Integrated (Bachelor-Master) Educational Program for Training of Secondary Education of Teachers of Phisics,Chemistry and Biology

Recent changes made to the program

are discussed at the session of the faculty council:

Protocol No. ს5-23, 15.05.2023

Approved by the decision of the Governing Board:

Resolution No. 14, 25.05.2023

Level of Higher Academic Education: II level of higher academic education (Integrated bachelor-master level)

Instruction language: Georgian

Type of educational program: academic

Detailed field name and code: 0114 Teacher Training with Subject Specialization

Awarded qualification: Master of Education (Secondary Education Teachers of Physics, Chemistry and Biology)

Duration of studying: 10 semesters

Educational program volume: 300 credits

Heads of the program: affiliated assisstant-professor Nino Petviashvili, Email: petviashvili.nino@eu.edu.ge; Affiliated assisstant-professor Natia Arabuli, Email: arabuli.natia@eu.edu.ge.

Relevance of Program

The European University is focused on promoting the implementation of public and socio-economic activities of the country. One of the important issues in this direction is raising the field knowledge, professional skills and qualifications of teachers of general educational institutions. The teaching profession is one of the professions regulated by the state, which clearly emphasizes the importance of the mentioned profession from the point of view of the development of the state and society.

Based on the need for a complex and systematic approach to improving the quality of education, there is a need to raise the qualifications of the teacher, adapt the educational process to the student, and

increase its quality. Despite the fact that many regulatory documents have been developed (teacher standards, teachers' career advancement scheme, etc.) and professional development-oriented activities are ongoing, the competence of a large part of teachers is not in compliance with the demand. From 2015 to 2020, 21% of teachers did not change their status, and in accordance with the defined basic level, the holder of the status of a practicing teacher is already out of status for the given moment. Examining today's data, it is clear that a large number of Physics, Chemistry and Biology teachers have not passed the lower limit of competence certification, such as 216 Physics teachers, 131 cChemistry teachers and 139 Biology teachers.

The main task of the current school reform in the country is to meet the challenges of the 21st century, to meet the demands of modernity, and to provide modern approaches to teaching and learning the subjects defined by the national curriculum, which is very difficult to achieve considering the current situation. Also, there is the problem of "aging" of the teachers' corps, which is considered one of the obstacles to access to quality basic education. The average age of the working corps of teachers makes visible the need to strengthen work in the direction of training new staff. Consequently, there are serious challenges in ensuring access to high-quality basic and secondary education in the country.

Within the implementation of the education reform, a special demand in the direction of exact and natural sciences is highlighted, which is a serious challenge. In addition, recent studies in the education system have confirmed the shortage of teachers who have research skills, which will help them to improve the quality of teaching and learning and professional development based on the research of pedagogical practice. A large number of teachers use information technology only for simple communication and conduct lessons using traditional methods. Against the background of new challenges emerging in the century of information technologies, the level of media literacy and digital citizenship competencies is unsatisfactory, which affects students' motivation, achievement in terms of subject knowledge and skills, as confirmed by the PISA results, based on the data, Georgia is among the 12 out of 20 participating countries in which the average student achievement rate (statistically) is significantly lower than the average of the 13 OECD member countries, in particular, more than 50% of the surveyed 15-year-olds do not meet the elementary level of achievement in natural sciences, in literacy and Mathematics https://naec.ge/uploads/postData/20-21/kvlevebi/PISA2018-Georgia%20(1).pdf.

The program aims to train teachers of Physics, Chemistry and Biology, which is due to the shortage of qualified teachers in the field of natural sciences.

It should be noted that the current education reform within the framework of the "New School Model" provides the introduction of the third generation national curriculum at the primary and basic levels from the 2021-2022 school year. At this stage, new secondary standards have already been developed, which provide for advanced and integrated teaching of natural sciences in grades 10-12. Within the framework of the new standard, such topics and issues are selected that present the scientific

foundations of all three disciplines, are relevant for modern public life, and can be processed from the perspective of subject areas. The program presented by us responds to this challenge, because the teacher of natural sciences must possess the knowledge and professional skills of both Chemistry and Biology, as well as Physics, in accordance with the requirements of the teacher's standard, as well as the competence to teach them in an integrated manner.

