Support to strengthening the higher education system in Azerbaijan

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 Twinning project ENI/2018/395-401

#### A methodological compendium on

#### identifying and defining learning outcomes

**Introduction**

A methodological compendium on identifying and defining learning outcomes was developed within Activity 2.2 of component 2: Pilot Study Programme in Priority Areas are Improved to be More Student-Centred. The aim of this methodological compendium is to provide support for stakeholders of Azerbaijanian universities, especially teaching staff, and facilitate the transition from teacher-centred to student-centred approach in Azerbaijanian higher education.

The compendium material is made up of the following resources, which has been reduced to the essential guidelines for a brief explanation of the essential steps to be taken in writing learning outcomes within student-centred approach:

Student-Centred Learning -Toolkit for Students, Staff and Higher Education Institutions, European Students' Union and Education International, 2010;

Overview on Student Centred Learning in Higher Education in Europe: Research Study Brussels, European Students’ Union, 2015;

Kennedy D. Writing and using learning outcomes: a practical guide, Cork, University College Cork, 2006;

This compendium is also comprised of a set of learning outcomes, which were created by working groups composed of representatives of the universities of Azerbaijan.

#### What is student-centred teaching, learning and assessment approach?

Student-centred approach represents both a mind-set and a culture within a given higher education institution and is a learning approach which is broadly related to, and supported by, constructivist theories of learning. It is characterised by innovative methods of teaching which aim to promote learning in communication with teachers and other learners and which take students seriously as active participants in their own learning, fostering transferable skills such as problem-solving, critical thinking and reflective thinking (Student-Centred Learning -Toolkit for Students, Staff and Higher Education Institutions, European Students' Union and Education International, 2010).

Nine general principles underly student-centred approach (Student-Centred Learning -Toolkit for Students, Staff and Higher Education Institutions, European Students' Union and Education International, 2010):

Principle I: Student-centred approach requires an on-going reflexive process

Principle II: Student-centred approach does not have a “One-Size-Fits-All” solution

Principle III: Students have different learning styles

Principle IV: Students have different needs and interests

Principle V: Choice is central to effective learning in student-centred approach

Principle VI: Students have different experiences and background knowledge

Principle VII: Students should have control over their learning

Principle VIII: Student-centred approach is about enabling not telling

Principle IX: Learning needs cooperation between students and staff

The concept of learning outcomes forms the core conceptual basis for a student-centred higher education system. A description in terms of expected or desired learning outcomes should be a statement of what a learner is expected to know, understand, and be able to do at the end of a learning process. Expected learning outcomes should be customly written for every course and programme and written before the learning activity begins and evolve through dialogue between teacher and student throughout the learning activity (Overview on Student Centred Learning in Higher Education in Europe: Research Study. Brussels, European Students’ Union, 2015).

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#### What are the learning outcomes?

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| Learning outcomes are statements of what a student is expected **to know, understand and / or be able to demonstrate** after completion of a process of learning (*ECTS Users’ Guide*) |

This approach is referred to as an outcomes-based approach where learning outcomes are used to express what students should be capable of doing at the end of the process of learning. With the implementation of the Bologna Process, all modules and programmes throughout the participating countries must be expressed using learning outcomes (Kennedy D. Writing and using learning outcomes: a practical guide, Cork, University College Cork, 2006.)

*What is a purpose of learning outcomes?*

The use of learning outcomes as a type of common language for describing qualifications helps to make these qualifications clearer to other institutions, employers and those involved in evaluating qualifications.

The use of learning outcomes when describing programmes and subjects makes it very clear to students what they are expected to achieve by the end of the programme or module. This also assists students in the choice of programmes and in actively participating in student-centred learning (Kennedy D. Writing and using learning outcomes: a practical guide, Cork, University College Cork, 2006).

*What are the differences between Programme aim and learning outcomes?*

The aim of a programme is a broad general statement of the teaching intention, i.e. it indicates what the lecturer intends to cover in a block of learning. For example, the aim of a module could be “to introduce students to the basic principles of atomic structure” or “to provide a general introduction to the history of Ireland in the twentieth century”.

One of the advantages of learning outcomes is that they are clear statements of what the student is expected to achieve and how he or she is expected to demonstrate that achievement. Thus, learning outcomes are more precise, easier to compose and far clearer than aim.For example, the learning outcome of a module could be: at the end of the course the student should be able „to recognise and formulate problems that are amenable to energy management solutions“ or „to explain the social, economic and political effects of World War I on the post-war world“ (Kennedy D. Writing and using learning outcomes: a practical guide, Cork, University College Cork, 2006).

#### *Why write learning outcome statements?* (Kennedy D. Writing and using learning outcomes: a practical guide, Cork, University College Cork, 2006):

* Identifying outcomes is an effective way to review your curriculum and content. This leads to a more balanced and well-sequenced curriculum.
* It helps you design appropriate assessment and evaluation tools that accurately reflect the curriculum.
* The learning outcomes help inform everyone as to what new knowledge or skills they are intended to learn.
* Lecturers are able to evaluate the effectiveness of their teaching - have the outcomes been achieved.
* An instructional shift from teaching to learning is facilitated. The focus is on the learner rather than the lecturer.
* Students will know exactly what they are expected to learn, thus avoiding ambiguity.
* Students will know exactly how their learning will be assessed.
* Students begin to take more responsibility for their own learning when they know what they are expected to do and what standard they are expected to achieve.

**How to identify the learning outcomes?**

Programme learning outcomes should correlate with external reference documents(Picture 1). During the development of programme learning outcomes Higher Education Institutions must have consultations with labour market representatives. Guidelines how to transform Labour Market Intelligence into Higher Education curricula are developed under Activity 1.4 of the project (Annex 1). Guidelines for universities comprise the following recommendations: 1) Establish programme committees; 2) Aware of the importance of stakeholders’ opinion within internal quality assurance and competence development processes; 3) Undertake graduates career tracking and capacity building; 4) Ensure the engagement of employers in the improvement of the higher education system; 5) Review institutional strength and consider establishing smart specialisation action plan.

#### Picture 1

#### How to write the learning outcomes?

**Bloom’s taxonomy** (Picture 2) is frequently used for writing learning outcomes as it provides a ready-made **structure and list of verbs** (Annex 2). These verbs are the key to writing learning outcomes.

Picture 2



It is recommended to have a small number of important learning outcomes rather than a large number of superficial ones. There should be 5 – 10 learning outcomes for a programme. Programme learning outcomes describe the essential knowledge, skills and attitudes that it is intended that graduates of the programme will be able to demonstrate (Kennedy D. Writing and using learning outcomes: a practical guide, Cork, University College Cork, 2006).

Learning outcomes must be simply and clearly described and must be capable of being assessed, i.e. they should be written in a way that allows testing of whether or not the student has achieved the outcome (Annex 4) (Kennedy D. Writing and using learning outcomes: a practical guide, Cork, University College Cork, 2006).

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| ***The following guidelines may be of assistance when writing Learning Outcomes*** (Kennedy D. Writing and using learning outcomes: a practical guide, Cork, University College Cork, 2006)***:*** *When writing programme learning outcomes, it is common practice to use an initial statement like “On completion of this programme, it is expected that the students will be able to…”** Begin each learning outcome with an **active verb**, followed by the object of the verb followed by a phrase that gives the context.
* Use only **one verb** per learning outcome.
* Ensure that the learning outcomes of the subject **relate to the overall learning outcomes of the programme.**
* The learning outcomes must be **observable and measurable**.
* Ensure that the learning outcomes are **capable of being assessed**.
* When writing learning outcomes, bear in mind the **timescale** within which the outcomes are to be achieved. Ask yourself if it is **realistic to achieve** the learning outcomes within the time and resources available.

***Avoid:***• Vague terms like *know, understand, learn, be familiar with, be exposed to, be acquainted with, and be aware of*. These terms are associated with teaching objectives rather than learning outcomes. • Complicated sentences. If necessary, use more than one sentence to ensure clarity. **NOTE:**1. *When writing learning outcomes for programmes, it is important to ensure that, where applicable, the* ***learning outcomes for professional* *bodies*** *are incorporated into the programme outcomes – discuss learning outcomes with the representatives of the labour market.*
2. *Before finalising the learning outcomes, ask your colleagues and possibly former students if the learning outcomes make sense to them.*
 |

*Referring programme learning outcomes with subjects*

It is possible to use the mapping to help to get an overview of how the programme learning outcomes are covered within the various subjects offered in the programme. The coverage of each programme learning outcomes within the subjects may be shown in the form of a grid (Picture 3) (Kennedy D. Writing and using learning outcomes: a practical guide, Cork, University College Cork, 2006):

Picture 3

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Programme Learning Outcome** | Subject 1 | Subject 2 | Subject 3 | Subject 4 | Subject 5 |
| *Outcome 1* | X |  | X |  |  |
| *Outcome 2* |  | X |  | X |  |
| *Outcome 3* | X |  |  |  | X |
| *Outcome 4* |  | X |  |  |  |
| *Outcome 5* |  |  | X | X | X |
| *Outcome 6* | X |  |  |  |  |

How are Learning Outcomes linked to Teaching and Assessment?

