APPROVED BY
Order No. V-809 of the Minister of Education and Science of the Republic of Lithuania of 23 July 2015

DESCRIPTOR OF THE STUDY FIELD OF PHYSICS

CHAPTER I
GENERAL PROVISIONS

1. The Descriptor of the study field of Physics (hereinafter referred to as the "Descriptor") shall govern the special requirements applied to the study programmes of the study field of Physics.

2. The Descriptor has been prepared in accordance with the Law on Higher Education and Research of the Republic of Lithuania, taking into account Resolution No 535 of the Government of the Republic of Lithuania of 4 May 2010 "On the Approval of the Descriptor of the Lithuanian Qualifications Framework", Order No V-2212 of the Minister of Education and Science of the Republic of Lithuania of 21 November 2011 "On the Approval of the Descriptor of Study Cycles", Order No V-501 of the Minister of Education and Science of the Republic of Lithuania of 9 April 2010 "On the Approval of the Descriptor of General Requirements for Degree-Awarding First Cycle and Integrated Study Programmes", Order No V-826 of the Minister of Education and Science of the Republic of Lithuania of 3 June 2010 "On the Approval of the Descriptor of General Requirements for Master's Study Programmes", Order No V-2463 of the Minister of Education and Science of the Republic of Lithuania of 15 December 2011 "On the Approval of Recommendations for Developing the Descriptor of a Study Field or Study Fields", Order No ISAK-276 of the Minister of Education and Science of the Republic of Lithuania of 27 February 2007 "On the Approval of Regulations of Study Fields", Order No ISAK-1026 of the Minister of Education and Science of the Republic of Lithuania of 15 May 2009 "On the Approval of the Descriptor of Full-time and Part-time Studies", as well as taking into account the documents of the European Association of Physicists, Guidelines of the European project "Tuning", EUPEN (the European University Physics Education Network) and its follow-up recommendations for STEPS projects.

3. The Descriptor of the study field of Physics shall be applied to the first and second cycle university study programmes. Study programmes may be organised on a full-time and/or part-time basis.

4. This Description aims to:

4.1. Assist higher education institutions in designing, implementing and assessing study programmes;

4.2. Inform students and employers about the knowledge and skills acquired by the graduates;

4.3. Give guidelines to experts who assess the study programmes.

5. The study field of Physics belongs to the area of physical sciences. The Descriptor shall be applied to all the branches of the study field of Physics: Applied physics, Chemical physics, Environmental physics, Mathematical and Theoretical physics, Energy physics, Optical physics, Nuclear and Particle physics, Acoustics.

6. Upon completion of the studies of Physics study field, the higher education qualification shall be acquired:

6.1. After completing the study programmes of the first cycle university studies, a Bachelor's degree in Physics shall be acquired by issuing a Bachelor's diploma and supplement by the higher education institution;

6.2. After completing the study programmes of the second cycle university studies, a Master's degree in Physics shall be acquired by issuing a Master's diploma and supplement by the higher education institution.

7. In the first cycle university studies, study programmes of the study field of Physics may provide for a possibility to acquire a Bachelor's degree of a minor study field.

8. General enrolment requirements shall be:

8.1. Persons with at least secondary education shall be enrolled to study programmes of the study field of Physics in an enrolment contest, taking into account their learning outcomes, entrance examinations or other criteria established by the higher education institution. Higher education institutions shall establish a list of competitive subjects by field of study and principles for the award of contest points, the lowest possible entrance grade and other criteria, having received the assessment of student representation, and publish them no later than 2 years preceding the start of the school year;

8.2. Persons with at least Bachelor's degree of physical, technological or biomedical fields and meeting enrolment requirements established by the higher education institution shall be enrolled to study programmes of the second cycle studies;

8.3. Learning outcomes of excellent or standard levels acquired during the first cycles studies shall ensure the ability to study Master's degree programmes of Physics;

