciplines in Ostrava. After the split of Czechoslovakia, the Faculty of Transportation was established as part of the Czech Technical University in Prague and the Jan Perner Transportation Faculty with the University of Chemical Technology in Pardubice which existed at that time. Also, the Faculty of Mechanical Engineering at the Technical University

of Ostrava established conditions for starting courses in new study specializations mostly focused on construction, operation and maintenance of rail vehicles and operations and maintenance of road vehicles. The field of Logistics is included in many programmes of study at transport faculties in many universities in the Czech Republic (The Faculty of Transportation Sciences at the Czech Technical University, Jan Perner Transportation Faculty at the University of Pardubice, the Institute of Transport at the Technical University of Ostrava, etc.), there is a separate programme of study in logistics taught at the University of Logistics in Pířev.

At the end of 2010, programmes of study focused on transport and logistics and corresponding fields were taught at 9 colleges and universities in the Czech Republic as part of 37 bachelor's degree programmes, and 28 master's degree programmes and at 7 tertiary vocational schools.

## PRIMARY FIELDS

**Technology of transport and transportation services** (including technology, economics, management, transport logistics and IT support using information systems), or **Technology and management of transport and transportation services** at higher levels of tertiary education.

## DEFINITION OF OBJECTIVES

**The subject** of study in the field of transport and transportation services is the process of relocating as a dynamic system from the technical, technological, economic and logistics viewpoint. Also, the relocation process is defined as a service related to all other relevant processes taking place in the society.

**The objective** of study in the field of transport and transportation services is to gain theoretical knowledge base in the field of engineering, technology, economics and logistics - specialist knowledge - linked to practical use - specialist skills - in applying the corresponding general competencies in the area of operational management, in the rationalization of transport and transportation processes using transport networks, processing and evaluation of projects, including technological and economic analysis of transport systems and the use of information technologies as information support to such services via information systems. The development of knowledge of legal regulations in transport as well as an emphasis on environmental aspect of education is part of study in the field of transport and transportation services.

**The objective of study** is to set up the conditions for successful activity in analysing and subsequent rationalization and optimization of existing technologies in organizing transport, in designing modern transport logistics systems and their efficient management, including prevention and management of crisis situations in traffic. The objectives of the field of study include mastering theoretical knowledge of transport logistics, transportation management and marketing, economic disciplines and other related subjects, as well as preparation of new university experts to tackle the challenges in transport as well as pro-active communication with foreign experts in this field. The knowledge basis includes international standards and regulation principles of business in network industries in the EU and worldwide. The aim of study is to provide theoretical education for future management professionals across the transport sector as well as in the business sector of other sectors of national economy.

The objective of **short cycle study programme** is to educate experts specializing in the field of transport or communications. The curricula should be designed primarily on the basis of foundations of theoretical and applied subjects of general base and their focus should be in the field of vocational subjects so that graduates are employable in specialized executive posts - specific qualifications, or



in lower operational management positions in departments of transport and communications ministry and companies involved in securing safety of vehicles and transport infrastructure. This programme assumes direct employability of graduates in specialized professions of productive practice, individual graduates of short-cycle study programme achieving excellent academic performance may continue in studying bachelor's programmes.

The aim of the **bachelor's degree programme** is to educate professionals with a broad knowledge and skills in the field of transport and communications. The curricula should be designed on theoretical and applied subjects of general base and vocational subjects so that graduates are employable in mid-level management positions in the field of transport and communications, in management posts in administration related to the discipline (both state administration and local administration) and in companies involved in securing safety of vehicles and transport infrastructure. Some graduates of bachelor's degree programmes achieving excellent academic performance may continue in studying master's degree programme.

The aim of **master's degree programme** of the structured study is to prepare highly qualified, university-educated professionals in the field of transport. The curricula are compiled of subjects of general theoretical base, deepening the theoretical basis of undergraduate studies, specialized subjects developing qualification in the relevant discipline and alternative as well as recommended subjects allowing for individual specialization and profiling of students so that graduates are employable in senior management positions in transport and communications, in executive and management positions (after gaining required experience) in transport and communications administration (both state administration and local administration) and in companies involved in securing safety of vehicles and transport infrastructure. Some graduates of master's degree programme achieving excellent academic performance may continue in studying the follow-up doctoral degree programme. Selected graduates are employable in research and teaching in the field of tertiary vocational education specializing in transportation.

The aim of the **doctoral degree programme** is to educate top experts in the field of transport. The curricula are designed with respect to the needs of individual specialization and profiling of students so that graduates are employable in senior management positions in departments of the Transport and Communications Ministry, so that they gain competence in research, in developing projects in applied research in the field of transport and transportation services, in administration and management of the sector as a whole (both in state administration and local administration) and in the management of companies involved in ensuring safety of transport vehicles and transport infrastructure. In terms of its content, the doctoral degree programme intersects with subject areas Economics, Mechanical Engineering and Materials, or Information Technology and Cybernetics.