The challenge for teachers is to ensure that there is alignment between teaching methods, assessment techniques, assessment criteria and learning outcomes. This connection between teaching, assessment and learning outcomes helps to make the overall learning experience more transparent and meaningful for students (Kennedy D. Writing and using learning outcomes: a practical guide, Cork, University College Cork, 2006).

A flowchart (Picture 4) may be of help in clarifying the steps involved in the development, refining and assessment of learning outcomes (Kennedy D. Writing and using learning outcomes: a practical guide, Cork, University College Cork, 2006).

Picture 4



Appropriate teaching, learning and assessment methods are required to enable the student to be empowered to know and to do at the end of the learning process. Teachers must designe and introduce active learning activities, like field trips, problem solving, note-taking with mind maps, short periods of discussions, etc. Common, active, cooperating learning between students and teachers and between students and students brings more benefits to the personal development of students’ knowledge and skills.

Accordingly, **student-centered**(active, cooperative) teaching and learning methods should be applied: students solve problems, answer questions, formulate questions of their own, discuss, explain, debate, brainstorm during class; work in teams on problems and projects within and outside the class.

Also, it is important to ensure that there is alignment between intended learning outcomes, teaching / learning methods and assessment methods. When writing learning outcomes, it is important to write them in such a way that they are capable of being assessed. The assessment of learning outcomes within student-centred approach requires a more complex assessment system, which would include more variety of assessment methods, because the components of a learning outcomes, i.e. knowledge, abilities, skills and values, predetermine a different technique and procedures of their assessment (Annex 3).

**ANNEXES**

**ANNEX 1.** **Guidelines how to transform Labour Market Intelligence into Higher Education curricula**

**To be inserted**

**ANNEX 2. PRACTICAL TOOLS OF BLOOM’S TAXONOMY FOR WRITING LEARNING OUTCOMES**





**ANNEX 3. Assessment methods and examples of assessment assignments**

|  |  |  |  |
| --- | --- | --- | --- |
| **Levels of cognition according to B. Bloom’s taxonomy** | **Verbs to be used when formulating purposes and learning outcomes** | **Assessment methods** | **Examples of assessment assignments** |
| **1. Knowledge** Reproduction and provision of information (theories, facts) from memory. The lowest level. | To know, to remember, to recognise, to reproduce facts, concepts, terms; to define, to describe classifications, criteria, methods, rules, theories, laws, consistent patterns, conventional signs, tendencies. | • Written, verbalquiz• Testing• Concept maps | • Open and closed-type questions / assignments:presentation of information / data (documents, texts, rules, dates, facts) from memory |
| **2. Understanding**Recognition of information, explanation of information using other words, rephrasing, description in another form. | To say in your own words, to translate (from one language into another), to rephrase, to interpret, to explain. | • Narration• Presentation• Written composition• Writing of a diary• Testing | • To explain the steps of carrying out a complicated assignment in your own words• To retell or translate a text read in a foreign language |
| **3. Application**Acquired knowledge (theories, rules, laws, etc.) is applied in a variety of new situations. | To apply, to select, to adapt, to modify, to recalculate, to prepare, to transform, to abstract, to specify. | • Practical studies• Testing | • To draw up a cost estimate using the pricelist• To assess the reliability of the test by applying the laws of statistics |
| **4. Analysis**The entirety is divided into components. | To separate, to distinguish, to establish elements, organisational principles, categories, relationship; to distinguish, to identify items, features that describe phenomena, peculiarities; to classify, to group into categories; to compare elements, relationship, subordination; to specify, to elaborate, to deduce, to contrast, to compare. | • Writing of essays• Project-related activities• Testing• Concept maps• Case analysis• Graphic methods | • To analyse the presented problem situation• To analyse the bibliographical source• To compare two phenomena, to distinguish similarities and differences |
| **5. Synthesis**Individual elements, components are united into one entirety, into a system. | To correlate, to tie components, to systematise; to summarise material, practical experience (verbally, in writing); to discover, to construct something new; to draft a plan of actions, reading material, a module, studies. To simulate, to formulate hypotheses, to draft a plan of verification of hypotheses; to prepare a methodological aid, to write a term paper. | • Compilation of a list of references• Construction of new models• Survey of references and other sources of information• Portfolio | • To draft a plan of actions• To formulate hypotheses and to draft a plan of verification thereof• To construct a theoretical model• To write a term paper |
| **6. Evaluation**Information, data, process, etc., are evaluated according to a variety of parameters and criteria; decisions are made and conclusions are presented. | To form an opinion, to assess, to evaluate, to reflect, to formulate assessment / quality criteria; to carry out expert assessment, to perform diagnostics, to diagnose; to make an assessment using the criteria, standards, collected information; To develop methods and instruments of assessment of practical activities; to reason, to present conclusions, to logically justify conclusions, to submit recommendations based on conclusions. | • Writing of essays• Research work• Projects (individual and group projects)• Case analysis• Portfolio• Preparation and delivery of presentations• Report | • To select the most efficient way of resolving the problem • To explain and justify the corporate budget• To prepare the research report and to submit recommendations based on conclusions• To diagnose the patient’s condition |

Source: T. Bulajeva, D. Lepaitė, D. Šileikaitė-Kaishauri. DEGREE PROGRAMME DEVELOPMENT. METHODOLOGICAL GUIDE FOR STUDY PROGRAMME TEACHERS, Vilnius, 2012.

**ANNEX 4.** **CHECKLIST FOR WRITING LEARNING OUTCOMES**

* Have I focussed on outcomes not processes, i.e. have I focussed on what the students are able to demonstrate rather than on what I have done in my teaching?
* Have I begun each outcome with an active verb?
* Have I used only one active verb per learning outcome?
* Have I avoided terms like *know, understand, learn, be familiar with, be exposed to, be acquainted with, and be aware of*?
* Are my outcomes observable and measurable?
* Are my outcomes capable of being assessed?
* Have I included learning outcomes across the range of levels of Bloom’s Taxonomy?
* Do all the outcomes fit within the aims and content of the programme?
* Have I the recommended number of outcomes (maximum of nine per programme)?
* Is it realistic to achieve the learning outcomes within the time and resources available?

Source: Kennedy D. Writing and using learning outcomes: a practical guide, Cork, University College Cork, 2006

**ANNEX 5. EXAMPLES OF Competences and PROGRAMME LEARNING OUTCOMES**

**Example 1. Programme Learning Outcomes for Chemical Engineering**

**Competences and learning outcomes of the study programmes in the study field of Chemical engineering**

The following general and professional competences shall be developed, and following learning outcomes should be attained within the study programme at Bachelor level:

|  |  |
| --- | --- |
| **Generic competences** | **Programme learning outcomes** |
| **1.** | Ability to communicate effectively in writing and orally in first and one foreign language | **1.1.** | To use language skills obtained in the field of chemistry and technology  |
| **1.2**  | To use language skills acquired in order to collect data from external sources and to exchange knowledge  |
| **2.** | Ability for abstract thinking, analysis and synthesis, and to develop argumentation with critical mind. | **2.1.** | To analyze a problem and to identify main requirements |
| **2.2** | To argument his/her opinion and have a critical approach for their results obtained |
| **3.** | Ability to identify, select, analyse and summarize various specialized resources to document a subject | **3.1.** | To identify to what extent the problem is relevant  |
| **3.2** | To analyze the outcomes obtained and compare them with outcomes obtained from other sources |
| **3.3**  |  To summarize the outcomes obtained and identify key points |
| **4.** | Ability to use digital tools of reference and rules of computer security to acquire, process, produce and disseminate information as well as to collaborate internally and externally | **4.1.** | To be able to use computer technologies in order to get knowledge from digital information sources  |
| **4.2** | To be able to analyze, process and share the data obtained |
| **5.** | Ability to plan and organise one’s own activities, self-learning and skills enhancement | **5.1** | To be able to plan and implement experiments and interprete the outcomes achieved |
| **6.** | Ability to act with social and environmental responsibility, civic awareness and ethical reasoning | **6.1** | To have an understanding of professional, ethical and safety issues and also responsibilities spesific for engineering |
| **7.** | Able to step back from a situation, self-evaluate and questioning himself in order to improve knowledge and skills | **7.1** | To have a critical approach toward one’s knowledge and skills and to be able to develop the skills obtained |
| **7.2**  | To be able to respect the opposite side’s views and reckon with others’ views |
| **8.** | Ability to establish their role and mission within an organization, to adapt and take initiatives. | **8.1** | To have a well-developed personality and to get actively involved in education and training process |
| **9.** | Ability to work as part of a team while being independent and responsible with respect to a project | **9.1** | To be able to work efficiently in multidisciplinary groups, in particular in projects that require engineering skills |
| **9.2** | To be able to build work-related activities based on relevant laws, legal acts, standards,methods and guidelines.  |
| **9.3** | To work out a strategy for his/her own personal and professional development in order to boost work efficiency in multidisciplinary working conditions.  |
| **Professional competences** | **Programme learning outcomes** |
| **1.** | Mobilize appropriate concepts and methods in the fields of mathematics, physics, biology, English langages and computer science and to address and solve problems in chemistry. | **1.1.** | To be able to solve complex problems in chemistry by using appropriate concepts of mathematics.  |
| **1.2.** | To be able to solve complex problems in chemistry by using appropriate methods and tools of computer sciences |
| **1.3.** | To be able to perform tasks and solve problems in chemistry by using technical supports or scientific document in english |
| **2.** | Mobilize, develop use and mastering of fundamental concepts and methods of all fields of organic, inorganic, analytical, physical and theoretical chemistry to address and solve global problems in chemistry  | **2.1.** | To be able to define a problem in rigorous scientific terms. |
| **2.2.** | To be able to formulate hypotheses and to develop a resolution process |
| **2.3.** | To be able to identify concept and methods of molecular and physical chemistry that are connected to a problem to solve |
| **2.4** | To be able to use and to implement concepts and methods of molecular and physical chemistry that are connected to a problem to solve |
| **3.** | Identify the different stages of experimental approach and lead independently and efficiently experimental protocol in organic, inorganic, analytical and physical chemistry. | **3.1.** | To be able to select, implement and document laboratory processes while carrying out a chemical synthesis |
| **3.2.** | To be able to obtain and/or extract chemical compounds using standard methods of synthesis |
| **3.3.** | To be able to isolate, purify and characterize compounds while carrying out a chemical synthesis |
| **4.** | Analyze criticaly experimental protocol and propose adapted improvements increasing efficiency and safety | **4.1.** | To be able to analyze, compare and select experimental protocols taking into account state of art, safety and efficiency |
| **4.2.** | To be able to test and modify experimental protocol taking into account state of art, safety and efficiency |
| **5.** | Choice and use appropriate scientific instruments and methods to study selected physical property or to characterized compounds or materials | **5.1** | To be able to select and use scientific instruments and methods to characterized or analyze compounds or materials |
| **5.2** | To be able to select and use scientific instruments and methods to study selected physical properties of compounds or materials |
| **6.** | Analyze, exploit and present experimental data using modelisation and/or taking into account sources of errors and uncertainty with a critical mind | **6.1** | To be able to take into account sources of errors and uncertainty with a critical mind and to use appropriate analysis software of datas |
| **6.2** | To be able to select or implement models and/or to use modelisation tools or softwares to study phenomena or properties  |
| **7.** | Identify specific regulations and implement the main prevention measures in terms of health, safety and environmental responsability | **7.1** | To be able to identify and support the various safety and regulatory isues related to the use of chemical products and experimental protocols |
| **7.2** | To be able to design protocols and processes for laboratory or companies that meet the economics, ecology and social aspects requirements |