8.4. Enrolment to Master's studies at higher education institutions may provide for supplementary studies.

9. The main aims of study programmes of the study field of Physics shall be:

9.1. In the first cycle studies, to prepare graduates of the university study programme of Physics study field who:

9.1.1. Are able to apply the knowledge of Physics, Mathematics and Information technologies in their activities;

9.1.2. Have specialised knowledge and skills of branches of Physics or Physics-related areas;

9.1.3. Have acquired professional skills and abilities to solve theoretical and practical tasks of Physics;

9.1.4. Have acquired experience in teamwork, ability to work in a team with the representatives of their own or other scientific fields/areas;

9.1.5. Have acquired knowledge and skills necessary to form a physical image of the world at professional level and sufficient to continue their studies in the second cycle studies.

9.2. The aim of the study programmes of Physics study field in the second cycle studies shall be to prepare graduates who:

9.2.1. Are able to apply fundamental and applied research results independently for solving tasks in new or unfamiliar environment, implementing innovations and carrying out scientific research;

9.2.2. Have acquired the abilities needed to work in higher education and research institutions, physical abilities and knowledge-intensive businesses or the public sector;

9.2.3. Have acquired experience in teamwork, ability to work with the representatives of other scientific fields/areas;

9.2.4. Have acquired initial leadership skills in study or research activities;

9.2.5. Have gained experience in publication and publishing of research results;

9.2.6. Have acquired knowledge and skills that are sufficient to continue third cycle studies and teach in higher education institutions.

10. The granted Bachelor's degree in Physics corresponds to the sixth level of the Lithuanian Qualifications Framework and the European Qualifications Framework for Lifelong Learning, as well as the first cycle of the Framework for Qualifications of the European Higher Education Area.

11. The granted Master's degree in Physics corresponds to the seventh level of the Lithuanian Qualifications Framework and the European Qualifications Framework for Lifelong Learning, as

well as the second cycle of the Framework for Qualifications of the European Higher Education Area.

CHAPTER II
CONCEPT AND SCOPE OF THE STUDY FIELD

12. Physics is a fundamental science exploring its substance, structure and behaviour, as well as interactions of its elements, and theoretically summarises its patterns, explaining natural phenomena and providing ways for their use on the basis of obtained results. The object of Physics research may be both elementary particles and processes in microcosm, micro objects and phenomena, problems of the structure of the Universe and its evolution, new materials and technologies, and research methods. In Physics, experimental results and theoretical generalisations must be consistent.

13. Studies of Physics science shall include experimental, theoretical and applied physics.

14. Studies of Physics shall cover all main branches of Physics. Study programmes may be designed on a thematic basis including subjects covering several branches and exploring the link of Physics with other subjects studied (for example, Chemistry, Biophysics, Biochemistry, Medical physics, Geophysics), as well as applied aspects (for example, Environmental physics, Technical and Technology physics, Energy physics, Materials science, etc.); in addition to Physics, Mathematics and Information technology shall be the main study subjects.

15. Graduates of Physics studies may work in educational institutions, research institutes, manufacturing enterprises, develop new business, especially associated with the technique and technology, enterprises and other institutions.

16. The knowledge of Physics acquired during studies shall be preconditions for graduates to engage independently in lifelong learning.

CHAPTER III
GENERAL AND SPECIAL LEARNING OUTCOMES

17. In the first cycle studies, the learning outcomes of the study field of Physics shall be:

17.1. Knowledge and its application:

17.1.1. Ability to understand the basic laws of physics and principles and apply them in different areas of physics;

17.1.2. Knowledge of the basic laws of physics and principles that are learned by studying classical, relativistic and quantum mechanics, electromagnetism, statistical physics and thermodynamics, and optics;

17.1.3. Knowledge and application of the basic laws and principles in different areas of Physics that are learned by studying atomic physics, nuclear and elementary particle physics, astrophysics, physics of solids and properties of materials;

17.1.4. Use of mathematical and information technologies for analytical and numerical description and simulation of physical phenomena;

