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**Curriculum**

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| **Program** | **Ecology** |
| **Degree awarded** | **Bachelor of Science (BSc) in Ecology** |
| **Faculty**  | **Faculty of Exact and Natural Sciences** |
| **Program coordinator/coordinators** | **Maia Gabunia** - PhD, Associated Professor🕿-04 31 7 09 52; 577 39 24 01; e-mail – maia.gabunia@atsu.edu.ge mmgabunia@ gmail.com |
| **Length of the program (semester, ECTS)** | **4 year / 8 semesters / 240 credits**Basic (Major) Programme – 180 cr.Minor Program/Free credits – 60 cr. |
| **Language of the Program**  | **Georgian** |
| **Program development and renewal date of issue** | The Accreditation Decision #50, 23.09.2011Faculty of Exact and Natural Sciences Board protocol №7; 25.04.2011Academic Board protocol №1 (11/12) 31.08.2011; Faculty Board Protocol #8, 24.05.2012Academic Board protocol #17, 25.05.2012 Faculty Board Protocol #3, 16.05.2014Faculty Board Protocol #12, 15.06.2016Academic Board protocol #2, (15/16) 22.09.2016Faculty Board Protocol #1, 11.09.2017Academic Board protocol #1 (17/18) 15.09.2017 |
| **Program prerequisites** |
| **-** Certificate of General Education issued by the State agency;**-**  Certificate of confirmation of passing the unified national exams; |
| **Aim of the Program** |
| The program aims to * Provide students with theoretical knowledge of professional level and develop their practical skills in biological and ecological disciplins, also provide knowledge of the basics in natural and other (Calculus, Computer, Physics, Chemoistry and Geography) sciences;
* Introduce major ecological factors and the impact on certain plants and animals, species and eco-systems to be able to analyse interaction of live organizms with the environment;
* exercise the skills of application of practical knowledge;
* provide students with knowledge and experience which after the completion of the program enables him/her to get employed at the educational and science institutions and agencies of the related profile.
* Ensure the implementation of the course according to the standards set by ATSU Quality Insurance office;

award students with bachelor degree approved by the Ministry of Education of Georgia. |
| **Learning outcomes (the map of competences): see appendix 2** |
| **Knowledge and understanding** | A student* defines correlation mechanisms of live organisms and the surrounding environment;
* has broad knowledge of biological and ecological processes on various levels (from molecular to eco-system;
* is aware of major types of eco-systems and studies the issues of the population of organism;
* understands the forms of correlation between live organisms in the biosphere;
* describes the effect of ecological factors of the environment over plants and animals;
* analyses peculiarities of anthropogenic impact over the environment;
* is aware of the basics of biodiversity and bio conservation, and the principles of nature protection and rational use of natural resources;
* knows environmental impact factors on human health and life expectancy, also the mechanisms of workability maintenance;
* knows the basics of environmental protection and law, natural resources and nature protection;
* understands the basics of environmental biomonitoring and expertise which is an essential for the preservation of biodiversity;
* possesses level of knowledge of chemistry and physics necessary for the acknowledgement of chemical and physical basics of biological and ecological processes.
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| **Applying knowledge** | A student * applies knowledge to plan future scientific activities;
* applies major research methods of ecology;
* knows basic methods of field research;
* applies modern technical and analytical methods to study genetic links between organisms and population.
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| **Making judgement** | After the completion of the program, the graduate * has skills for abstract thinking, analysis and synthesizing, problem identification and solution;
* understands professional situations;
* is able to infer conclusions on the basis of rounded vision and analysis of ecological problems.
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| **Communication skills** | A student * is capable of discussion and inference to accurately pass conclusions to the addressee;
* discusses program issues and establishes his/her viewpoint with the appropriate vocabulary.
 |
| **Learning skills** | A student* is able to work independently, employs information and communication technologies and electronic resources;
* evaluates personal educational process opportunities and necessities, makes decision on future academic development;
* respects his/her professional practice;