The Master level general and professional competencies must be built up on the general and professional competencies acquired in the studies at Bachelor level. Additionally, graduate of Master level shall master the general and professional competences by achievement the following learning outcomes within the study programme at Master level:

|  |  |
| --- | --- |
| **Generic competences** | **Programme learning outcomes** |
| **1.** | Ability to work in a team, in an interdisciplinary and international environment | **1.1.** | To be able to work efficiently in multidisciplinary teams, in particular in projects that require engineering skills  |
| **1.2** | To be able to demonstrate a high level of language knowledge, communication, project and team management skills |
|  **1.3** | To be able to effectively act as a leader of a team of people with different qualifications  |
| **1.4** | To be able to work and communicate effectively both in national and international contexts  |
| **2.** | Ability to address and respond well to situations in a new and original ways within the given context |  **2.1** | To be able to apply innovative methods and develop new scientific methods while solving problems based on basic principles  |
|  **2.2**  | To be able to analyze and solve the problems with competitive technical indices and that are unusual or uncertain from a scientific point of view.  |
| **…** |  |
| **3.** | Ability to identify, analyse and define the significant elements constituting a problem in order to solve it effectively and with good criteria | **3.1** | To be able to determine how relevant the proble is  |
|  **3.2**  | To analyze the outcomes obtained and compare them with outcomes obtained from other sources |
|  **3.3** | To summarize the outcomes obtained and identify key points |
| **4.** | Ability to do fundamental and applied research and apply its results independently for solving tasks in new or unfamiliar environment, implement innovations | **4.1**  | To be able to perform, coordinate and document laboratory processes while carrying out a quantitative analysis |
| **4.2** | To be able to obtain and extract chemical compounds using standard methods and synthesis |
| **4.3**  | To be able to use innovative approaches aimed at practical solutions to problems  |
| **Professional competences** | **Programme learning outcomes** |
|  **1**  | Document in an exhaustive and synthetic way an emerging method, devices or system in his field of competencesIdentify, analyze and assimilate the main concepts of a whole production process | **…** |  |
|  |  |  |
| **2** | Build, plan and implement a production process project | **…** |  |
|  |  |  |
| **3** | Design and implement autonomously a new chemical engineering process using state of the art methods and equipments. | **…** |  |
|  |  |  |
| **4** | Formatting and presenting technology and engineering report |  |  |
| **5** | Integrate and contribute autonomously to a collaborative engineering project |  |  |

**Example 2. Programme Learning Outcomes for Primary school teacher**

**Competences and learning outcomes of the study programmes in the study field of Primary School teacher**

The following general and professional competences shall be developed and following learning outcomes should be attained within the study programme at Bachelor level:

|  |  |
| --- | --- |
| **Generic competences** | **Programme learning outcomes** |
| **1.** | Ability to communicate effectively in writing and orally in first and one foreign language  | **1.1.** |  |
| **…** |  |
| **2.** | Ability for abstract thinking, analysis and synthesis, and to develop argumentation with critical mind | **2.1.** |  |
| **…** |  |
| **3.** | Ability to identify, select, analyse and summarize various specialized resources to document a subject | **3.1.** |  |
| **…** |  |
| **4.** | Ability to use digital tools of reference and rules of computer security to acquire, process, produce and disseminate information as well as to collaborate internally and externally | **4.1.** |  |
| **…** |  |
| **5.** | Ability to plan and organise one’s own activities, self-learning and skills enhancement | **5.1.** |  |
| **…** |  |
| **6.** | Ability to act with social and environmental responsibility, civic awareness and ethical reasoning | **6.1.** |  |
| **…** |  |
| **7.** | Able to step back from a situation, self-evaluate and questioning him/ herself in order to improve knowledge and skills | **7.1.** |  |
| **…** |  |
| **8.** | Ability to appreciate and take into account the diversity and multiculturality of school pupils and students | **8.1.** |  |
| **…** |  |
| **9.** | Ability to engage in an individual and collective approach to professional development | **9.1.** |  |
| **…** |  |
| **Professional competences** | **Programme learning outcomes** |
|  **1.** | Ability to integrate the theoretical and didactic knowledge of various sciences (moral education, languages, mathematics, social and natural sciences, physical education, technologies and arts) and to develop the content of primary education | **1.1.** |  |
| **…** |  |
| **2.**  | Ability to explain the peculiarities of the development of the personality of the younger school age children under the influence of different environmental factors and base on its own professional activity | **2.1.** |  |
| **…** |  |
| **3.** | Ability to use various innovative educational tools, technologies, methodologies in the education process and to teach primary school pupils based on them | **3.1.** |  |
| **…** |  |
| **4.**  | Ability to develop and ensure a safe, learning-driven, pupil-centered environment, create conditions for pupils' values, social skills, comprehensive personal development and self-expression | **4.1.** |  |
| **…** |  |
| **5.** | Ability to build, implement and animate effective teaching and learning situations, taking into account the diversity of pupils | **5.1.** |  |
| **…** |  |
| **6.** | Ability to ensure learner's progress, assessment of achievements and feedback | **6.1** |  |
| **…** |  |
| **7.** | Ability to analyse individually and collectively its practices for professional development | **7.1** |  |
| **…** |  |

The Master level general and professional competencies must be built up on the general and professional competencies acquired in the studies at Bachelor level. Additionally, graduate of Master level shall master the general and professional competences by achievement the following learning outcomes within the study programme at Master level:

|  |  |
| --- | --- |
| **Generic competences** | **Programme learning outcomes** |
| **1.** | Ability to influence people and / or groups, anticipate the future and contribute the personal and professional development | **1.1.** |  |
| **…** |  |
| **2.** | Ability to address and respond well to situations in a new and original ways within the given context | **2.1.** |  |
| **…** |  |
| **3.** | Ability to identify, analyse and define the significant elements constituting a problem in order to solve it effectively and with good criteria | **3.1.** |  |
| **….** |  |
| **4.** | Ability to do fundamental and applied research and apply its results independently for solving tasks in new or unfamiliar environment, implement innovations | **4.1.** |  |
| **….** |  |
| **Professional competences** | **Programme learning outcomes** |
| **1.** | Ability to analyze, systematise, critically evaluate information, legal and political documents related to pre-school, pre-primary and primary education content development | **1.1.** |  |
| **…** |  |
| **2.** | Ability to build, write and plan a research project concerning the field of primary education | **2.1.** |  |
| **…** |  |
| **3.** | Implement autonomously a new educational sciences research problematic in the field of primary education | **3.1.** |  |
| **….** |  |
| **4.** | Contribute to the production of new materials or educational materials from recent results of educational research | **4.1.** |  |
| **….** |  |
| **5.** | Integrate and contribute autonomously to new collaborative pedagogical approaches like program approach and / or competence -based approach | **5.1.** |  |
| **….** |  |