17.1.5. Knowledge of the terminology of Physics and units of measurement;

17.1.6. Knows and ability to apply qualitative and quantitative physical methods of analysis.

17.2. Research skills:

17.2.1. Ability to formulate research objectives and tasks;

17.2.2. Ability to use information technologies and resources;

17.2.3. Ability to carry out scientific literature searches, to analyse scientific and information literature;

17.2.4. Ability to choose the research work methodology;

17.2.5. Ability to apply theoretical knowledge of various areas of Physics, carrying out research, analysing and assessing the results;

17.2.6. Ability to summarise research findings and formulate conclusions and recommendations.

17.3. Special abilities:

17.3.1. Ability to use physical measurement equipment and devices;

17.3.2. Ability to safely behave in physical training and scientific laboratories in accordance with work safety requirements;

17.3.3. Ability to interpret the results of observations and physical experiments;

17.3.4. Ability to process the data of conducted scientific research, applying information technologies;

17.3.5. Ability to formulate the speciality-related practical problem, to plan, design the course of activity and control its performance;

17.3.6. Ability to plan and monitor material resources designed to perform work.

17.4. Social abilities:

17.4.1. Ability to communicate and collaborate seeking common objectives;

17.4.2. Ability to work individually and in a team;

17.4.3. Ability to organise and ensure safe work;

17.4.4. Able to make decisions and assess their social consequences;

17.4.5. Ability to communicate in the correct Lithuanian language (oral and written) and foreign language(oral and written);

17.4.6. Ability to work in an interdisciplinary environment;

17.4.7. Ability to deliver the experiment or research results in writing and orally to specialist and non-specialist audiences.

17.5. Personal abilities:

17.5.1. Ability to plan and organise one's own activities and self-learning;

17.5.2. Ability to work and adapt in new situations;

17.5.3. Ability to develop their professional skills;

17.5.4. Ability to assume moral responsibility for the results of one's own work and their impact on the staff, the public and the environment;

17.5.5. Able to deal with the tasks of various applied fields and assess their technological, economic, social and legal context;

17.5.6. Resolution to convey ideas and proposed solutions in writing and orally

18. In the first second studies, the learning outcomes of the study field of Physics shall be:

18.1. Knowledge and its application:

18.1.1. Knowledge and understanding of theories, concepts, principles, facts of specialised physics;

18.1.2. Ability to integrate knowledge of Physics to solve new types of problems;

18.1.3. Knowledge of the latest scientific achievements in Physics, theories, ideas, and principles; ability to critically assess and apply them at work;

18.1.4. Ability to integrate knowledge of different fields;

18.1.5. Knowledge and ability to work and lead a team composed of a variety of persons of scientific fields and with different expertise.

18.2. Research skills:

18.2.1. Ability to formulate research objectives and tasks;

18.2.2. Ability to search for, analyse and critically assess scientific and information literature;

18.2.3. Ability to critically assess existing theoretical knowledge and research methods of Physics;

18.2.4. Ability to plan and carry out analytical, modelling and experimental research, to critically assess experiment or simulation procedures, results and their reliability;

18.2.5. Ability to process and interpret the data of conducted scientific research, applying information technologies;

18.2.6. Ability to develop a research methodology for solving new problems in a scientific point of view;

18.2.7. Ability to summarise research findings and justify conclusions in a reasoned manner;

18.2.8. Ability to understand the limits of experimental data accuracy and take them into account when planning further research.

18.3. Special abilities:

18.3.1. Ability to simulate physical processes;

18.3.2. Ability to use simulation or experimental results for new researches;

18.3.3. Ability to focus collective forces for solving a difficult task;

18.3.4. Ability to assess the need for material and intelligent resources to solve physical problems;

18.3.5. Ability to perform non-standard laboratory tests using special physical and technological equipment;

18.3.6. Ability to operate in accordance with work safety requirements when working with dangerous equipment and materials;