independently works on the reference literature, and gets regularly updated on the current scientific information. |
| **Values** | A student * has ability of critical thinking and self-criticism;
* is able to stand for professional values in different situations;
* Is able to apply wide range of knowledge and practice;
* is responsible for the safety of the environment;
* understands the importance to take responsibility.
 |
| **Teaching methods** |
| Verbal, computer, audio-visual presentations, laboratory and practical sessions, seminars, internship, individual consultations, independent work.  |
| **Structure of the Program** |
| **4 years / 8 semesters / 15 weeks per semester** The program covers 180 credits of major and 60 credits of minor courses equaling a total of 240 credits. Major course combines: compulsory university courses: Foreign Language 1, 2, 3 (15 credits), elective faculty courses (20 credits), compulsory courses of specialization (120 credits) and elective specialization courses (25 credits); free course (5 credits). ATSU faculty of Exact and Natural Sciences Department of Biology implements the program.**See Appendix 1.** |
| **Assessment System** |
| Final assessment of a student is obtained from the add-up of mid-term and final exams throughout the semester. The educational course has a grading scale of 100 points. The student has the right to take the final exam, if his/her minimum competency equals 18 points.Minimum margin of assessment received by the student on the final exam is 15 points. Below than this, is assessed with FX (fail).Evaluation System includes: A. Five Forms 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 pointsB. Two Forms of Negative Assessment: (FX) (Administrative Fail in Course for Grade/could not pass) – A student gets 41-50 points from maximum evaluation which means that s/he is required to work more for passing the exam, and that s/he is entitled to take a make-up exam only once through personal study(F) (Academic Fail) – A student gets 0 – 40 points from maximum evaluation; it means that the work done by him/her is not sufficient and she/he has to retake the course. According to educational component of educational program, in case of adoption of FX, a makeup exam will be appointed no less than 5 calendar days after the conclusion of the final exam results.The number of points received in the make-up final exam, is not added to the final assessment received by the student.According to the assessment 0-50 points received from the make-up final exam, in the final evaluation of the educational component, the student will receive a grade of F-0.(Midterm and final exams take place in exam center of ATSU)Specific assessment criteria are outlined in the syllabus of the relevant academic course. |
| **Employment opportunities** |
| Scientific research and scientific entrepreneurial organizations; environmental management and administration offices, Georgia state museums, zoos, botanical gardens, customs and environmental services, different production enterprises and farms, Natural Recourses Management and Environmental Monitoring Service; sphere of eco-tourism, pharmaceutical companies; health prophylactic, sanitary, epidemiological and disease control services; private companies implementing environmental programs; food industry.After graduation from bachelor degree student can apply graduate programs in biology and other related fields at any universities. |