## GENERAL PROFILE OF GRADUATES

Graduates of **short cycle study programme** demonstrate an understanding of the field and its scope within the narrow range of specialized occupations in the field of transport and transportation services having a corresponding theoretical knowledge for this qualification. They demonstrate the knowledge of the role of a particular type of transport and transportation services in the social context. They demonstrate the knowledge of technology, organizing, including operational planning and control, an overview as well as basic knowledge of economic concepts and methods, basic knowledge of logistics, mathematics, statistics and information technology needed for application in a narrower range of specialized professions. They demonstrate the knowledge of key legal standards in national as well as international context including issues related to health and safety at work. They demonstrate understanding of technological, economic and logistic links between means of transport and can apply them in order to devise solutions to practical problems, are able to coordinate the basic

technological processes for different types of transport, depending on the required specification, they are able to prepare the rationalization of technology for a given type of transport including public transport and integrated transport systems. They are capable of unassisted management of corresponding technical and operational documentation, are able to use information systems designed for controlling a selected mean of transport or a sector of transport or transportation services.

Graduates of **bachelor's degree programme** demonstrate a broad theoretical basis accompanied by systemic skills which they can effectively exploit under the specific conditions of practice. They demonstrate the knowledge of the role of transport and transportation services in society, knowledge of key economic aspects of transportation, of the function and definition of logistics chains, have an overview of the potential impacts of transport on the environment. They demonstrate general knowledge of the role of transport in social process and in international relationships, including legal and economic awareness.

They demonstrate a broad knowledge of transport technology, basic knowledge of logistics theories, concepts and methods, all in the context of international regulatory standards and business principles in network industries in the EU and in the world, basic knowledge of mathematics, statistics, key methods of operations research and information systems in transport. They demonstrate a good knowledge of intermodal transportation, integrated transport systems and forwarding. This basis is further developed by adding general economic disciplines and application subjects, focused on the economics of a transport company, transport management, marketing and others.

Graduates are capable of unassisted application of technological, economic and logistic knowledge in devising solutions to practical problems in various segments of transport and transportation services when presented with a broadly specified task. They are able to coordinate activities under technological processes of individual means of transport, while respecting the principles of safety, analyse the situation and suggest rationalization in the area of technology, are capable of unassisted management of technical and operational documentation associated with the control of technological processes. They are familiar with the operating regulations and technological procedures, are able to use information systems designed for transport control. They are able to apply basic research methods in devising solutions to practical problems (under expert guidance), they can prepare and carry out basic market research.

Graduates are able to hold positions in the lower and middle management in companies dealing with all means of transport, technical posts in public administration and businesses that carry out the transport process. They are able to hold unsupervised posts in forwarding and logistics companies and logistics centres.

Graduates of the **master's degree programme** demonstrate a broad and deep theoretical knowledge and understanding of the importance of transport and transportation services in the society, demonstrate an extensive knowledge of economic aspects of transport, knowledge of creation, operation and management of logistics chains, understanding of the possible effects of transport on the environment. They demonstrate a high degree of understanding of the interaction among technological, economic and logistical aspects of transport and transportation services in terms of their management. Graduates demonstrate a deeper understanding of the significance of key legal standards in the field of transport and transportation nationally as well as internationally. They demonstrate an understanding of the findings of related disciplines - especially technical - and are able to make use of these for transportation and shipping.

Graduates of the master's degree programme demonstrate a broad and deep knowledge of transport technology and management, a comprehensive knowledge of logistics theories, concepts and methods, all in the context of international regulatory standards and business principles in network industries in the EU and in the world. They demonstrate a deep knowledge of mathematics, statistics, operations research methods and information technology required to manage and upgrade transport

services. They demonstrate expert knowledge in the field of quality of transport processes and services and in controlling traffic in crisis situations. This basis is further developed by adding economic disciplines and application subjects, focused on the economy, economics of a transport company, transport management, marketing and management.

Graduates are able to coordinate and manage technological processes in transport while respecting the principles of safety, are able to prepare, design and manage the optimization of technology management processes in transport, effectively manage technical and operational documentation in terms of technology process management, are able to manage process information systems including their creative use. They demonstrate a comprehensive knowledge of operating regulations and technological procedures and are able to assess these critically, are capable of comprehensive utilization of information systems for transport management, are capable of independent application of selected research procedures in implementing, upgrading and optimizing transport, are able to prepare, out-source or carry out market research.