18.3.7. Ability to solve practical problems on the basis of acquired knowledge and skills in the field of Physics;

18.3.8. Ability to choose a suitable research methodology;

18.3.9. Ability to interpret data received from observations and measurements;

18.3.10. Ability to monitor physical phenomena, to measure physical quantities, to systematically and reliably store and process the research data;

18.3.11. Ability to formulate a practical problem, to plan, design the course of activity and control its performance;

18.3.12. Ability to take the physics related innovative solutions and to assess social consequences.

18.4. Social abilities:

18.4.1. Ability to coordinate research activities;

18.4.2. Ability to organise and ensure safe work;

18.4.3. Ability to communicate, collaborate and motivate persons seeking common objectives;

18.4.4. Ability to work in an interdisciplinary environment;

18.4.5. Ability to present the research results in writing and orally to specialist and non-specialist audiences;

18.4.6. Ability to communicate in the correct Lithuanian language (oral and written) and foreign language (oral and written).

18.5. Personal abilities:

18.5.1. Ability to plan and organise self-work and self-learning;

18.5.2. Ability to work independently, responsibly and accurately;

18.5.3. Ability to develop their professional skills;

18.5.4. Ability to work and adapt in new situations;

18.5.5. Ability to think systematically and analytically;

18.5.6. Ability to think creatively and act proactively;

18.5.7. Ability to assume moral responsibility for the results of one’s own work and their impact on the staff, the public and the environment;

18.5.8. Ability to work in an international and multicultural environment.

CHAPTER IV
TEACHING, LEARNING AND ASSESSMENT

19. Teaching, learning and assessment activities shall be organised in such a way that students can effectively achieve the intended learning outcomes of the study programme.

20. The applicable teaching and learning methods shall be described, constantly reviewed and improved in light of changing needs of the labour force, the latest scientific achievements in Physics and modern didactic requirements. The reaching and learning strategy shall be help the students acquire relevant expertise, skills and practical skills necessary for professional activities.

21. The content of teaching shall be constantly updated and improved by integrating new knowledge and teaching methods in the study process corresponding to the concept of lifelong learning. Students shall be prepared and encouraged to follow the principles of this concept during their studies.

22. The studies shall provide for practical training to strengthen practical skills of students and form their working skills.

23. Teachers shall know and understand the didactic concept of the study programme, apply a variety of teaching methods in order to make optimum use of available material resources.

24. The choice of the teaching method shall depend on the form of studies (full-time or part-time) and specific objectives of the subject taught and provided for by a teacher, intended learning outcomes, as well as knowledge and abilities provided to a student.

25. In different stages of studies, the same teaching and learning methods may be used, differing in scope and complexity of tasks, student's autonomy, etc.:

25.1. Lectures;

25.2. Laboratory works;

25.3. Seminars (studies in small groups);

25.4. Exercises (modelling, solution of physical tasks);

25.5. Individual counselling;

25.6. Practical training (recommended in industrial enterprises or other higher education and research institutions);

25.7. Individual and/or group projects;

25.8. Interactive learning methods;

25.9. Sightseeing;

25.10. Case studies;

25.11. Writing papers;

25.12. Searching and summarising of the required information, reading books and original research papers;

25.13. Preparation or reports, their presentation and defence.

26. At the beginning of studies, a teacher shall present students with a detailed subject programme, its aims and their relationship to the overall study programme objectives, the indented learning outcomes, the intended workload, the procedure and criteria for the assessment of learning outcomes (influence of examination and intermediate assessments on the final grade, assessment terms, etc.).

27. Students of each subject of the study programme shall be given self-work time, a necessary workplace (if necessary for the task) needed to perform the work, facilities and access to information.

28. The study assessment system shall ensure feedback to students about their learning achievements and the justification of assessment of their works.

29. Assessment methods may be both summative and formative and diagnostic in nature. Summative assessment allows to measure students' achievement after completing studies, a semester, a course or a study programme of the subject. Formative and diagnostic assessment allows teachers and students to monitor the study progress, identify problems, and analyse achievements.