**Example 3. Programme Learning Outcomes for Informatics and Math Teacher**

**Competences and learning outcomes of the study programmes in the study field of Informatics and Math teacher**

The following general and professional competences shall be developed and following learning outcomes should be attained within the study programme at Bachelor level:

|  |  |
| --- | --- |
| **Generic competences** | **Programme learning outcomes** |
| **1.** | Ability to communicate effectively in writing and orally in first and one foreign language  | **1.1.** |  |
| **…** |  |
| **2.** | Ability for abstract thinking, analysis and synthesis, and to develop argumentation with critical mind | **2.1.** |  |
| **…** |  |
| **3.** | Ability to identify, select, analyse and summarize various specialized resources to document a subject | **3.1.** |  |
| **…** |  |
| **4.** | Ability to use digital tools of reference and rules of computer security to acquire, process, produce and disseminate information as well as to collaborate internally and externally | **4.1.** |  |
| **…** |  |
| **5.** | Ability to plan and organise one’s own activities, self-learning and skills enhancement | **5.1.** |  |
| **…** |  |
| **6.** | Ability to act with social and environmental responsibility, civic awareness and ethical reasoning | **6.1.** |  |
| **…** |  |
| **7.** | Able to step back from a situation, self-evaluate and questioning him/ herself in order to improve knowledge and skills | **7.1.** |  |
| **…** |  |
| **8.** | Ability to appreciate and take into account the diversity and multiculturality of school pupils and students | **8.1.** |  |
| **…** |  |
| **9.** | Ability to engage in an individual and collective approach to professional development | **9.1.** |  |
| **…** |  |
| **Professional competences** | **Programme learning outcomes** |
|  **1.** | Ability to mobilize appropriate concepts and methods in the fields of mathematics / computer and informatics science to address simple problems and experiments in informatics | **1.1.** |  |
| **…** |  |
| **2.**  | Ability to apply disciplinary knowledge and their didactics with the most appropriate method | **2.1.** |  |
| **…** |  |
| **3.** | Ability to design and implement practical teaching to develop interest in mathematics / computer and informatics sciences, understanding their methods and identifying their fields of application | **3.1.** |  |
| **…** |  |
| **4.**  | Ability to build, implement and animate effective teaching and learning situations, taking into account the diversity of students  | **4.1.** |  |
| **…** |  |
| **5.** | Ability to organize and ensure a group operating mode that promotes student learning and socialization  | **5.1.** |  |
| **…** |  |
| **6.** | Ability to ensure learner's progress, assessment of achievements and feedback | **6.1** |  |
| **…** |  |
| **7.** | Ability to analyse individually and collectively its practices for professional development | **7.1** |  |
| **…** |  |

The Master level general and professional competencies must be built up on the general and professional competencies acquired in the studies at Bachelor level. Additionally, graduate of Master level shall master the general and professional competences by achievement the following learning outcomes within the study programme at Master level:

|  |  |
| --- | --- |
| **Generic competences** | **Programme learning outcomes** |
| **1.** | Ability to influence people and / or groups, anticipate the future and contribute the personal and professional development | **1.1.** |  |
| **…** |  |
| **2.** | Ability to address and respond well to situations in a new and original ways within the given context | **2.1.** |  |
| **…** |  |
| **3.** | Ability to identify, analyse and define the significant elements constituting a problem in order to solve it effectively and with good criteria | **3.1.** |  |
| **….** |  |
| **4.** | Ability to do fundamental and applied research and apply its results independently for solving tasks in new or unfamiliar environment, implement innovations | **4.1.** |  |
| **….** |  |
| **Professional competences** | **Programme learning outcomes** |
| **1.** | Ability to document in an exhaustive and synthetic way an educational research subject in his field of competences | **1.1.** |  |
| **…** |  |
| **2.** | Ability to identify, analyse and transfer main concepts of a research theme in a new and useful problematic | **2.1.** |  |
| **…** |  |
| **3.** | Ability to build, write and plan a starting research project concerning the field of education in mathematics / computer and informatics | **3.1.** |  |
| **….** |  |
| **4.** | Ability to implement autonomously a new mathematics / computer and informatics sciences research problematic in the field of informatics teaching | **4.1.** |  |
| **….** |  |
| **5.** | Ability to contribute to the production of new materials or educational materials from recent results of mathematics / computer and informatics research  | **5.1.** |  |
| **….** |  |
| **6.** | Ability to integrate and contribute autonomously to new collaborative pedagogical approaches like program approach and / or competence-based approach  | **6.1.** |  |
| **….** |  |

**Example 4. Programme Learning Outcomes for Foreign Language Teacher**

**Competences and learning outcomes of the study programmes in the study field of Foreign Language teacher**

The following general and professional competences shall be developed and following learning outcomes should be attained within the study programme at Bachelor level:

|  |  |
| --- | --- |
| **Generic competences** | **Programme learning outcomes** |
| **1.** | Ability to communicate effectively in writing and orally in first and one foreign language  | **1.1.** |  |
| **…** |  |
| **2.** | Ability for abstract thinking, analysis and synthesis, and to develop argumentation with critical mind | **2.1.** |  |
| **…** |  |
| **3.** | Ability to identify, select, analyse and summarize various specialized resources to document a subject | **3.1.** |  |
| **…** |  |
| **4.** | Ability to use digital tools of reference and rules of computer security to acquire, process, produce and disseminate information as well as to collaborate internally and externally | **4.1.** |  |
| **…** |  |
| **5.** | Ability to plan and organise one’s own activities, self-learning and skills enhancement | **5.1.** |  |
| **…** |  |
| **6.** | Ability to act with social and environmental responsibility, civic awareness and ethical reasoning | **6.1.** |  |
| **…** |  |
| **7.** | Able to step back from a situation, self-evaluate and questioning him/ herself in order to improve knowledge and skills | **7.1.** |  |
| **…** |  |
| **8.** | Ability to appreciate and take into account the diversity and multiculturality of school pupils and students | **8.1.** |  |
| **…** |  |
| **9.** | Ability to engage in an individual and collective approach to professional development | **9.1.** |  |
| **…** |  |
| **Professional competences** | **Programme learning outcomes** |
|  **1.** | Ability to apply knowledge of underlying assumptions in linguistics | **1.1.** |  |
| **…** |  |
| **2.**  | Ability to apply knowledge of underlying assumptions in literature | **2.1.** |  |
| **…** |  |
| **3.** | Ability to understandthe overall system of foreign language and establish connections between its elements | **3.1.** |  |
| **…** |  |
| **4.**  | Awareness of cultural specifics and civilization of the foreign language speaking countries: interdependence of language, culture, religion and socio-economic factors | **4.1.** |  |
| **…** |  |
| **5.** | Proficiency in the national language | **5.1.** |  |
| **…** |  |
| **6.** | Ability to perform at C1 level (active and passive skills) in foreign language | **6.1** |  |
| **…** |  |
| **7.** | Ability to communicate through translating, interpreting and rendering information | **7.1** |  |
| **…** |  |
| **8.** | Ability to choose and apply appropriatelanguage teaching, learning and assessment methods | **8.1** |  |
| **…** |  |

The Master level general and professional competencies must be built up on the general and professional competencies acquired in the studies at Bachelor level. Additionally, graduate of Master level shall master the general and professional competences by achievement the following learning outcomes within the study programme at Master level:

|  |  |
| --- | --- |
| **Generic competences** | **Programme learning outcomes** |
| **1.** | Ability to influence people and / or groups, anticipate the future and contribute the personal and professional development | **1.1.** |  |
| **…** |  |
| **2.** | Ability to address and respond well to situations in a new and original ways within the given context | **2.1.** |  |
| **…** |  |
| **3.** | Ability to identify, analyse and define the significant elements constituting a problem in order to solve it effectively and with good criteria | **3.1.** |  |
| **….** |  |
| **4.** | Ability to do fundamental and applied research and apply its results independently for solving tasks in new or unfamiliar environment, implement innovations | **4.1.** |  |
| **….** |  |
| **Professional competences** | **Programme learning outcomes** |
| **1.** | Ability to perform at C2 level (active and passive skills) in foreign language | **1.1.** |  |
| **…** |  |
| **2.** | Ability to use knowledge of philological research methods from a historical and contemporary perspective | **2.1.** |  |
| **…** |  |
| **3.** | Ability to apply knowledge of conceptual provisions of an education system | **3.1.** |  |
| **….** |  |

