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**Curriculum**

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| **Program** | | **Biology** | |
| **Degree awarded** | | **Bachelor of Science (BSc) in Biology** | |
| **Faculty** | | **Faculty of Exact and Natural Sciences** | |
| **Program coordinator/coordinators** | | **Shota Jinjolia** - Head of the Department of Biology, Associated Professor | |
| **Length of the program (semester, ECTS)** | | **4 years / 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 #39, 23.09.2011  Faculty of Exact and Natural Sciences Board protocol №7; 25.04.2011  Academic Board protocol №1 (11/12) 31.08.2011;  Faculty Board Protocol #8, 24.05.2012  Academic Board protocol #17, 25.05.2012  Faculty Board Protocol #3, 16.05.2014  Faculty Board Protocol #12, 15.06.2016  Academic Board protocol #2, (15/16) 22.09.2016  Faculty Board Protocol #1, 11.09.2017  Academic 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 at preparing professionals in the field of Natural Sciences. It provides students with theoretical knowledge of fundamental disciplines in biology and relevant undergraduate qualification. Students are offered to study processes on different levels (from molecular to ecosystem) of structural organization; basic biological and chemical processes through which any organisms function; basic types of cells and tissues and their functions; molecular basis of inheritance; microorganisms and viruses; physiology of plants, animals and humans and the connection of physiological processes taking place in organisms with environment; modern theories of evolution; basic principles of terminology, taxonomy and classification, and the identification of essential taxonomic units; major types of ecosystem; links between live organisms and biosphere; methods searching and analyzing field information; ways of applying field knowledge in solving known/unknown problems.  The program promotes basic knowledge of natural studies and its related sciences (physics, chemistry, calculus, and computer), also, it helps develop practical skills and ethical aspects for field work on live organisms. | | | |
| **Learning outcomes (the map of competences):** | | | |
| **Knowledge and understanding** | A student has:   * Basic theoretical education in biology; * Ability to demonstrate the knowledge of methods for collecting field information and analyzing it; * Ability to use field knowledge to solve known/unknown problems; * Biological knowledge of the processes on different levels (from molecular to ecosystem) of structural organization; * Ability to demonstrate knowledge of major types and functions of cells and tissues; * Understanding of basic biochemical processes beyond the existence of the organisms; * Education in microbiology; * Knowledge of molecular basis of inheritance; * Theoretical knowledge of the physiology of plants, animals and humans, and can refer physiological processes of the organisms to the environment. * Ability to discuss modern theories of evolution; * Ability to demonstrate knowledge of major principles of terminology, taxonomy and classification, and to identify essential taxonomic units; * Ability to describe major differences between essential taxonomic units; * Ability to describe major types of ecosystem and to interpret links between live organisms and biosphere. * sufficient knowledge of chemistry and physics to understand chemical and physical basis of biological effects. | | |
| **Applying knowledge** | * Ability to take field practice in chemical and biochemical laboratories; * Ability to acquire and use modern methodology; * Ability to conduct independent field research with modern methodology as well as to acquire new field research methods; * Ability to conduct independent experiment, describe experimental data, analyze and critically evaluate; * Ability to apply theoretical knowledge, acquired in various directions of biology, in practice. | | |
| **Making judgement** | After the completion of the program, the graduate will have:   * Ability to discuss, analyze, synthesize and proceed practical issues, theories and concepts in different directions of biology; * Ability to perceive professional situations; * Ability to view biological problem from multiple angles and to come to come to reasonable conclusions; * Ability to study, infer and report the field material . | | |
| **Communication skills** | A student will be   * Communicating effectively orally and in written form with colleagues and academic personnel on professional issues; * Able to present information to the audience with the use of biological terminology. | | |
| **Learning skills** | A student will have:   * Ability to use information, communication technologies and electronic resources; * Ability to independently get updated on biological sciences and current scientific information on regular basis; * Ability to evaluate his/her own professional state, understand the necessity of development, define learning priorities and plan the process. | | |
| **Values** | A student will have:   * Ability to share and practically realize professional values on local and national levels; * Ability of critical thinking and self-criticism; * Ability to stand for professional values in different situations; * Ability to independently apply wide range of knowledge and practice; * Ability to conduct field/laboratory research on live organisms considering the principles of ethics and security; * Ability to be responsible for the safety of the environment. | | |
| **Teaching methods** | | | |
| In teaching biology, we apply various methods and techniques that are frequently combined and interrelated.  **Verbal/Narrative technique** – Lecture and audio-visual presentation. Traditional form of lectures is consistent with computer and/or audio-visual presentation to illustrate teaching material.  **Practical, laboratory and demonstration methods** – this type of organizing teaching process aims at enhancing the sensitivity towards the diversity of bio systems among students, upgrade field knowledge and practice skills. These methods assist the development of general skills of communication, group work and problem solving.  **Writing technique** – writing and testing, quizzes, exercises and problem solving; preparing abstracts using programmatic and additional reference literature;    With certain courses we apply following methods:   * **Group work** * **Presentation** * **Independent work** * **Discussion/Debate** * **Field practice**   Methods used for specific courses are described in the related syllabuses. | | | |
| **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 (20 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 points  B. 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 specializations at any universities. | | | |
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**Curriculum 2017-2021**