30. Teachers should be familiar with generally accepted assessment methods and their application methodology, their contribution to students' success in acquiring knowledge and developing skills. Teachers may choose the most appropriate assessment methods to reflect the size of the group of students, educational objectives of assessment and the subject taught, intended learning outcomes and other factors.

31. When assessing learning outcomes, teachers should follow the principles of objectivity, transparency, impartiality, mutual respect and benevolence. Students' participation in the assessment/self-assessment process shall be recommended.

32. The methods applied to the assessment of learning achievements shall be based on clearly formulated criteria allowing to correctly and reliably reflect the level of knowledge, abilities and skills achieved by the student during (subject) studies. Assessment criteria shall demonstrate how the level of student's acquired knowledge and skills corresponds to the intended learning outcomes defined by the study programme.

33. Student's learning outcomes shall be assessed using a ten-point criteria assessment system. A variety of assessment methods for students' achievements may be used:

33.1. Written examination;

33.2. Written and oral examination;

33.3. Testing;

33.4. Report of results laboratory works and their defence;

33.5. Simulation work;

33.6. Solution of tasks;

33.7. Report of an individual or group project;

33.8. Oral and stand presentations;

33.9. Presentation and defence of practical training work (research) reports;

33.10. Colloquium;

33.11. Tests by providing closed and/or open-ended questions;

33.12. Written work (literature review, abstract, essays, etc.);

33.13. Course, final thesis and its defence.

34. The final thesis, its defence and assessment shall summarise the student's knowledge, general and special skills corresponding to the Bachelor or Master's qualification requirements.

35. An important part of the assessment of students' achievements/outcomes shall be providing feedback to students about their achievements/outcomes and justification of the assessment, as well as students' feedback provided to the teachers, in order to improve and develop the efficiency of learning process and improve the quality of teaching. Students shall timely receive information about their work performed.

36. Students shall be given the opportunity to discuss with the teachers/assessors all the aspects of their studies, including their assessments. An appeal concerning the assessment process or assessment grade shall be submitted and considered in the procedure established by a higher education institution.

37. Individual assessments of students' study subjects shall not be made public.

CHAPTER V
REQUIREMENTS FOR THE IMPLEMENTATION OF STUDY PROGRAMMES

38. General requirements for the curriculum of the study programme of Physics study field shall be:

38.1. The study programme shall provide theoretical knowledge and develop practical skills and abilities;

38.2. The study programme shall be regularly improved and updated and reflect the new changes of science and methodical studies. Programme developers shall ensure that the study programme includes innovative and relevant topics.

38.3. When designing a study programme, the needs and recommendations of Physics knowledge-intensive businesses and the needs of the state and the public shall be taken into account;

38.4. Aims and intended learning outcomes of the study programme shall be clear and achievable, and the programme title shall correspond to its curriculum;

38.5. In the first cycle studies, all study programmes of the study field of Physics shall dedicate at least 140 credits to studies of Physics, Mathematics and Information technology, including practical training and a final thesis;

38.6. Minor and first cycle university study programmes of Physics study field, where teachers of Physics are prepared, shall dedicate at least 60 credits to Physics subjects;

38.7. The list of compulsory subjects for the study programmes of Physics study field in the second cycle studies shall not be established. Depending on the specifics of the institution implementing the study programme, these programmes may be designed to prepare professionals, applied activities or preparation for doctoral studies.

39. General requirements for the teachers of the study programme of Physics study field shall be:

39.1. In the study programme of first cycle university studies of Physics study field, at least half of all study subjects should be taught by scientists holding a docent or professor's position;

39.2. In the study programme of second cycle studies of Physics study field, at least 80 percent of all study subjects should be taught by scientists holding a docent or professor's position. If the study programme is focused on practical activities, scientists holding a docent or professor's position shall teach at least 60 percent of all study subjects. At least 60 percent of teachers' scientific activities shall comply with their taught subjects;

39.3. At least 20 percent of the scope of study field subjects both in the first cycle and second cycle studies shall be taught by scientists holding a professor's position;