Graduates are able to hold management and executive posts in transport, forwarding and logistics companies, in state and local administration.

Graduates of **doctoral degree programmes** demonstrate a deep theoretical knowledge as well as understanding of the importance of transport and transportation services in the social context. They demonstrate understanding of the system of disciplines in transport as well as at the intersection with other fields. They demonstrate a comprehensive and systematic knowledge of theory, formation, function and management of logistic chains, practices, methods and tools in research in the field of transport technology and management, management of logistics in transport, a deep knowledge of process information systems in transport, the capability of creative applications of imaging transport processes in information systems.

Graduates of doctoral degree programmes are employable in positions focusing on unassisted and creative project work in different kinds of companies including science and research institutions. They demonstrate expertise for performing conceptual work at all management levels. Graduates are also capable of applying modern methods of economic management in transport and forwarding companies in terms of sustainable development as well as in research organizations and educational institutions.

# EDUCATION DESCRIPTORS

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
<p>the knowledge of the role of transport and transportation services in social context emphasizing a particular mean of transport, such as the knowledge of the structure and basics of technological processes of individual means of transport;</p> <p>an overview of economic aspects of transport and transportation services in a social context, such as basic economics, economy of a business entity in general, marketing in transport, basic knowledge of management;</p> <p>an understanding of the basic function and demarcation of logistics chains, for example, they are able to describe logistics systems in transport and transportation services;</p> <p>an understanding of the possible impact of transport and transportation services on the environment, for example, they are</p>	<p>a broad knowledge of the role of transport and transportation services in social context, such as knowledge of the structure, organization and processes of means of transport;</p> <p>the knowledge of key economic aspects of transport and transportation services in a social context, such as economics, economy of a business entity in general, marketing in transport, management;</p> <p>the understanding of the function and demarcation of logistics chains, for example, they are able to describe and explain logistics systems in transport and transportation services;</p> <p>an overview of the possible impact of transport and transportation services on the environment, for example, are able to compare the effects and impacts of different means of transport on the environment;</p> <p>a broad knowledge of the</p>	<p>a broad and deep understanding of the role of transport and transportation services in social context, such as the knowledge of the structure, organization and management of technological processes in individual means of transport;</p> <p>a broad knowledge of economic aspects of transport and transportation services in a social context, such as economics, economy of a business entity in individual types of transport, marketing in transport, management;</p> <p>a broad knowledge of creation, function and management of logistics chains, such as the knowledge of the theory of logistics and transport technology in transportation services;</p> <p>a deep understanding of the interaction of technological, economic and logistical aspects of transport services in terms of their management, for example,</p>	<p>a broad and deep understanding of transport as a system and its role in the social context;</p> <p>a knowledge and understanding of the latest theories, concepts and methods in the discipline internationally;</p> <p>a deep understanding of the system of disciplines in the field of transport as well as at the intersection with other disciplines;</p> <p>a complex systematic knowledge of theory of creating, operating and managing logistic chains;</p> <p>the knowledge of procedures, methods and methodological tools in research in the field of technology and management of transport, management and logistics in transport;</p> <p>the knowledge required for unassisted and creative project work in different kinds of companies including science and research institutions;</p>

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
<p>able to understand the effects and impacts of different means of transport on the environment;</p> <p>an overview of the technology of a selected type of transport and transportation services, such as what means of transport are used for transportation of various types of goods, they are able to design the use of transport, handling and automated equipment, prepare a timetable of transport processes for a selected mean of transport;</p> <p>an overview and basic knowledge of economic concepts and methods for a selected type of transport and transportation services, for example, they know the basic principles of creating calculations regarding transport and transpotation service performance, calculating transport indicators, demonstrate a basic knowledge of marketing;</p> <p>a basic knowledge of logistics</p>	<p>technology of transport and transportation services, such as what means of transport are used for transportation of various types of goods, they are able to compare and design the use of transport, handling and automated equipment, set up a timetable of transport processes;</p> <p>a basic knowledge of economic concepts and methods required for the studied discipline, for example, demonstrate the knowledge of the principles of creating calculations regarding transport and transportation service calculations, assessment of transport indicators, basic knowledge of marketing;</p> <p>a basic knowledge of logistics theories, concepts and methods in transport and transportation services, such as logistics technologies and their characteristics to the extent required to assess the suitability of their use in a particular case;</p>	<p>they demonstrate the knowledge of technological, economic and logistic processes regarding their control and are able to interconnect them;</p> <p>an understanding of the possible impact of transport and transportation services on the environment, for example, they are able to examine the effects and impacts of different means of transport on the environment;</p> <p>a broad and deep knowledge of the technology and the management of transport services, for example, they are able to design an appropriate technological process taking into account its economical side, technological complexity and logistic support as well as determine the schedule of transport processes;</p> <p>a comprehensive knowledge of economic theories, concepts and methods required for the studied discipline, for example, they demonstrate the knowledge</p>	<p>a comprehensive knowledge required for carrying out research work in a company and managing transport services, including planning and control;</p> <p>the understanding of concepts, methods and research problems of other relevant scientific disciplines, especially technical;</p> <p>the knowledge of the latest efficient scientific, technical and technological trends in transportation and related fields;</p> <p>a deep and broad knowledge of mathematics, statistics, key methods of operations research and information technology required for research activities in the discipline;</p> <p>the understanding of potential use of theories, concepts and methods of transportation and transport services in connection with related disciplines, especially technical, such as adjustment of technical parameters of road vehicles for use in logistics</p>