**Example 5. Programme Learning Outcomes for Geography**

**Competences and learning outcomes of the study programmes in the study field of Geography**

The following general and professional competences shall be developed and following learning outcomes should be attained within the study programme at Bachelor level:

|  |  |
| --- | --- |
| **Generic competences** | **Programme learning outcomes** |
| **1.** | Ability to communicate effectively in writing and orally in first and one foreign language | **1.1.** |  |
| **…** |  |
| **2.** | Ability for abstract thinking, analysis and synthesis, and to develop argumentation with critical mind | **2.1.** |  |
| **…** |  |
| **3.** | Ability to identify, select, analyse and summarize various specialized resources to document a subject | **3.1.** |  |
| **…** |  |
| **4.** | Ability to use digital tools of reference and rules of computer security to acquire, process, produce and disseminate information as well as to collaborate internally and externally | **4.1.** |  |
| **…** |  |
| **5.** | Ability to plan and organise one’s own activities, self-learning and skills enhancement | **5.1.** |  |
| **…** |  |
| **6.** | Ability to act with social and environmental responsibility, civic awareness and ethical reasoning | **6.1.** |  |
| **…** |  |
| **7.** | Ability to step back from a situation, self-evaluate and questioning himself in order to improve knowledge and skills | **7.1.** |  |
| **…** |  |
| **8.** | Ability to establish their role and mission within an organization, to adapt and take initiatives | **8.1.** |  |
| **…** |  |
| **9.** | Ability to work as part of a team while being independent and responsible with respect to a project | **9.1.** |  |
| **…** |  |
| **Professional competences** | **Programme learning outcomes** |
|  **1.** | Ability to use fundamental knowledge of physical (study field of physical geography) and social (study field of human geography) phenomena and their qualitative and quantitative expression | **1.1.** |  |
| **…** |  |
| **2.**  | Ability to apply knowledge on changes happening in nature (physical geography field) and society (human geography field) and their interaction in space and time, the extent of critical changes and their forecast | **2.1.** |  |
| **…** |  |
| **3.** | Ability to monitor and measure quantitative and qualitative aspects of physical (physical geography field) or human phenomena (human geography field), independently carry out monitoring in nature observations, document information and present research reports | **3.1.** |  |
| **…** |  |
| **4.**  | Ability to carry out expertise on territorial processes, plan, regulate and manage socio-economic (human geography field) and nature management (physical geography field) activities | **4.1.** |  |
| **…** |  |
| **5.** | Ability to create maps representing spatial distribution of events and processes and collect, structure and analyse geo-referenced data using geographic information systems (GIS) technology, mathematical and statistical techniques | **5.1.** |  |
| **…** |  |
| **6.** | Ability to responsibly evaluate social, cultural, economic and political indicators and changes of social life as well as interaction between nature and society | **6.1** |  |
| **…** |  |

The Master level general and professional competencies must be built up on the general and professional competencies acquired in the studies at Bachelor level. Additionally, graduate of Master level shall master the general and professional competences by achievement the following learning outcomes within the study programme at Master level:

|  |  |
| --- | --- |
| **Generic competences** | **Programme learning outcomes** |
| **1.** | Ability to work in a team, in an interdisciplinary and international environment | **1.1.** |  |
| **…** |  |
| **2.** | Ability to address and respond well to situations in a new and original ways within the given context | **2.1.** |  |
| **…** |  |
| **3.** | Ability to identify, analyse and define the significant elements constituting a problem in order to solve it effectively and with good criteria | **3.1.** |  |
| **….** |  |
| **4.** | Ability to do fundamental and applied research and apply its results independently for solving tasks in new or unfamiliar environment, implement innovations | **4.1.** |  |
| **….** |  |
| **Professional competences** | **Programme learning outcomes** |
| **1.** | Ability to use methods to predict changes in nature (physical geography field) or society (human geography field) and their interaction in space and time, when solving practical problems | **1.1.** |  |
| **…** |  |
| **2.** | Ability to carry out expertise of physical (physical geography field) or human (human geography field) processes, regulating environmental exploitation (physical geography field) or socio-economic activities (human geography field), managing and planning. | **2.1.** |  |
| **…** |  |
| **3.** | Ability to plan, organise and conduct applied territory research, prepare corresponding reports and present them to the public | **3.1.** |  |
| **….** |  |
| **4.** | Ability to the sound orientation towards environmental protection (physical geography field) or social-economic field (human geography field) and land management | **4.1.** |  |
| **….** |  |

**Example 6. Programme Learning Outcomes for Biology- Ecology**

**Competences and learning outcomes of the study programmes in the study field of Biology-** **Ecology**

The following general and professional competences shall be developed and following learning outcomes should be attained within the study programme at Bachelor level:

|  |  |
| --- | --- |
| **Generic competences** | **Programme learning outcomes** |
| **1.** | Ability to communicate effectively in writing and orally in first and one foreign language | **1.1.** |  |
| **…** |  |
| **2.** | Ability for abstract thinking, analysis and synthesis, and to develop argumentation with critical mind | **2.1.** |  |
| **…** |  |
| **3.** | Ability to identify, select, analyse and summarize various specialized resources to document a subject | **3.1.** |  |
| **….** |  |
| **4.** | Ability to use digital tools of reference and rules of computer security to acquire, process, produce and disseminate information as well as to collaborate internally and externally | **4.1.** |  |
| **…** |  |
| **5.** | Ability to plan and organise one’s own activities, self-learning and skills enhancement | **5.1.** |  |
| **…** |  |
| **6.** | Ability to act with social and environmental responsibility, civic awareness and ethical reasoning | **6.1.** |  |
| **…** |  |
| **7.** | Able to step back from a situation, self-evaluate and questioning himself / herself in order to improve knowledge and skills | **7.1.** |  |
| **…** |  |
| **8.** | Ability to establish his / her role and mission within an organization, to adapt and take initiatives. | **8.1.** |  |
| **…** |  |
| **9.** | Ability to work as part of a team while being independent and responsible with respect to a project | **9.1.** |  |
| **…** |  |
| **Professional competences** | **Programme learning outcomes** |
| **1.** | Ability to mobilize fundamental concepts and technologies of molecular biology, biochemistry, cell biology, genetics, microbiology, physiology, immunology, life classification, developmental biology and evolution to address a problematic domain or analyze a research paper or presentation | **1.1.** |  |
| **…** |  |
| **2.** | Ability to mobilize the fundamental concepts of ecology and ecosystems to situate biological and physiological issues | **2.1.** |  |
| **…** |  |
| **3.** | Ability to identify and lead independently the different stages of an experimental procedure | **3.1.** |  |
| **….** |  |
| **4.** | Ability to identify, select and apply a combination of analytical tools (standard techniques, instrumentation) adapted to characterize organisms (from the bio-molecule to the individual in its complexity) and their operation at different levels of analysis (intracellular metabolism, biology and physiology of complex organisms, interactions between individuals and groups, interactions with the environment) | **4.1.** |  |
| **…** |  |
| **5.** | Ability to interpret experimental data to validate a model by comparing its predictions to experimental results. Identify sources of error, calculate uncertainty, assess validity limits. Exploit data acquisition and analysis software with a critical mind. | **5.1.** |  |
| **…** |  |
| **6.** | Ability to mobilize the concepts and tools of mathematics, physics, chemistry and computer science in the context of life sciences issues | **6.1.** |  |
| **…** |  |
| **7.** | Ability to identify specific regulations and implement the main preventive health and safety measures | **7.1.** |  |
| **…** |  |

The Master level general and professional competencies must be built up on the general and professional competencies acquired in the studies at Bachelor level. Additionally, graduate of Master level shall master the general and professional competences by achievement the following learning outcomes within the study programme at Master level:

|  |  |
| --- | --- |
| **Generic competences** | **Programme learning outcomes** |
| **1.** | Ability to work in a team, in an interdisciplinary and international environmentAbility to address and respond well to situations in a new and original ways within the given context | **1.1.** |  |
| **…** |  |
| **2.** | Ability to identify, analyse and define the significant elements constituting a problem in order to solve it effectively and with good criteria | **2.1.** |  |
| **…** |  |
| **3.** | Ability to work in a team, in an interdisciplinary and international environmentAbility to address and respond well to situations in a new and original ways within the given context | **3.1.** |  |
| **….** |  |
| **4.** | Ability to identify, analyse and define the significant elements constituting a problem in order to solve it effectively and with good criteria | **4.1.** |  |
| **….** |  |
| **Professional competences** | **Programme learning outcomes** |
| **1.** |  | **1.1.** |  |
| **…** |  |
| **2.** |  | **2.1.** |  |
| **…** |  |
| **3.** |  | **3.1.** |  |
| **….** |  |
|  |  |  |  |
|  |  |  |  |