In the optional training courses of the specialty component, we also offer the student an optional Physical Geography training course and natural sciences teaching methodology, in case of choosing it, the student will be able to teach natural science at the elementary level as well. The knowledge and skills acquired within the Physical Geography training course will help future teachers to master the competence of integrated teaching of natural sciences in accordance with the requirements of the new secondary level standard.

The integrated (bachelor's-master's) educational program of elementary/secondary level for training of Physics, Chemistry and Biology teacher training of the European University takes into account the country's education policy and is focused on connecting the results obtained from the research of one's pedagogical activities with the key factors that determine teaching and learning in a general educational institution.

The university's highly qualified academic staff and material-technical base enable the university to support the implementation of the set tasks by developing educational programs corresponding to modern challenges.

Prerequisites of admission to the program

The following will be admitted to the integrated (bachelor's-master's) educational program of Physics, Chemistry and Biology teacher training at the basic/secondary level of a general educational institution:

A person with a document confirming complete general education or equivalent, who will be entitled to study at a European university based on the ranking of the coefficients of points obtained in the unified national exams.

To enroll in the program, the entrant is obliged to pass the following subjects at the unified national exams:

a) Georgian language and Literature, foreign language (English language, Russian language, French language, German language). The entrant must overcome the minimum competence limit established by the legislation.

b) Mathematics/History (the entrant must pass the minimum competence limit); The number of seats for each subject (mathematics/history) should not be less than 10% of the seats announced on the

program. The exact percentage distribution will be decided by the program head before the announcement of seats.

c) Physics/Chemistry/Biology (the entrant must pass the minimum competence limit). The number of seats for each subject (Physics, Chemistry, Biology) should not be less than 10% of the seats announced on the program. The exact percentage distribution will be decided by the program head before the announcement of seats.

The ones will get the right to study on the program without passing the general master's exams as follows:

Persons who, on the basis of the Order No. 224/N of the Minister of Education and Science of Georgia dated December 29, 2011, "On the approval of the procedure for submission and review of documents by entrants/candidates of master's degree /students with the right to study without passing unified national exams/general master's exams" have to enroll in the university without passing the general master's exams. The mentioned persons are obliged to confirm the B2 level of the Georgian language in accordance with the "Rule for determining the language competence for a student of European University ".

The following will also be admitted to the program:

Students enrolled by the rule of mobility in accordance of Order№10/N of the Minister of Education and Science of Georgia dated February 4, 2010 "On approval of the procedure and fees for transferring from a higher educational institution to another higher educational institution".

Goals of Program

The purpose of the integrated (bachelor's-master's degree) educational program for elementary/secondary level Physics, Chemistry and Biology teacher training is to:

To prepare a teacher of Physics, Chemistry and Biology with critical and creative thinking, academic skills of a general educational institution, who:

1. will be able to plan and implement the learning process based on constructivism and student-oriented;

2. will develop his professional activity based on practice research in order to improve the quality of teaching and learning;

3. will take into account the needs of the local labor market and the international trends of the field, respond to the development requirements of the field, state and society.

Learning Ourcomes

The consistent and full implementation of the goals set by the program ensures the achievement of the corresponding results of the second-level qualification discriptor of the higher education qualifications framework, namely:

Learning Outcome 1: In accordance with the requirements of the subject standard of the Physics teacher, he/she determines the essence of physical phenomena, explains the laws of Physics, the essence of physical quantities and effectively uses them to solve practical problems. Investigates the causes of events and the characteristic regularities of their course, owns technological achievements.

Learning Outcome 2: In accordance with the requirements of the subject standard of the Chemistry teacher, he/she determines the essence of chemical events, investigates the regularities of chemical processes, causes and expected results.

Learning Outcome 3: In accordance with the requirements of the subject standard of the Biology teacher, defines the basic principles of Biology as a life science, objects of study, their classification, theories of development, the main characteristics of living organisms at the cellular and molecular level, describes and analyzes modern research methods. Justifies the role of bioinformatics in genomic research.

Learning Outcome 4: Discusses issues related to the field of Physics, Chemistry and Biology in an interdisciplinary perspective and connects the acquired knowledge with everyday life. Analyzes information for research-based instruction and experimentation.

Learning Outcome 5: In order to plan and manage the short-term and long-term educational process focused on the student and the result, selects, researches and creates appropriate learning resources for the level, plans extracurricular activities taking into account the national goals of general education, the national curriculum, school priorities and students' needs. Researches and creates support resources using information technology.