## PROFESSIONAL KNOWLEDGE



# EDUCATION DESCRIPTORS

PROFESSIONAL KNOWLEDGE			
Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
<p>concepts and selected methods in transport and transportation services, such as the knowledge of basic logistics technologies and their characteristics to the extent required for their use in a particular case;</p> <p>a basic knowledge of mathematics, statistics and information technology required for application in a particular field of study in a narrow range of specialized professions;</p> <p>an orientation in the organization of a selected type of transportation services, including operational planning and control, for example, they know the principles of defining rail operating schedules, transportation plans, transportation geography, technology of loading operations;</p> <p>an understanding of technological, economic, logistic concepts and links among individual types of transport under</p>	<p>a basic knowledge of mathematics, statistics, key operations research methods and information technology required for their application in practice;</p> <p>the knowledge of organizing transport and transportation services, including planning and control, for example, demonstrate the knowledge of the principles of defining rail operating schedules and transportation plans;</p> <p>the understanding of the links among the interrelated technological, economic, logistical and information concepts;</p> <p>the knowledge of principles of key legal standards for transport and transportation services in the national and international</p>	<p>of the principles and methods of creating calculations regarding transport and transportation service performance, they are able to assess transport indicators, demonstrate basic knowledge of marketing as well as management theories;</p> <p>a comprehensive knowledge of logistic theories, concepts and methods in transportation services, for example, they know logistics and transport technologies with regard to their use in a particular case;</p> <p>a deep knowledge of mathematics, statistics, methods of operations research and information technologies required to manage and upgrade transport services;</p> <p>a comprehensive knowledge of the organization and management of transport services with information support using process information systems including planning and control, for example, they know the principles</p>	<p>chains.</p>

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
<p>transportation services, such as in-house transport and its link to production and other processes, setting the course and relations among production, transport and storage activity;</p> <p>the knowledge of key legal standards nationally and internationally for a selected type of transport services, such as an overview of legal regulations and their significance for various types of transport and transportation services, including basic knowledge of health and safety at work.</p>	<p>contexts, including international regulatory standards and business principles in network industries, such as the summary of legal standards and their importance and impact on transport and transportation services, transportation geography, work safety.</p>	<p>and procedures for creating and managing the designing of rail operating schedules and transport plans;</p> <p>the understanding of potential use of theories, concepts and methods of transportation and transport services in connection with related disciplines, especially technical, such as adjustment of technical parameters of road vehicles for use in logistics chains.</p>	

PROFESSIONAL KNOWLEDGE

# TRANSPORT AND TRANSPORTATION



# EDUCATION DESCRIPTORS

PROFESSIONAL SKILLS		
Short-cycle programme	Bachelor's study programme	Master's study programme
Study programme graduates		
<p>when presented with a specific task, they can independently apply the technological, economic and logistical knowledge in solving practical problems in various segments of the transport and transportation services, such as coordination of vessel in water transport in compliance with the navigation schedule, coordination of rail transport in accordance with rail operating schedule, calculation proposals, processing of operational plans; they are able to coordinate the basic technological processes of different types of transport and transportation services while respecting the principles of work safety, such as the coordination of rail transport at the station as well as in the inter-station section, coordination of loading and unloading;</p> <p>based on given instructions, they are able to prepare supporting documents for rationalization in the area of technology of road,</p>	<p>can independently apply the technological, economic and logistical knowledge in devising solutions to practical problems in various segments of the transport and transportation services, such as traffic management in road transport, the management of rail operations in compliance with rail operating schedule, making calculations for a particular type of transportation, marketing, processing of operational plans; they are able to coordinate and manage technological processes in various types of transport while respecting the principles of work safety, such as designing and managing the process of loading and unloading;</p> <p>they can prepare, design and manage optimization of technological and control processes in the areas of road,</p>	<p>they can independently and, in a creative manner, apply the technological, economic and logistical knowledge when devising solutions to practical problems in various types of transport and transportation services, such as traffic management in road transport, the management of rail operations in compliance with rail operating schedule, making calculations for a particular type of transportation, marketing, processing of operational plans; they are able to coordinate and manage technological processes in various types of transport while respecting the principles of work safety, such as designing and managing the process of loading and unloading;</p> <p>they can prepare, design and manage optimization of technological and control processes in the areas of road,</p> <p>can fully exploit theories, concepts and methods in the field in the context of research activity; can monitor and evaluate new research practices of other disciplines and adequately apply these in a creative fashion or modify them for use in researching transport technologies, logistics technologies and economy of transport; can propose and make use of advanced research methods used in transport disciplines in such a way as to extend the knowledge in transport and applied disciplines through original research; are able to draw on specialist knowledge and work independently and creatively in order to identify and devise solutions to theoretical or practical problems in the transport discipline; are able to improve and develop theories, concepts and methods in the specialized field of technology and management of</p>