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**Curriculum 2017-2021**

**Program: Ecology**

**Qualification: Bachelor of Science in Ecology (BSc in Ecology)**

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| --- | --- | --- | --- | --- | --- | --- | --- |
| № | course | Contact hrs. per week | Credit Number | The number of hours | Lectures/practical/group work/laboratory | Semester | დაშვების წინაპირობა |
| Total | Contact | Independent | I | II | III | IV | V | VI | VII | VIII |
| Auditory | Midterm and final exam |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |  18 |
| **1** | **University Compulsory (15 ECTS)** |
| 1.1 | Foreign Language-1  | 4 | 5 | 125 | 60 | 3 | 62 | 0/3/0/0 | 5 |  |  |  |  |  |  |  | – |
| 1.2 | Foreign Language -2 | 4 | 5 | 125 | 60 | 3 | 62 | 0/3/0/0 |  | 5 |  |  |  |  |  |  | 1.1 |
| 1.3 | Foreign Language -3 | 4 | 5 | 125 | 60 | 3 | 62 | 0/3/0/0 |  |  | 5 |  |  |  |  |  | 1.2 |
|  | **Total** | **9** | **15** | **375** | **135** | **9** | **231** |  |  |  |  |  |  |  |  |  |  |
| **2** | **Faculty Compulsory Courses (20 ECTS )** |
| 2.1 | Calculus | 4 | 5 | 125 | 60 | 3 | 62 | 2/2/0/0 | 5 |  |  |  |  |  |  |  | – |
| 2.2. | Mathematical Analysis -1 | 4 | 5 | 125 | 60 | 3 | 62 | 2/2/0/0 | 5 |  |  |  |  |  |  |  | – |
| 2.3. | Introduction to Physics | 3 | 5 | 125 | 45 | 3 | 77 | 2/1/0/0 | 5 |  |  |  |  |  |  |  | – |
| 2.4 | Introduction to Chemistry | 3 | 5 | 125 | 45 | 3 | 77 | 2/0/1/0 | 5 |  |  |  |  |  |  |  | – |
| 2.5 | Introduction to Biology | 3 | 5 | 125 | 45 | 3 | 77 | 2/1/0/0 | 5 |  |  |  |  |  |  |  | – |
| 2.6 | Introduction to Geography | 3 | 5 | 125 | 45 | 3 | 77 | 2/1/0/0 | 5 |  |  |  |  |  |  |  | – |
| 2.7. | Linear Algebra and Analytic Geometry | 3 | 5 | 125 | 45 | 3 | 77 | 2/1/0/0 | 5 |  |  |  |  |  |  |  | – |
| 2.8. | Basics of Programming | 3 | 5 | 125 | 45 | 3 | 77 | 1/1/1/0 | 5 |  |  |  |  |  |  |  | – |
|  | **Total** |  | **20** | **500** | **195** | **12** | **293** |  |  |  |  |  |  |  |  |  |  |
| **3** | **Specialization Compulsory Courses (120 ECTS)** |
| 3.1 | Computer Skills | 4 | 5 | 125 | 60 | 3 | 62 | 2/0/2/0 | 5 |  |  |  |  |  |  |  | – |
| 3.2 | Physics | 3 | 4 | 100 | 45 | 3 | 52 | 2/1/0/0 |  | 4 |  |  |  |  |  |  | – |
| 3.3 | Organic Chemistry | 2 | 3 | 75 | 30 | 3 | 42 | 1/0/1/0 |  | 3 |  |  |  |  |  |  | 2.4 |
| 3.4 | Physical and Colloid Chemistry | 2 | 3 | 75 | 30 | 3 | 42 | 1/0/1/0 |  | 3 |  |  |  |  |  |  | – |
| 3.5 | Human Anatomy | 3 | 5 | 125 | 45 | 3 | 77 | 1/2/0/0 |  | 5 |  |  |  |  |  |  | – |
| 3.6 | Botany | 3 | 5 | 125 | 45 | 3 | 77 | 2/1/0/0 |  | 5 |  |  |  |  |  |  | 2.5 |
| 3.7 | Training Field Practice in Botany | 3 | 5 | 125 | 45 | – | 80 |  |  | 5 |  |  |  |  |  |  | 3.6 |
| 3.8 | Zoology | 3 | 5 | 125 | 45 | 3 | 77 | 2/1/0/0 |  |  | 5 |  |  |  |  |  | – |
| 3.9 | Cytology | 3 | 5 | 125 | 45 | 3 | 77 | 2/1/0/0 |  |  | 5 |  |  |  |  |  | – |
| 3.10 | General Ecology | 3 | 5 | 125 | 45 | 3 | 77 | 2/1/0/0 |  |  | 5 |  |  |  |  |  | 3.6 |
| 3.11 | Training Field Practice in Zoology | 3 | 5 | 125 | 45 | – | 80 |  |  |  |  | 5 |  |  |  |  | 3.8 |
| 3.12 | Plant Ecology | 3 | 5 | 125 | 45 | 3 | 77 | 2/1/0/0 |  |  |  | 5 |  |  |  |  | 3.10 |
| 3.13 | Biophysics | 3 | 5 | 125 | 45 | 3 | 77 | 2/1/0/0 |  |  |  | 5 |  |  |  |  | 3.9 |
| 3.14 | Microbiology-Virology | 3 | 5 | 125 | 45 | 3 | 77 | 1/1/1/0 |  |  |  | 5 |  |  |  |  | – |
| 3.15 | Plant Physiology | 3 | 5 | 125 | 45 | 3 | 77 | 2/1/0/0 |  |  |  |  | 5 |  |  |  | 3.6 |
| 3.16 | Biophysics | 3 | 5 | 125 | 45 | 3 | 77 | 2/1/0/0 |  |  |  |  | 5 |  |  |  | 3.10 |
| 3.17 | Molecular Biology | 3 | 5 | 125 | 45 | 3 | 77 | 2/1/0/0 |  |  |  |  | 5 |  |  |  | 3.9 |
| 3.18 | Genetics | 3 | 5 | 125 | 45 | 3 | 77 | 2/1/0/0 |  |  |  |  |  | 5 |  |  | 3.9 |