Learning Outcome 6: Establishes grading schemes and rubrics to objectively assess each student's achievement and progress. Effectively uses formative assessment for the personal and cognitive development of the student.

Learning Outcome 7: Effectively using the knowledge of personality development and education theories creates a safe, free and motivating learning environment, taking into account the individual, special needs of each student, cultural diversity, differentiated approaches to integrate them into the learning process.

Learning Outcome 8: Integrates democratic values, sustainable development goals in the educational process in order to educate a citizen with responsibility towards the social and natural environment.

Learning Outcome 9: Conducts research in compliance with ethical standards, plans interventions based on analysis of research results. Formulates research findings and presents them to academic, professional or other interested audiences. Identifies own professional needs and plans own professional development activities.

Learning Outcome 10: In order to establish a cooperative culture in the school, he/she uses new strategic approaches, shows professional responsibility for the norms of ethical behavior. Establishes effective communication and business cooperation with students, colleagues, parents.

Volume and Structure of Program

The educational program is made on the basis of the European Credit Transfer System (ECTS), is student-centered, and is based on the student's academic load required to achieve the goals and results of the educational program.

1 credit includes 25 astronomical hours; a credit in a unit of time (hours) reflects the volume of work required by the student to master the relevant study course of the program and to achieve the learning outcomes. Credit includes contact and independent work hours.

The duration of the program is 5 academic years, or 10 semesters and includes 300 credits (7500 hours in total). During the semester, the student must complete 30 credits (30 credits - 750 hours), and during the academic year - 60 credits, however, depending on the student's individual workload, the number of credits per semester may be less or more than 30, while the number of credits during the academic year may be less than 60 or more but not more than 75 credits.

Within the framework of mandatory and optional components of the main field of study, the program imparts subject and professional knowledge of Physics, Chemistry and Biology, focused on development and development of skills, namely:

The major field of study component provides 130 credits, including a Physics, Chemistry and Biology subject module that provides the student with subject knowledge in accordance with the physics, including, 121 credits are provided for mandatory study courses and 9 credits to optional study courses (the student has the opportunity to choose 9 credits from the 21 credits offered).Chemistry and Biology teacher subject standard outline http://tpdc.ge/ptk_files/_ckuploaded/800248.pdf. Including, 121 credits are provided for mandatory study courses and 9 credits to optional study courses (the student has the opportunity to choose 9 credits from the 21 credits offered).

The teacher training module (63 credits) is oriented to respond to the challenges of the 21st century, to educate an active, motivated and development-oriented teacher of Physics, Chemistry and Biology in accordance with the requirements of modernity, who educates a critical thinking citizen. Within

the module, the student has the opportunity to choose one study course from three study disciplines, taking into account their interests.

The School Practice and Practice Research module (60 credits) focuses on developing practical and research skills.

School practice provides for the implementation of practical activities in a real environment, in particular, the preparation and conduct of lessons, the assessment of students, the development of an individual curriculum, the creation and use of electronic resources in the educational process. Within the framework of pedagogical practice, the student has direct communication with colleagues. Integration with the school community will enable the student to manage and adapt to a complex, unpredictable or multidisciplinary learning and/or work environment through new strategic approaches.

The research component provides teaching of the following disciplines: innovative research methods in education, practice-based research, diagnostic research and differentiated approach. The research component also includes the development and defense of a master's thesis. The module will provide the future teacher with the ability to research their own practice, which is a means of adapting to a changing environment and professional development.

The program includes mandatory courses (29 credits) as a free component, which are focused on the development of general, transferable skills, including the English language, the study of which begins at the B1 level and continues through the B2 level.

Optional training courses (with the volume of 18 credits) are also programmatically allocated within the framework of the free component, within which the student is given the opportunity to develop the transferable/general competencies of the teacher and to deepen knowledge and skills through relevant specialized training courses.

The program allows the student to develop transferable/general competencies within the optional disciplines of the free component, the knowledge and skills required for a teacher of the subjects included in the subject group, including in the direction of natural sciences teaching methods, which, according to the field document, allows him/her to work as a 5th and 6th grade teacher of natural sciences.

the graduate student will be able to use modern educational digital technologies while teaching science subjects, will be able to create an authentic digital product in accordance with the specific content as well.