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
<p>rail, air, water and public transport, but also in integrated transport systems, such as selecting the type of handling and automated equipment for warehouse management;</p> <p>they can manage independently the relevant technical and operational documentation within the technological processes in transport and transportation services, such as keeping records of the fulfilment of rail operating schedule, reports of road transport, keeping operating records;</p> <p>they can describe the basic factors affecting operation of a company in terms of transport services, for example, they can prepare the economic and technological indicators for evaluation;</p> <p>they are able to detect and make use of information required for solving practical problems in a given segment of transport services;</p>	<p>modifications and changes to the timetables, selecting means of transport;</p> <p>are able to manage independently the appropriate technical and operational documentation in the management of technological processes in transport and transportation services, such as creating transportation plans, developing timetables;</p> <p>can identify factors affecting the operation of a transport and transportation service company, for example, they are able to evaluate the economic and technological indicators;</p> <p>can detect, classify, and interpret information required for devising solutions to practical problems in various segments of transport and transportation services, for example within the aforementioned examples;</p> <p>can detect, classify, and interpret information required for rationalization in the area of</p>	<p>rail, air, water and public transport, but also in integrated and intermodal systems, such as creating, editing, and changing timetables, selecting types of transport;</p> <p>they can optimize factors influencing the operation of a transport service company, such as price calculation, knowledge of technological and economic indicators and their evaluation;</p> <p>they can effectively keep technical and operational records as part of controlling technological processes in transport and transportation services, such as designing and managing the transport plan, developing timetables including their modifications and changes;</p> <p>they can independently retrieve, classify and interpret information required for devising solutions to practical problems in various segments of transport and transportation services;</p>	<p>transport and integrate them into a broader scientific knowledge; are able to produce new knowledge in a particular scientific area and be pro-active in terms of independent scientific work as well as teamwork;</p> <p>are able to use research practices in the field of technology and management of transport systems in complex and unpredictable situations in a global environment.</p>

## PROFESSIONAL SKILLS

# TRANSPORT AND TRANSPORTATION

# EDUCATION DESCRIPTORS

PROFESSIONAL SKILLS		
Short-cycle programme	Bachelor's study programme	Master's study programme
Study programme graduates		
<p>they can detect information required for rationalization in the area of technology of road, rail, air, water and public transport as well as in integrated systems;</p> <p>they are familiar with the operating rules and technological procedures of a particular type of transport and transportation services, such as regulations for ensuring the operation of individual transport modes within an organizational unit of a transport company;</p> <p>they can make use of information systems designed for the management of a particular type of section of traffic and transportation services;</p>	<p>technology of road, rail, air, water and public transport as well as in integrated and intermodal systems;</p> <p>are familiar with the operating rules and technological processes of transport and transportation services, such as the knowledge of traffic regulations, operating schedules;</p> <p>can make use of information systems designed for the management of traffic and transportation services;</p> <p>with the help of guidance, they can apply some of the basic research methods in devising solutions to practical problems in the area of transport services, such as data collection and analysis for evaluating operating activities</p> <p>within the given instructions, they can carry out basic market research in different segments of transport services, such as marketing research;</p>	<p>they can independently retrieve, classify, and interpret information required for optimization in the area of technology of road, rail, air, water and public transport as well as in integrated and intermodal systems;</p> <p>they demonstrate a comprehensive understanding of operating regulations and technological processes of transport and transportation services and are able to critically evaluate them, for example, a comprehensive knowledge of traffic regulations, operating schedules, directives and regulations in a selected type of transport;</p> <p>they can thoroughly make use of information systems designed for the management of traffic and transportation services;</p> <p>they are able to independently and comprehensively apply certain research practices</p>