**Example 7. Programme Learning Outcomes for Computer sciences**

**Competences and learning outcomes of the study programmes in the study field of Computer sciences**

The following general and professional competences shall be developed and following learning outcomes should be attained within the study programme at Bachelor level:

|  |  |
| --- | --- |
| **Generic competences** | **Programme learning outcomes** |
| **1.** | Ability to communicate effectively in writing and orally in first and one foreign language | **1.1.** |  |
| **…** |  |
| **2.** | Ability for abstract thinking, analysis and synthesis, and to develop argumentation with critical mind | **2.1.** |  |
| **…** |  |
| **3.** | Ability to identify, select, analyse and summarize various specialized resources to document a subject | **3.1.** |  |
| **….** |  |
| **4.** | Ability to use digital tools of reference and rules of computer security to acquire, process, produce and disseminate information as well as to collaborate internally and externally | **4.1.** |  |
| **…** |  |
| **5.** | Ability to plan and organise one’s own activities, self-learning and skills enhancement | **…** |  |
| **6.** | Ability to act with social and environmental responsibility, civic awareness and ethical reasoning |  |  |
| **7.** | Able to step back from a situation, self-evaluate and questioning himself / herself in order to improve knowledge and skills |  |  |
| **8.** | Ability to establish his / her role and mission within an organization, to adapt and take initiatives. |  |  |
| **9.** | Ability to work as part of a team while being independent and responsible with respect to a project |  |  |
| **Professional competences** | **Programme learning outcomes** |
| **1.** | Ability to characterize fundamental logical and algebraic tools (theory of languages and compilation, logic and reasoning, orders, induction) and their implications in programming and modeling | **1.1.** |  |
| **…** |  |
| **2.** | Ability to apply reasoned approaches to solve complex problems by decompositions and / or successive approximations and implement analysis methods to design applications and algorithms based on partially given specifications | **2.1.** |  |
| **…** |  |
| **3.** | Ability to choose, on objective criteria, the data structures and build the algorithms best suited to a given problem | **3.1.** |  |
| **….** |  |
| **4.** | Ability to design the computerized processing of information of different natures, such as data, images and texts, design, implement and operate databases | **4.1.** |  |
| **…** |  |
| **5.** | Ability to identify and characterize the main functional elements and hardware architecture of a computer, interpret the technical information provided by the constructors, write simple routines in machine language | **5.1.** |  |
| **…** |  |
| **6.** | Ability to characterize the operation of systems and networks, as well as practices, tools and techniques to ensure the security of computer systems during their development and use | **6.1.** |  |
| **…** |  |
| **7.** | Ability to explain and document the implementation of technical solution | **7.1.** |  |
| **…** |  |

The Master level general and professional competencies must be built up on the general and professional competencies acquired in the studies at Bachelor level. Additionally, graduate of Master level shall master the general and professional competences by achievement the following learning outcomes within the study programme at Master level:

|  |  |
| --- | --- |
| **Generic competences** | **Programme learning outcomes** |
| **1.** | Ability to work in a team, in an interdisciplinary and international environmentAbility to address and respond well to situations in a new and original ways within the given context | **1.1.** |  |
| **…** |  |
| **2.** | Ability to identify, analyse and define the significant elements constituting a problem in order to solve it effectively and with good criteria | **2.1.** |  |
| **…** |  |
| **3.** | Ability to work in a team, in an interdisciplinary and international environmentAbility to address and respond well to situations in a new and original ways within the given context | **3.1.** |  |
| **….** |  |
| **4.** | Ability to identify, analyse and define the significant elements constituting a problem in order to solve it effectively and with good criteria | **4.1.** |  |
| **….** |  |
| **Professional competences** | **Programme learning outcomes** |
| **1.** |  | **1.1.** |  |
| **…** |  |
| **2.** |  | **2.1.** |  |
| **…** |  |
| **3.** |  | **3.1.** |  |
| **….** |  |
|  |  |  |  |
|  |  |  |  |

**Example 8. Programme Learning Outcomes for Oil and gas engineering**

**Competences and learning outcomes of the study programmes in the study field of Oil and gas engineering**

The following general and professional competences shall be developed and following learning outcomes should be attained within the study programme at Bachelor level:

|  |  |
| --- | --- |
| **Generic competences** | **Programme learning outcomes** |
| **1.** | Ability to communicate effectively in writing and orally in first and one foreign language | **1.1.** |  |
| **…** |  |
| **2.** | Ability for abstract thinking, analysis and synthesis, and to develop argumentation with critical mind | **2.1.** |  |
| **…** |  |
| **3.** | Ability to identify, select, analyse and summarize various specialized resources to document a subject | **3.1.** |  |
| **….** |  |
| **4.** | Ability to use digital tools of reference and rules of computer security to acquire, process, produce and disseminate information as well as to collaborate internally and externally | **4.1.** |  |
| **…** |  |
| **5.** | Ability to plan and organise one’s own activities, self-learning and skills enhancement | **5.1.** |  |
| **…** |  |
| **6.** | Ability to act with social and environmental responsibility, civic awareness and ethical reasoning | **6.1.** |  |
| **…** |  |
| **7.** | Able to step back from a situation, self-evaluate and questioning himself / herself in order to improve knowledge and skills | **7.1.** |  |
| **…** |  |
| **8.** | Ability to establish his / her role and mission within an organization, to adapt and take initiatives. | **8.1.** |  |
| **…** |  |
| **9.** | Ability to work as part of a team while being independent and responsible with respect to a project | **9.1.** |  |
| **…** |  |
| **Professional competences** | **Programme learning outcomes** |
| **1.** | Ability to mobilize appropriate concepts and methods in fields of mathematics, physics, geosciences, chemistry and computer science to address and solve problems in physical and chemical engineering for oil and gas industry | **1.1.** |  |
| **…** |  |
| **2.** | Ability to identify and lead independently the different stages of an experimental approach in physics, chemistry, physical and chemical engineering | **2.1.** |  |
| **…** |  |
| **3.** | Ability to analyze and exploit experimental or process data, taking into account sources of errors and uncertainty and using a programming language or analysis software with a critical mind | **3.1.** |  |
| **….** |  |
| **4.** | Ability to transpose a laboratory procedure in industrial terms and develop a related process, modify a process or production unit when the need of the market, safety or regulation requires  | **4.1.** |  |
| **…** |  |
| **5.** | Ability to analyze the equipment requirements for the operation of a production unit, select and commission them  | **5.1.** |  |
| **…** |  |
| **6.** | Ability to apply, manage, design, launch and repair chemical production unit assisting operators, animating teams and participating in training | **6.1.** |  |
| **…** |  |
| **7.** | Ability to identify specific regulations and implement the main prevention measures in terms of health, safety, societal and environmental responsability | **7.1.** |  |
| **…** |  |

The Master level general and professional competencies must be built up on the general and professional competencies acquired in the studies at Bachelor level. Additionally, graduate of Master level shall master the general and professional competences by achievement the following learning outcomes within the study programme at Master level:

|  |  |
| --- | --- |
| **Generic competences** | **Programme learning outcomes** |
| **1.** | Ability to work in a team, in an interdisciplinary and international environmentAbility to address and respond well to situations in a new and original ways within the given context | **1.1.** |  |
| **…** |  |
| **2.** | Ability to identify, analyse and define the significant elements constituting a problem in order to solve it effectively and with good criteria | **2.1.** |  |
| **…** |  |
| **3.** | Ability to work in a team, in an interdisciplinary and international environmentAbility to address and respond well to situations in a new and original ways within the given context | **3.1.** |  |
| **….** |  |
| **4.** | Ability to identify, analyse and define the significant elements constituting a problem in order to solve it effectively and with good criteria | **4.1.** |  |
| **….** |  |
| **Professional competences** | **Programme learning outcomes** |
| **1.** |  | **1.1.** |  |
| **…** |  |
| **2.** |  | **2.1.** |  |
| **…** |  |
| **3.** |  | **3.1.** |  |
| **….** |  |
|  |  |  |  |
|  |  |  |  |

**Example 9. Programme Learning Outcomes for Information technologies**

**Competences and learning outcomes of the study programmes in the study field of Information technologies**

The following general and professional competences shall be developed and following learning outcomes should be attained within the study programme at Bachelor level:

|  |  |
| --- | --- |
| **Generic competences** | **Programme learning outcomes** |
| **1.** | Ability to communicate effectively in writing and orally in first and one foreign language | **1.1.** |  |
| **…** |  |
| **2.** | Ability for abstract thinking, analysis and synthesis, and to develop argumentation with critical mind | **2.1.** |  |
| **…** |  |
| **3.** | Ability to identify, select, analyse and summarize various specialized resources to document a subject | **3.1.** |  |
| **….** |  |
| **4.** | Ability to use digital tools of reference and rules of computer security to acquire, process, produce and disseminate information as well as to collaborate internally and externally | **4.1.** |  |
| **…** |  |
| **5.** | Ability to plan and organise one’s own activities, self-learning and skills enhancement | **5.1.** |  |
| **…** |  |
| **6.** | Ability to act with social and environmental responsibility, civic awareness and ethical reasoning | **6.1.** |  |
| **…** |  |
| **7.** | Able to step back from a situation, self-evaluate and questioning himself / herself in order to improve knowledge and skills | **7.1.** |  |
| **…** |  |
| **8.** | Ability to establish his / her role and mission within an organization, to adapt and take initiatives. | **8.1.** |  |
| **…** |  |
| **9.** | Ability to work as part of a team while being independent and responsible with respect to a project | **9.1.** |  |
| **…** |  |
| **Professional competences** | **Programme learning outcomes** |
| **1.** | Ability to mobilize appropriate knowledge, general culture and skills in humanities, social sciences, languages and sciences in the field of information and communication to use, design or implement information system | **1.1.** |  |
| **…** |  |
| **2.** | Ability to implement digital communication strategies, apply modeling methods in the analysis of information processes and systems and apply capabilities of ICT in all fields | **2.1.** |  |
| **…** |  |
| **3.** | Ability to use digital reference tools and computer security rules to acquire, process, produce and disseminate information and to collaborate internally and externally | **3.1.** |  |
| **….** |  |
| **4.** | Ability to use, manage and configurate a computerized information system | **4.1.** |  |
| **…** |  |
| **5.** | Ability to search information, manage editorial content | **5.1.** |  |
| **…** |  |
| **6.** | Ability to produce and process audiovisual products | **6.1.** |  |
| **…** |  |
| **7.** | Ability to descript, structure, archive, and dematerialize information | **7.1.** |  |
| **…** |  |