39.4. If a study programme is focused on practical activities, up to 40 percent of teachers of study subjects may be scientists-practitioners, who in the past 7 years had acquired at least 3 years of professional experience conforming to the taught subjects;

39.5. Studies of the study field of Physics shall promote the exchange of teachers and scientists with other Lithuanian or foreign higher education institutions and research centres;

39.6. If several teachers deliver theoretical subject lectures and conduct laboratory works, it shall be necessary to ensure their mutual communication: they must be aware of the theoretical course taught by their colleagues and laboratory works accompanying that course, seminars and practicals, as well as criteria of intermediate assessments of students' knowledge and skills;

39.7. Teachers' competence shall be assessed according to the academic level of the subjects taught, pedagogical and research experience, the ability to freely communicate in at least one foreign language used for international scientific cooperation, initiatives in developing more effective teaching methods, based on qualifications, recognition in the scientific, professional and some other communities, participation in qualification development programmes, and respectful peer communication skills with students;

39.8. Teachers' pedagogical contact load shall be no greater than 25 percent of his/her total workload;

39.9. Teachers shall have time to conduct research, develop new technologies and research methodologies, to study new scientific achievements, and to prepare scientific publications;

39.10. Teachers shall have to constantly update the curriculum of subjects taught, teaching and assessment methods and procedures used;

39.11. Teachers shall be encouraged to write books, to develop new study subjects, methodological tools, laboratory equipment, in order to provide new knowledge and skills to the students of the study programme;

39.12. Teachers shall tutor the subject course: advise students on the themes of the subject taught, reveal study perspectives, discuss career options, and advise students on academic exchanges;

39.13. Teachers shall be aware of the aims of the study programme, intended learning outcomes and criteria, based on which study programmes are accredited.

40. General requirements for the study process shall be:

40.1. The level of knowledge acquired by graduates of Physics study programmes shall comply with the European level. Graduates shall be prepared to continue their studies in the further study cycle;

40.2. Graduates shall be able to develop special abilities related to the fields of studies and work activities;

40.3. During their studies, students shall be properly informed about the study prospects in the context of future work;

40.4. During their studies, students shall be consulted and introduced to the applicability of the subjects studied, their development prospects and labour market needs by providing practical examples;

40.5. It is recommended to conclude agreements with bodies and companies, which enable students to carry out a proper practical training, and indicate the labour supply to programme graduates.

41. First and second cycle studies shall be completed with the final thesis (project):

41.1. Bachelor's final thesis (project) of the first cycle university studies shall be based on independent research, application of knowledge acquired or prepared as a project revealing the abilities conforming to the aims of the programme. A students with his/her final thesis (project) shall demonstrate an adequate knowledge of Physics and the initial level of independent experimental or theoretical working performance, the capacity to analyse the chosen topic, take into account the works previously performed by other researchers, describe their own work and its outcomes in a fluent and coherent language, use generally accepted specific terms, formulations, measurement units of physical values, formulate clear, justified research findings and recommendations;

41.2. A final thesis (project) of the first cycle university studies shall be presented and defended in the procedure established by the higher education institution;

41.3. A Master's final thesis (project) of the second cycle studies shall be based on independent scientific or applied research, application of knowledge or prepared as a project revealing the abilities acquired during studies. With the final thesis (project), a student shall demonstrate a good level of understanding of the solved physical problem, the ability to comprehensively analyse the chosen topic, take into account the results of the works previously performed by other researchers and related to that theme, plan and perform physical research independently, describe his/her research work in a fluent language, using generally accepted specific terms, formulations, and measurement units of physical values. A student shall demonstrate the ability to briefly summarise his/her work and to formulate justified and summarising findings and recommendations based on the result analysis;

41.4. A final thesis (project) of the second cycle studies shall be presented in the procedure established by a higher education institution, discussed at the department or other academic unit where the work was performed, and its results and findings shall be explained during discussions and defended at the Final Thesis Evaluation Commission;

41.5. The Final Thesis Evaluation Commission shall be formed of competent study field specialists: scientists, practitioners-professionals, and representatives of possible employers in the

procedure established by the higher education institution. The head of the Commission shall come from a higher education and research institution other than the graduation institution.