Short-cycle programme	Bachelor's study programme	Master's study programme	Doctoral study programme
Study programme graduates			
	when given instructions, they can apply the selected basic research procedures in the implementation, upgrade and optimization of transport and transportation systems, including integrated systems, such as evaluation of effectiveness, modifications and changes to	when implementing, upgrading and optimizing transport systems, such as analysis and synthesis of data for evaluating operational activity, modelling of technological processes; they can independently prepare, outsource and/or conduct	

PROFESSIONAL SKILLS

# TRANSPORT AND TRANSPORTATION

## CHARACTERISTIC OCCUPATIONS AND RELEVANT REGULATED OCCUPATIONS

Examples of typical jobs - graduates of **short cycle study programme**:

- independent logistician in transport,
- air transport technician,
- flight data operator,
- worker in transport infrastructure,
- independent transport officer,
- independent officer in forwarding (freight forwarding officer),
- independent customs agent,
- independent logistician in warehouse operations,
- executive officer in dispatching.

Examples of typical jobs - graduates of **bachelor's degree programme**:

- independent logistician,
- independent logistician in warehouse operations,
- independent logistician in transport,
- independent officer in rail transport,
- independent technician in rail transport,
- rail transport controller,
- independent technician in shipping - controller,
- independent technician in road transport,
- independent traffic manager in road transport,
- rail vehicle controller,
- mechanic,
- train dispatcher,
- air traffic controller,
- air traffic controller in air navigation and terminal services,
- logistics manager.

Examples of typical jobs - graduates of **master's degree programme** :

- air traffic engineer,
- shipping engineer - clerk,
- road transport engineer,
- road transport manager,
- chief officer in road transport,
- rail transport engineer,
- rail transport supervisor,
- rail traffic supervisor,
- operations controller in rail transport,
- logistics specialist,
- logistics specialist in transport,
- logistics director,
- operations specialist in Rail Authority,
- inspector of aerial works,
- air traffic inspector,
- general aviation inspector,
- air traffic management inspector,
- navigation supervisor,
- specialist in transport administration for a local authority unit,

specialist in transport system and transport service for a local authority unit,  
specialist in transport and road management for a local authority unit.

#### RELATIONS TO OTHER SUBJECT AREAS

Subject area Transport and Transportation Services is closely tied especially to the following subject areas:

economics,  
mechanical engineering and materials,  
civil engineering,  
information technology and cybernetics,  
informatics.

# ANNEX 1

## EXPERT GROUPS OF THE Q-RAM PROJECT FOR THE DEMARCATION AND DESCRIPTION OF THE SUBJECT AREAS

The list includes experts involved exclusively in the development of subject areas under the IPn Q-RAM. The project team wishes to thank several dozens of other experts, who provided informal consultations on issues and problems over the course of project's development.

### **Subject areas Psychology, Educational Studies, Pedagogy for Non-teachers, Physical Education and Sports, Kinanthropology:**

doc. PhDr. Felix Černoš, CSc., College of International and Public Relations Prague

prof. PhDr. Jiří Mareš, CSc., Charles University in Prague, Faculty of Medicine in Hradec Králové

doc. PhDr. Jiří Němec, Ph.D., Masaryk University, Faculty of Education

PhDr. Eva Pasáčková, CSc., University of West Bohemia, Faculty of Education

prof. PhDr. Milan Pol, CSc., Masaryk University, Faculty of Arts

prof. RNDr. Antonín Rychtecký, CSc., Charles University in Prague, Faculty of Physical Education and Sport

doc. PhDr. Vladimír Řehan, CSc., Palacký University Olomouc, Philosophical Faculty

prof. Dr. Gabriel Švejda, CSc., The College of European and Regional Studies, České Budějovice

doc. PaedDr. Jaroslava Vašutová, Ph.D., Charles University in Prague, Faculty of Education

prof. PhDr. Marie Vítková, CSc., Masaryk University, Faculty of Education

### **Subject areas Art and Art Sciences, Philosophical Sciences and Religious Studies, History, Philology, Anthropology, Theology:**

PhDr. Michal Bregant, Academy of Performing Arts in Prague, Film and TV School

doc. Ing. Marie Dohnalová, CSc., Charles University in Prague, Faculty of Humanities

doc. Petr Chalupa, Th.D., Palacký University in Olomouc, The SS. Cyril and Methodius Faculty of Theology

prof. PhDr. Zdeněk Jirásek, PhD., Silesian University in Opava, The Faculty of Philosophy and Science

prof. PhDr. Mgr. Tomáš Knoz, Ph.D., Masaryk University, Faculty of Arts

doc. Mgr. Josef Kružík, Ph.D., Charles University in Prague, Faculty of Humanities

doc. PaedDr. Iva Málková, Ph.D., University of Ostrava, Faculty of Arts

prof. MgA. Ing. Ivo Medek, Ph.D., Janáček Academy of Music and Performing Arts in Brno

prof. PhDr. Miroslav Plešák, Janáček Academy of Music and Performing Arts in Brno, Faculty of Theatre



doc. Mgr. Irena Radová, Ph.D., Masaryk University, Faculty of Arts

Mgr. Zdeněk A. Tichý, Academy of Performing Arts in Prague, Faculty of Theatre

doc. ThDr. Martin Wernisch, Charles University in Prague, Protestant Theological Faculty