| 3.19 | Human and Animal Physiology | 4 | 5 | 125 | 45 | 3 | 77 | 2/0/1/0 |  |  |  |  |  | 5 |  |  | 3.53.9 |
| 3.20 | Applied Ecology | 3 | 5 | 125 | 45 | 3 | 77 | 2/1/0/0 |  |  |  |  |  | 5 |  |  | 3.10 |
| 3.21 | Bio conservation and Protected Territories | 3 | 5 | 125 | 45 | 3 | 77 | 2/1/0/0 |  |  |  |  |  |  | 5 |  | – |
| 3.22 | Medical Ecology | 3 | 5 | 125 | 45 | 3 | 77 | 2/1/0/0 |  |  |  |  |  |  | 5 |  | – |
| 3.23 | Hydrobiology | 3 | 5 | 125 | 45 | 3 | 77 | 2/1/0/0 |  |  |  |  |  |  |  | 5 | 3.6 3.8 |
| 3.24 | Biogeography | 3 | 5 | 125 | 45 | 3 | 77 | 2/1/0/0 |  |  |  |  |  |  |  | 5 | 3.10 |
| 3.25 | Legislative Basics of Ecology | 3 | 5 | 125 | 45 | 3 | 77 | 2/1/0/0 |  |  |  |  |  |  |  | 5 | 3.21 |
| **სულ:** | **50** | **120** | **3000** | **1140** | **69** | **1791** |  |  |  |
| **4** | **Specialization Elective Modules (20 ECTS)** |
| **Elective Module - 1** |  | **5** |  |  |  |  |  |  |  |  |  | **5** |  |  |  |  |
| 4.1.1 | Agricultural Ecology | 3 | 5 | 125 | 45 | 3 | 77 | 2/1/0/0 |  |  |  |  |  |  |  |  | 3.12 |
| 4.1.2 | Ecological Anatomy of Plants | 3 | 5 | 125 | 45 | 3 | 77 | 2/1/0/0 |  |  |  |  |  |  |  |  | 3.6 |
| 4.1.3 | Foreign Language | 3 | 5 | 125 | 45 | 3 | 77 | 0/3/0/0 |  |  |  |  |  |  |  |  | 1.3 |
| **Elective Module – 2** |  | **5** |  |  |  |  |  |  |  |  |  |  | **5** |  |  |  |
| 4.2.1 | Radioactive Ecology | 3 | 5 | 125 | 45 | 3 | 77 | 2/1/0/0 |  |  |  |  |  |  |  |  | – |
| 4.2.2 | Population Ecology | 3 | 5 | 125 | 45 | 3 | 77 | 2/1/0/0 |  |  |  |  |  |  |  |  | 3.10 |
| 4.2.3 | Foreign Language | 3 | 5 | 125 | 45 | 3 | 77 | 0/3/0/0 |  |  |  |  |  |  |  |  | 1.3 |
| **Elective Module – 3** |  | **5** |  |  |  |  |  |  |  |  |  |  |  | **5** |  |  |
| 4.3.1 | Nature Protection and Rational Application of Natural Resourses  | 3 | 5 | 125 | 45 | 3 | 77 | 2/1/0/0 |  |  |  |  |  |  |  |  | 3.10 |
| 4.3.2 | Ecological Journalistics | 3 | 5 | 125 | 45 | 3 | 77 | 2/1/0/0 |  |  |  |  |  |  |  |  | 3.10 |
| 4.3.3 | Foreign Language | 3 | 5 | 125 | 45 | 3 | 77 | 0/3/0/0 |  |  |  |  |  |  |  |  |  |
| **Elective Module – 4** |  | **5** |  |  |  |  |  |  |  |  |  |  |  |  | **5** |  |
| 4.4.1 | Monitoring and Expertise | 3 | 5 | 125 | 45 | 3 | 77 | 2/1/0/0 |  |  |  |  |  |  |  |  | 3.10 |
| 4.4.2 | Urban Ecology | 3 | 5 | 125 | 45 | 3 | 77 | 2/1/0/0 |  |  |  |  |  |  |  |  | 3.10 |
|  | **Total:** | **12** | **20** | **500** | **180** | **12** | **308** |  |  |  |  |  |  |  |  |  |  |
|  | **Free Credit** | 3 | **5** | 125 | 45 | 3 | 77 |  |  |  |  |  |  |  | **5** |  |  |
|  | **Overall total** |  | **180** | **4500** | **1695** | **105** | **2700** |  |  |  |  |  |  |  |  |  |  |
|  | **Minor modules** |  | **60** |  |  |  |  |  |  |  | **10** | **10** | **10** | **10** | **10** | **10** |  |
|  | **Total** |  | **240** |  |  |  |  |  | **30** | **30** | **30** | **30** | **30** | **30** | **30** | **30** |  |

**Program Components**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Courses** | **Credits** | **Semesters** |
| **I** | **II** | **III** | **IV** | **V** | **VI** | **VII** | **VIII** |
| 1 | **University courses (Foreifn language)** | 15 | 5 | 5 | 5 |  |  |  |  |  |
| 2 | **Faculty elective courses** | 20 | 20 |  |  |  |  |  |  |  |
| 3 | **Specialization courses** | **Compulsory** | 120 | 5 | 25 | 15 | 20 | 15 | 15 | 10 | 15 |
| **Elective** | 20 |  |  |  |  | 5 | 5 | 5 | 5 |
| 4 | **Free Credits** | 5 |  |  |  |  |  |  | 5 |  |
| 5 | **Minor credits** | 60 |  |  | 10 | 10 | 10 | 10 | 10 | 10 |
|  | **Total:**  |  **240** | **30** | **30** | **30** | **30** | **30** | **30** | **30** | **30** |

Students can choose among the following minor programs: chemistry, geography, physics, mathematics, economics, Information technologies,

teacher training program and etc.