The Master level general and professional competencies must be built up on the general and professional competencies acquired in the studies at Bachelor level. Additionally, graduate of Master level shall master the general and professional competences by achievement the following learning outcomes within the study programme at Master level:

|  |  |
| --- | --- |
| **Generic competences** | **Programme learning outcomes** |
| **1.** | Ability to work in a team, in an interdisciplinary and international environmentAbility to address and respond well to situations in a new and original ways within the given context | **1.1.** |  |
| **…** |  |
| **2.** | Ability to identify, analyse and define the significant elements constituting a problem in order to solve it effectively and with good criteria | **2.1.** |  |
| **…** |  |
| **3.** | Ability to work in a team, in an interdisciplinary and international environmentAbility to address and respond well to situations in a new and original ways within the given context | **3.1.** |  |
| **….** |  |
| **4.** | Ability to identify, analyse and define the significant elements constituting a problem in order to solve it effectively and with good criteria | **4.1.** |  |
| **….** |  |
| **Professional competences** | **Programme learning outcomes** |
| **1.** |  | **1.1.** |  |
| **…** |  |
| **2.** |  | **2.1.** |  |
| **…** |  |
| **3.** |  | **3.1.** |  |
| **….** |  |
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**Example 10. Programme Learning Outcomes for Electrical energy engineering**

**Competences and learning outcomes of the study programmes in the study field of Electrical Energy Engineering**

The following general and professional competences shall be developed and following learning outcomes should be attained within the study programme at Bachelor level:

|  |  |
| --- | --- |
| **Generic competences** | **Programme learning outcomes** |
| **1.** | Ability to communicate effectively in writing and orally in first and one foreign language | **1.1.** |  |
| **…** |  |
| **2.** | Ability for abstract thinking, analysis and synthesis, and to develop argumentation with critical mind | **2.1.** |  |
| **…** |  |
| **3.** | Ability to identify, select, analyse and summarize various specialized resources to document a subject | **3.1.** |  |
| **….** |  |
| **4.** | Ability to use digital tools of reference and rules of computer security to acquire, process, produce and disseminate information as well as to collaborate internally and externally | **4.1.** |  |
| **…** |  |
| **5.** | Ability to plan and organise one’s own activities, self-learning and skills enhancement | **5.1.** |  |
| **…** |  |
| **6.** | Ability to act with social and environmental responsibility, civic awareness and ethical reasoning | **6.1.** |  |
| **…** |  |
| **7.** | Able to step back from a situation, self-evaluate and questioning himself in order to improve knowledge and skills | **7.1.** |  |
| **…** |  |
| **8.** | Ability to establish their role and mission within an organization, to adapt and take initiatives. | **8.1.** |  |
| **…** |  |
| **9.** | Ability to work as part of a team while being independent and responsible with respect to a project | **9.1.** |  |
| **…** |  |
| **Professional competences** | **Programme learning outcomes** |
| **1.** | Ability to mobilize appropriate concepts and methods in the fields of electronics; power electronics, power distribution and conversion; computer systems; automated systems and associated local area networks | **1.1.** |  |
| **…** |  |
| **2.** | Ability to perform engineering analysis to build a technical specification in the field of electric energy production and distribution | **2.1.** |  |
| **…** |  |
| **3.** | Ability toexploit the knowledge of modeling and architecture of systems, using Computer Aided Design (CAD), measurement techniques, data transmission solutions between systems and local networks design, data acquisition and processing systems, signal detection and transmission systems (up to microwave) | **3.1.** |  |
| **….** |  |
| **4.** | Ability to contribute to design systems or devices implementing the technologies of digital, analog and power electronics, electrical engineering, automation, industrial computing or networks  | **4.1.** |  |
| **…** |  |
| **5.** | Ability to develop, choose technical solutions; install, maintain and troubleshoot equipment in the field of electric energy production and distribution | **5.1.** |  |
| **…** |  |
| **6.** | Ability to organize and manage the quality control operations of a device or network | **6.1.** |  |
| **…** |  |
| **7.** | Ability to identify specific regulations and implement the main prevention measures in terms of health, safety, societal and environmental responsability | **7.1.** |  |
| **…** |  |

The Master level general and professional competencies must be built up on the general and professional competencies acquired in the studies at Bachelor level. Additionally, graduate of Master level shall master the general and professional competences by achievement the following learning outcomes within the study programme at Master level:

|  |  |
| --- | --- |
| **Generic competences** | **Programme learning outcomes** |
| **1.** | Ability to work in a team, in an interdisciplinary and international environmentAbility to address and respond well to situations in a new and original ways within the given context | **1.1.** |  |
| **…** |  |
| **2.** | Ability to identify, analyse and define the significant elements constituting a problem in order to solve it effectively and with good criteria | **2.1.** |  |
| **…** |  |
| **3.** | Ability to work in a team, in an interdisciplinary and international environmentAbility to address and respond well to situations in a new and original ways within the given context | **3.1.** |  |
| **….** |  |
| **4.** | Ability to identify, analyse and define the significant elements constituting a problem in order to solve it effectively and with good criteria | **4.1.** |  |
| **….** |  |
| **Professional competences** | **Programme learning outcomes** |
| **1.** |  | **1.1.** |  |
| **…** |  |
| **2.** |  | **2.1.** |  |
| **…** |  |
| **3.** |  | **3.1.** |  |
| **….** |  |
|  |  |  |  |
|  |  |  |  |

**Example 11. Programme Learning Outcomes for Computer engineering**

**Competences and learning outcomes of the study programmes in the study field of Computer Engineering**

The following general and professional competences shall be developed and following learning outcomes should be attained within the study programme at Bachelor level:

|  |  |
| --- | --- |
| **Generic competences** | **Programme learning outcomes** |
| **1.** | Ability to communicate effectively in writing and orally in first and one foreign language | **1.1.** |  |
| **…** |  |
| **2.** | Ability for abstract thinking, analysis and synthesis, and to develop argumentation with critical mind | **2.1.** |  |
| **…** |  |
| **3.** | Ability to identify, select, analyse and summarize various specialized resources to document a subject | **3.1.** |  |
| **….** |  |
| **4.** | Ability to use digital tools of reference and rules of computer security to acquire, process, produce and disseminate information as well as to collaborate internally and externally | **4.1.** |  |
| **…** |  |
| **5.** | Ability to plan and organise one’s own activities, self-learning and skills enhancement | **5.1** |  |
| **…** |  |
| **6.** | Ability to act with social and environmental responsibility, civic awareness and ethical reasoning | **6.1.** |  |
| **…** |  |
| **7.** | Able to step back from a situation, self-evaluate and questioning himself / herself in order to improve knowledge and skills | **7.1.** |  |
| **…** |  |
| **8.** | Ability to establish his / her role and mission within an organization, to adapt and take initiatives. | **8.1.** |  |
| **…** |  |
| **9.** | Ability to work as part of a team while being independent and responsible with respect to a project | **9.1.** |  |
| **…** |  |
| **Professional competences** | **Programme learning outcomes** |
| **1.** | Ability to mobilize appropriate concepts and methods in the fields of mathematics, algorithms, programming, parallel and oriented object programming, hardware architecture, operating and programming systems, networks and protocols, data bases, economy, law… | **1.1.** |  |
| **…** |  |
| **2.** | Ability to perform computer engineering analysis to design a computer solution | **2.1.** |  |
| **…** |  |
| **3.** | Ability to design, realize, test and validate a computer solution | **3.1.** |  |
| **….** |  |
| **4.** | Ability to administrate Systems, Software and Networks | **4.1.** |  |
| **…** |  |
| **5.** | Ability to develop technical support for the software and advice and technical assistance to users, customers or services  | **5.1.** |  |
| **…** |  |
| **6.** | Ability to development quantitative and qualitative diagnostics, organize and manage the quality control operations | **6.1.** |  |
| **…** |  |
| **7.** | Ability to identify specific regulations and implement the main prevention measures in terms of health, safety, societal and environmental responsability | **7.1.** |  |
| **…** |  |

The Master level general and professional competencies must be built up on the general and professional competencies acquired in the studies at Bachelor level. Additionally, graduate of Master level shall master the general and professional competences by achievement the following learning outcomes within the study programme at Master level:

|  |  |
| --- | --- |
| **Generic competences** | **Programme learning outcomes** |
| **1.** | Ability to work in a team, in an interdisciplinary and international environmentAbility to address and respond well to situations in a new and original ways within the given context | **1.1.** |  |
| **…** |  |
| **2.** | Ability to identify, analyse and define the significant elements constituting a problem in order to solve it effectively and with good criteria | **2.1.** |  |
| **…** |  |
| **3.** | Ability to work in a team, in an interdisciplinary and international environmentAbility to address and respond well to situations in a new and original ways within the given context | **3.1.** |  |
| **….** |  |
| **4.** | Ability to identify, analyse and define the significant elements constituting a problem in order to solve it effectively and with good criteria | **4.1.** |  |
| **….** |  |
| **Professional competences** | **Programme learning outcomes** |
| **1.** |  | **1.1.** |  |
| **…** |  |
| **2.** |  | **2.1.** |  |
| **…** |  |
| **3.** |  | **3.1.** |  |
| **….** |  |
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**Example 12. Programme Learning Outcomes for Physics**