**Subject areas Economics, Law, Social Work, Political Sciences, Sociology, Media Studies:**

doc. PhDr. Stanislav Balík, Ph.D., Masaryk University, Faculty of Social Studies

doc. PhDr. Jiří Buriánek, Ph.D., Charles University in Prague, Faculty of Arts

Mgr. Ing. Ondřej Fischer, Charles University in Prague, Protestant Theological Faculty

prof. JUDr. Zdenka Gregorová, CSc., Masaryk University, Faculty of Law

prof. PhDr. Jan Jiráček, Ph.D., Charles University in Prague, Faculty of Social Sciences

Ing. Michal Karpíšek, MSc., Czech Association of Schools of Professional Higher Education, Prague

doc. Ing. Lenka Kaučková, CSc., VSB - Technical University of Ostrava, Faculty of Economics

doc. Ing. Alena Kocmanová, Ph.D., Brno University of Technology, Faculty of Business and Management

prof. Ing. Jiří Kraft, CSc., Technical University of Liberec

doc. Ing. Ivana Kraftová, CSc., University of Pardubice

Mgr. Lenka Krhutová, Ph.D., Union of Employers' Associations

PhDr. Blažena Křížová, Ministry for Regional Development

doc. Ing. Jiří Marek, CSc., Union of Employers' Associations

doc. PhDr. Ing. Oldřich Matoušek, CSc., Charles University in Prague, Faculty of Arts

prof. PhDr. Libor Musil, CSc., Masaryk University, Faculty of Social Studies

prof. Ing. Petr Němeček, DrSc., Brno University of Technology, Faculty of Business and Management

Mgr. Lukáš Novotný, M.A., Ph.D., Jan Amos Komenský University Prague, s.r.o.

Ing. Zdeňka Petrů, University of Economics in Prague, Faculty of International Relations

Mgr. Klára Poláčková, LL.M., International Court of Justice in The Hague

RNDr. PaedDr. Jaromír Rux, CSc., College of Polytechnics Jihlava

JUDr. Ing. Josef Staša, CSc., Charles University in Prague, Faculty of Law

prof. Ing. Gustav Tomek, DrSc., Czech Technical University in Prague, Faculty of Electrical Engineering

Ing. Jiří Zeman, Ph.D., University of Economics in Prague, Faculty of International Relations

doc. PhDr. Milan Znoj, CSc., Charles University in Prague, Faculty of Arts

**Subject areas Mathematics and Statistics, Physics, Chemistry, Earth Sciences, Informatics, Biology and Ecology:**

RNDr. Vladimír Krajčík, Ph.D., Ostrava Business School, a.s.

doc. RNDr. Jiří Langer, CSc., Charles University in Prague, Faculty of Mathematics and Physics

Mgr. Ondřej Lexa, Ph.D., Charles University in Prague, Faculty of Science  
 prof. RNDr. Luděk Matyska, CSc., Masaryk University, Institute of Computer Science  
 doc. RNDr. Jan Pícek, CSc., Technical University in Liberec, Faculty of Education  
 doc. RNDr. Jan Staněk, CSc., Institute of Chemical Technology Prague  
 RNDr. Aleš Špičák, CSc., Geophysical Institute of the Academy of Sciences  
 doc. PaedDr. RNDr. Milada Švecová, CSc., Charles University in Prague, Faculty of Science

**Subject areas Architecture, Civil Engineering, Electrical Engineering, Energy, Information Technology, Mechanical Engineering and Materials, Mining and Mineral Processing, Manufacturing Industry:**

Ing. Josef Beneš, CSc., Centre for the Study of Higher Education, v.v.i., Prague  
 prof. Ing. Radek Čada, CSc., VSB - Technical University of Ostrava, Faculty of Mechanical Engineering  
 prof. Ing. Jaroslav Dvořáček, CSc., VSB - Technical University of Ostrava, Faculty of Mining and Geology  
 prof. Ing. Jan Maxmilián Honzík, CSc., Brno University of Technology, Faculty of Information Technology  
 prof. Ing. František Hrdlička, CSc., Czech Technical University in Prague, Faculty of Mechanical Engineering  
 prof. Ing. Alena Kouhoutková, CSc., Czech Technical University in Prague, Faculty of Civil Engineering  
 Ing. Petr Richter, Secondary Technical School and Business Academy in Čáslav  
 prof. Ing. Petr Sáha, CSc., Tomas Bata University in Zlín  
 doc. Dr. Ing. Eduard Sojka, VSB – Technical University of Ostrava, Faculty of Electrical Engineering and Computer Science  
 RNDr. Miloslav Švec, CSc., Brno University of Technology  
 prof. Ing. Petr Vavřín, DrSc., Brno University of Technology, Faculty of Electrical Engineering and Communication