42. General requirements applied to the material base of studies shall be:

42.1. Number of classrooms and places shall meet the students' needs and provide for a possibility to make an adequate schedule of sessions;

42.2. Auditoriums shall meet hygiene and work safety requirements; they shall be equipped with audio and video equipment and other necessary demonstration tools;

42.3. Laboratories shall have danger warning signs. All rooms shall be provided with evacuation schemes;

42.4. Laboratory equipment, apparatuses, work methodologies shall be sufficient to enable a student to acquire practical skills provided for by the study programme;

42.5. A sufficient number of computers with the required software shall be equipped for simulation and information technology training tasks;

42.6. If unique research equipment, which may be used also for studies, is installed in a specialised laboratory, students shall be allowed to use it;

42.7. Work of technical and administrative services shall facilitate the implementation and improvement of the study process;

42.8. In libraries or methodical rooms, the number of textbooks or abstracts of lectures and other information sources indicated in the study programme for each subject shall meet the students' needs, and electronic sources of information should be freely available to all participants of the study process;

42.9. The library shall be equipped with a sufficient number of computers and appropriate software (Internet connection, literature directories, search engines, and the link with the larger library databases);

42.10. The library shall meet hygiene and work safety requirements, have adequate sound isolation, comfortable chairs and tables; it is advisable to have a debate room.

CHAPTER VI
DESCRIPTION OF LEVELS OF ACHIEVED LEARNING OUTCOMES

43. The following levels of achievement of learning outcomes in the first and second cycles studies of Physics shall be used:

43.1. Excellent achievement level:

43.1.1. A very good understanding of the concepts specified in the study programme is demonstrated;

43.1.2. A larger amount of information than was provided for students during their studies is applied;

43.1.3. Traditional calculations, explanations, interpretations and analysis are performed quickly, smoothly and accurately;

43.1.4. Knowledge and practical skills are quickly adapted to new situations, and to the solution of new, problematic tasks;

43.1.5. Problems and their solution results are critically assessed;

43.1.6. New knowledge is acquired quickly and confidently;

43.1.7. Excellent experimental skills specified in the study programme are demonstrated;

43.1.8. Experimental results are fully analysed and assessed;

43.1.9. Presented recommendations are defended;

43.1.10. Excellent teamwork, leadership characteristics are displayed;

43.1.11. Excellent general abilities are demonstrated.

43.2. Standard achievement level:

43.2.1. A good understanding of the concepts specified in the study programme is demonstrated;

43.2.2. Information provided during the studies is used;

43.2.3. Ability to accurately and reliably perform experiments is demonstrated;

43.2.4. Conventional calculations of well-known algorithms, explanations and interpretations are performed;

43.2.5. The research results are reliable, the analysis is carried out and the findings are justified;

43.2.6. Clear recommendations are proposed to both professionals and the public;

43.2.7. New knowledge is acquired easily and confidently;

43.2.8. Good teamwork skills;

43.2.9. Good general abilities are demonstrated;

43.2.10. A graduate, having acquired professional experience, may become a great practitioner capable to show good expert knowledge.

43.3. Threshold achievement level:

43.3.1. A basic understanding of the concepts specified in the study programme and application of knowledge is demonstrated;

43.3.2. Conventional calculations of well-known algorithms, explanations and interpretations and analyses are performed basically in a correct manner;

43.3.3. Standard experimental work is carried out correctly, but a graduate may not be capable to immediately determine the significance of all results and may need support in explaining and analysing the results;

43.3.4. Basic general abilities are demonstrated;

43.3.5. A graduate, having gained relevant professional experience, may become a good practitioner of a specific field where knowledge and understanding of physical phenomena and objects are critical, and the basic knowledge acquired during the studies is sufficient for successful work.

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