**Competences and learning outcomes of the study programmes in the study field of Physics**

The following general and professional competences shall be developed and following learning outcomes should be attained within the study programme at Bachelor level:

|  |  |
| --- | --- |
| **Generic competences** | **Programme learning outcomes** |
| **1.** | Ability to communicate effectively in writing and orally in first and one foreign language | **1.1.** |  |
| **…** |  |
| **2.** | Ability for abstract thinking, analysis and synthesis, and to develop argumentation with critical mind. | **2.1.** |  |
| **…** |  |
| **3.** | Ability to identify, select, analyse and summarize various specialized resources to document a subject | **3.1.** |  |
| **….** |  |
| **4.** | Ability to use digital tools of reference and rules of computer security to acquire, process, produce and disseminate information as well as to collaborate internally and externally | **4.1.** |  |
| **…** |  |
| **5.** | Ability to plan and organise one’s own activities, self-learning and skills enhancement | **…** |  |
| **6.** | Ability to act with social and environmental responsibility, civic awareness and ethical reasoning |  |  |
| **7.** | Able to step back from a situation, self-evaluate and questioning himself in order to improve knowledge and skills |  |  |
| **8.** | Ability to establish their role and mission within an organization, to adapt and take initiatives. |  |  |
| **9.** | Ability to work as part of a team while being independent and responsible with respect to a project |  |  |
| **Professional competences** | **Programme learning outcomes** |
| **1.** | Mobilize fundamental concepts concepts in order to simulate, analyze and solve simple physics problems. | **1.1.** |  |
| **…** |  |
| **2.** | Identify and lead independently the different steps of an experimental approach using common devices and techniques in the different fields of physics. | **2.1.** |  |
| **…** |  |
| **3.** | Analyze and exploit experimental data, taking into account sources of errors and uncertainty and probe a model by comparing its predictions to the experimental results | **3.1.** |  |
| **….** |  |
| **4.** | Use a programming language and analysis software with a critical mind to collect andexploit data | **4.1.** |  |
| **…** |  |
| **5.** | Use the main mathematical tools relevant for physics. | **…** |  |
| **6.** | Apply concepts and experimental methods of physics in the fields of civil engineering, fluid and solid mechanics and mechanical engineering, thermodynamics and heat, materials physics, chemical sciences, geosciences, astronomy. |  |  |
| **7.** | Identify specific regulations and implement the main prevention measures in terms of health, safety and environmental responsability |  |  |

The Master level general and professional competencies must be built up on the general and professional competencies acquired in the studies at Bachelor level. Additionally, graduate of Master level shall master the general and professional competences by achievement the following learning outcomes within the study programme at Master level:

|  |  |
| --- | --- |
| **Generic competences** | **Programme learning outcomes** |
| **1.** |  | **1.1.** |  |
|  | **…** |  |
| **2.** |  | **1.2.** |  |
|  | **…** |  |
| **3.** |  | **1.3.** |  |
|  | **….** |  |
| **4.** |  | **1.4.** |  |
|  | **…** |  |
| **…** |  | **…** |  |
|  |  |  |  |
| **Professional competences** | **Programme learning outcomes** |
| **…** |  | **…** |  |
|  |  |  |
| **…** |  | **…** |  |
|  |  |  |
| **…** |  | **…** |  |
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**Example 13. Programme Learning Outcomes for Chemistry / Physics Teacher**

**Competences and learning outcomes of the study programmes in the study field Chemistry / Physics Teacher**

The following general and professional competences shall be developed and following learning outcomes should be attained within the study programme at Bachelor level:

|  |  |
| --- | --- |
| **Generic competences** | **Programme learning outcomes** |
| **1.** | Ability to communicate effectively in writing and orally in first and one foreign languageAbility for abstract thinking, analysis and synthesis, and to develop argumentation with critical mind. | **1.1.** |  |
| **…** |  |
| **2.** | Ability to identify, select, analyse and summarize various specialized resources to document a subjectAbility to use digital tools of reference and rules of computer security to acquire, process, produce and disseminate information as well as to collaborate internally and externally | **2.1.** |  |
| **…** |  |
| **3.** | Ability to plan and organise one’s own activities, self-learning and skills enhancementAbility to act with social and environmental responsibility, civic awareness and ethical reasoning | **3.1.** |  |
| **….** |  |
| **4.** | Able to step back from a situation, self-evaluate and questioning himself in order to improve knowledge and skillsAbility to appreciate and take into account the diversity and multiculturality of school pupils and students | **4.1.** |  |
| **…** |  |
| **5.** | Ability to engage in an individual and collective approach to professional developmentAbility to communicate effectively in writing and orally in first and one foreign language | **5.1** |  |
| **…** |  |
| **6.** | Ability for abstract thinking, analysis and synthesis, and to develop argumentation with critical mind.Ability to identify, select, analyse and summarize various specialized resources to document a subject | **6.1.** |  |
| **…** |  |
| **7.** | Ability to use digital tools of reference and rules of computer security to acquire, process, produce and disseminate information as well as to collaborate internally and externallyAbility to plan and organise one’s own activities, self-learning and skills enhancement | **7.1.** |  |
| **…** |  |
| **8.** | Ability to act with social and environmental responsibility, civic awareness and ethical reasoningAble to step back from a situation, self-evaluate and questioning himself in order to improve knowledge and skills | **8.1.** |  |
| **…** |  |
| **9.** | Ability to appreciate and take into account the diversity and multiculturality of school pupils and students | **9.1.** |  |
| **…** |  |
| **Professional competences** | **Programme learning outcomes** |
| **1.** | Ability to mobilize appropriate concepts and methods in the fields of mathematics, physics, chemistry and computer science to address simple problems and experiments in Physics and chemistry | **1.1.** |  |
| **…** |  |
| **2.** | Ability to apply disciplinary knowledge and their didactics with the most appropriate methods | **2.1.** |  |
| **…** |  |
| **3.** | Ability to design and implement practical teaching to develop interest in natural sciences, understanding their methods and identifying their fields of application | **3.1.** |  |
| **….** |  |
| **4.** | Ability to build, implement and animate effective teaching and learning situations, taking into account the diversity of students | **4.1.** |  |
| **…** |  |
| **5.** | Ability to organize and ensure a group operating mode that promotes student learning and socialization ensuring learner's progress, assessment of achievements and feedback | **5.1.** |  |
| **…** |  |
| **6.** | Ability to ensure learner's progress, assessment of achievements and feedback | **6.1.** |  |
| **…** |  |
| **7.** | Ability to analyse individually and collectively its practices for professional development | **7.1.** |  |
| **…** |  |

The Master level general and professional competencies must be built up on the general and professional competencies acquired in the studies at Bachelor level. Additionally, graduate of Master level shall master the general and professional competences by achievement the following learning outcomes within the study programme at Master level:

|  |  |
| --- | --- |
| **Generic competences** | **Programme learning outcomes** |
| **1.** | Ability to influence people and / or groups, anticipate the future and contribute the personal and professional developmentAbility to address and respond well to situations in a new and original ways within the given context | **1.1.** |  |
| **…** |  |
| **2.** | Ability to identify, analyse and define the significant elements constituting a problem in order to solve it effectively and with good criteria | **2.1.** |  |
| **…** |  |
| **3.** | Ability to influence people and / or groups, anticipate the future and contribute the personal and professional developmentAbility to address and respond well to situations in a new and original ways within the given context | **3.1.** |  |
| **….** |  |
| **4.** | Ability to identify, analyse and define the significant elements constituting a problem in order to solve it effectively and with good criteria | **4.1.** |  |
| **….** |  |
| **Professional competences** | **Programme learning outcomes** |
| **1.** |  | **1.1.** |  |
| **…** |  |
| **2.** |  | **2.1.** |  |
| **…** |  |
| **3.** |  | **3.1.** |  |
| **….** |  |
|  |  |  |  |
|  |  |  |  |

**ANNEX 6. LIST OF IMPORTANT resources**

1. Student-Centred Learning: Toolkit for Students, Staff and Higher Education Institutions, European Students' Union and Education International, 2010. <https://files.eric.ed.gov/fulltext/ED539501.pdf>
2. Overview on Student Centred Learning in Higher Education in Europe: Research Study Brussels, European Students’ Union, 2015. <https://www.esu-online.org/?publication=overview-on-student-centred-learning-in-higher-education-in-europe>
3. Kennedy D. Writing and using learning outcomes: a practical guide, Cork, University College Cork, 2006. <https://www.cmepius.si/wp-content/uploads/2015/06/A-Learning-Outcomes-Book-D-Kennedy.pdf>

# European Qualification Framework

# <https://ec.europa.eu/ploteus/en/content/descriptors-page>

# Azerbaijan National Qualification Framework

# <http://e-qanun.az/framework/39622>