**Subject areas Agriculture, Forestry, Veterinary Medicine, Veterinary Hygiene, Food Industry:**

doc. Ing. Petr Čermák, Ph.D., Mendel University in Brno  
 prof. MVDr. et RNDr. Petr Hořín, CSc., University of Veterinary and Pharmaceutical Sciences Brno  
 prof. MVDr. Alois Nečas, Ph.D., University of Veterinary and Pharmaceutical Sciences Brno  
 doc. MVDr. Radko Rajmon, Ph.D., Czech University of Life Sciences Prague, Faculty of Agrobio-  
 logy, Food and Natural Resources  
 prof. MVDr. Iva Steinhäuserová, CSc., University of Veterinary and Pharmaceutical Sciences Brno  
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## ANNEX 2

### THE RELATIONSHIP BETWEEN THE SYSTEM OF SUBJECT AREAS AND THE ISCED AND KKOV CLASSIFICATIONS

ISCED 97 (level 2)		Subject areas under Q-RAM	KKOV (groups of disciplines)	
46	Mathematics and Statistics	Mathematics and Statistics	11	Mathematics
44	Sciences about Inanimate Nature	Earth Sciences	12	Geology Fields
			13	Geography Fields
		Chemistry	14	Chemistry Fields
			28	Engineering chemistry and chemistry of silicates
		Physics	17	Physical Fields
42	Life Sciences	Biology and Ecology	15	Biology Fields
			16	Ecology and Environmental Protection
48	Informatics	Informatics	18	Informatics Fields
52	Engineering Sciences and Engineering Disciplines	Mechanical Engineering and Materials	23	Mechanical Engineering and Mechanical Engineering Production
		Electrical Engineering	26	Electrical Engineering, Telecommunication and IT
		Information Technology and Cybernetics	39-02	Engineering Informatics
		Energetics	39-07	Energetics

54	Production and Processing	Food Industry	29	Food Industry and Food Chemistry
		Mining and Mineral Processing	21	Mining and Mining Geology, Metallurgy and Foundry
		Manufacturing	31	Textile Production and Clothing Industry
			32	Leather and Footwear Production and Processing of Plastics
			33	Wood Processing and Manufacture of Musical Instruments
			34	Printing, processing of paper, film and photography
58	Architecture and Civil Engineering	Architecture	35	Architecture
		Civil Engineering	36	Civil Engineering, Geodesy and Cartography
84	Transport and Communication Services	Transport and Transportation Services	37	Transport and Communications
62	Agriculture, Forestry and Fishing	Agriculture	41	Agriculture and Forestry
		Forestry		
64	Veterinary Practice	Veterinary Medicine, Veterinary Hygiene	43	Veterinary Practice and Prevention
72	Healthcare	General Medicine and Dentistry	51	Medical Sciences
			95	Military Healthcare
		Health Care	53	Healthcare
		Pharmacy	52	Pharmaceutical Sciences
31	Social and Behavioral Sciences	Economics	62	Economy
34	Business, Management and Administration		63	Economics and Administration
			64	Field Business
			65	Gastronomy, Hospitality and Tourism
			66	Business

31	Social and Behavioral Sciences	Sociology	67	Social Sciences
		Political Sciences		
		Social Work		
		Psychology	77	Psychology-related Disciplines
38	Law	Law	68	Law, Legal and Public Administration
22	Humanities	Philosophical Sciences and Religious Studies	61	Philosophy, Theology
		Theology		
		Anthropology		
		History	71	History-related Disciplines
		Philology	73	Philological Sciences
32	Journalism and Information	Media Studies	72	Journalism, Library Science and Information Science
81	Personal Services	Physical Education and Sports; Kinanthropology	74	Physical Education and Sports
14	Teacher Training and Pedagogy	Educational Studies:	75	Pedagogy, Educational Studies and Social Care
		Pedagogy for Non-Teachers		
21	Art	Art and Art Sciences	81	Theory and History of Art
			82	Art and Applied Art
86	Security Services	Security Studies	91	The Theory of Military Art
			39-08	Fire and Industrial Safety
			39-26	Military Technology



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