Within the framework of the optional free component, in case of need (when the student cannot prove his/her knowledge of the English language at the level required to start the level provided by the curriculum of the program), students have the opportunity to master the lower levels of English (A1,

A2), which the curriculum does not provide for teaching in the standard case . Confirmation of the level of knowledge of the English language by the student is regulated in accordance with the rule of determining the language competence valid in the university.

The classification of subjects according to study areas and their above-mentioned prioritization aims to add consistency to the program and bring it under a single logical framework, which minimizes the risk of confusing knowledge in different disciplines.

The distribution of credits between the main field of study and free components of the educational program is as follows:

Subject/subject group module - 130 ECTS, including the amount of credits allocated for mandatory study courses is 121 ECTS, and the amount of credits allocated for optional study courses - 9 ECTS;

Teacher training module - 63 ECTS, including 60 ECTS credits for compulsory training courses, and 3 ECTS credits for optional training courses;

Mandatory study courses/components of school practice and practice research module - 60 ECTS, including master's thesis - 20 ECTS;

Mandatory training courses of the free component - 29 ECTS;

Optional training courses of the free component - 18 ECTS.

Assessment System of Student's Knowledge

The assessment system of a student's knowledge is in accordance with the "Rules for calculating credits for higher educational programs" approved by Order No. 3 of the Minister of Education and Science of Georgia on January 5, 2007, which provides for:

a) Five types of positive assessment:

(A) Excellent - 91-100 points;

(B) very good – 81-90 points;

(C) Good – 71-80 points;

(D) Satisfactory - 61-70 points;

(E) Sufficient – 51-60 points.

b) Two types of negative assessment:

(FX) failed - 41-50 points, which means that the student needs more work to pass and is allowed to take the additional exam once with independent work;

(F) Failed – 40 points and less, which means that the work done by the student is not enough and he/she has to study the course/subject again.

In case of receiving a negative assessment (FX) in the component of the educational program, the student has the right to take an additional exam. The student obtains the right to take the additional exam even if he/she has scored 51 points or more in the final assessment, but has not passed the minimum competence limit defined for the final exam. An additional exam is scheduled at least 5 days after the announcement of the final exam results.

The number of points obtained in the final assessment is not added to the grade received by the student in the additional exam. The grade obtained on the additional exam is the final grade and is reflected in the final grade of the educational program component.

The mid-term assessment is divided into components. A mandatory component of the mid-term assessment is the mid-term exam, which is held in the 8th-9th week . Mid-term assessment refers to the total evaluation of students' work process during working group/practical work, mid-term exam and student's independent work, and final assessment - evaluation of the final exam. The methods of mid-term and final evaluations and their share are determined by the staff implementing the training course within the framework of the relevant syllabus. The syllabus also explains the evaluation criteria for each component.

A student will be admitted to the final exam if the minimum limit of the mid-term assessment is exceeded. The final exam will be considered passed if the minimum limit for the final exam is exceeded.

The following minimum competency limits are defined for the mid-term assessment and the final exam: 50% of the mid-term assessment, 50%+1 of the final exam assessment.

The credit will be considered as mastered whether the sum of the points obtained based on the minimum limit established for the mid-term assessment and the minimum limit established in the final exam is obtained by summing up 51 points or more.

The staff implementing the training course, taking into account the specifics of the training course, is authorized to define different (higher) minimum competency limits for mid-term and final assessments, in accordance with the requirements established by the current legislation of Georgia.

The staff implementing the training course, taking into account the goals, learning outcomes and specifics of the training course, is also authorized to determine the minimum competence limit in the evaluation method/methods. Whether there is a minimum competency limit in the assessment method/methods, credit will be granted by passing the minimum competency limit in each assessment method, passing the minimum competency limit in each assessment component (mid-term and final assessment) and obtaining at least 51 points as a result of summing the points obtained in the mid-term and final assessments in case.

Field of Employment

A graduate of the integrated (bachelor's-master's) educational program for training of elementary/secondary level Physics, Chemistry andBiology teacher can work:

- As a teacher of Physics, Chemistry and Biology in a public and private general educational institution;
- In the training center/centers;
- In teacher training centers;
- In educational resource centers;
- In governmental and non-governmental organizations working in the field of education.