**Programme: Biology**

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

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| № | Course | Contact hrs. per week | Credit Number | The number of hours | | | | Lectures/practical/group work/laboratory | Semester | | | | | | | | Precondition |
| 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:** | |  | **15** | **375** | **135** | **9** | **231** | **-** |  |  |  |  |  |  |  |  |  |
| 2 | **Faculty Compulsory Courses (20 ECTS – 4 courses)** | | | | | | | | | | | | | | | | | |
| 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 | 2/1/0/0 | 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** | **210** | **12** | **278** | **-** |  |  |  |  |  |  |  |  |  |
| 3 | **Specialization Compulsory Courses (120 ECTS) Faculty Elective Courses (5 ECTS 1 course)** | | | | | | | | | | | | | | | | | |
| 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 | 4 | 5 | 125 | 60 | 3 | 62 | 2/2/0/0 |  | 5 |  |  |  |  |  |  | 2.5 |
| 3.7 | Training Field Practice in Botany | 3 | 5 | 125 | 45 | - | 80 |  |  | 5 |  |  |  |  |  |  | 3.6 |
| 3.8 | Zoology | 4 | 5 | 125 | 60 | 3 | 62 | 2/2/0/0 |  |  | 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 | Biochemistry | 3 | 5 | 125 | 45 | 3 | 77 | 2/0/1/0 |  |  |  | 5 |  |  |  |  | 3.3 |
| 3.13 | Histology | 3 | 5 | 125 | 45 | 3 | 77 | 1/2/0/0 |  |  |  | 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 | 60 | 3 | 62 | 2/0/2/0 |  |  |  |  | 5 |  |  |  | 3.6 |
| 3.16 | Biophysics | 3 | 5 | 125 | 45 | 3 | 77 | 2/1/0/0 |  |  |  |  | 5 |  |  |  | 3.2 |
| 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 | 60 | 3 | 62 | 2/0/2/0 |  |  |  |  |  | 5 |  |  | 3.5  3.9 |
| 3.20 | Hydrobiology | 3 | 5 | 125 | 45 | 3 | 77 | 2/1/0/0 |  |  |  |  |  | 5 |  |  | 3.6  3.8 |
| 3.21 | Immunology | 3 | 5 | 125 | 45 | 3 | 77 | 2/1/0/0 |  |  |  |  |  |  | 5 |  | 3.13 |
| 3.22 | Theories of Evolution | 3 | 5 | 125 | 45 | 3 | 77 | 2/1/0/0 |  |  |  |  |  |  | 5 |  | 3.18 |
| 3.23 | Developmental Biology | 3 | 5 | 125 | 45 | 3 | 77 | 2/1/0/0 |  |  |  |  |  |  |  | 5 | 3.18 |
| 3.24 | Biogeography | 3 | 5 | 125 | 45 | 3 | 77 | 2/1/0/0 |  |  |  |  |  |  |  | 5 | 3.10 |
| 3.25 | Biotechnology | 3 | 5 | 125 | 45 | 3 | 77 | 2/1/0/0 |  |  |  |  |  |  |  | 5 | 3.14 |
| **Total:** | | **50** | **120** | **3000** | **1170** | **69** | **1761** | **-** |  |  |  |  |  |  |  |  |  |
| **4** | **Specialization Elective Modules (20 ECTS)** | | | | | | | | | | | | | | | | | |
|  | **Elective Module - 1 5** | | | | | | | | | | | | | | | | | |
| 4.1.1 | Healing Plants | 3 | 5 | 125 | 45 | 3 | 77 | 2/1/0/0 |  |  |  |  |  |  |  |  | 3.6 |
| 4.1.2 | Entomology | 3 | 5 | 125 | 45 | 3 | 77 | 2/1/0/0 |  |  |  |  |  |  |  |  | 3.8 |
| 4.1.3 | Foreign Language 1 | 3 | 5 | 125 | 45 | 3 | 77 | 0/3/0/0 |  |  |  |  |  |  |  |  | 1.3 |
|  | **Elective Module – 2 5** | | | | | | | | | | | | | | | | | |
| 4.2.1 | Parasitology | 3 | 5 | 125 | 45 | 3 | 77 | 2/1/0/0 |  |  |  |  |  |  |  |  | 3.8 |
| 4.2.2 | Physical and Chemical features of Membrane | 3 | 5 | 125 | 45 | 3 | 77 | 2/1/0/0 |  |  |  |  |  |  |  |  | 3.16 |
| 4.2.3 | Foreign Language 2 | 3 | 5 | 125 | 45 | 3 | 77 | 0/3/0/0 |  |  |  |  |  |  |  |  | 1.3 |
|  | **Elective Module – 3 5** | | | | | | | | | | | | | | | | | |
| 4.3.1 | Human Genetics | 3 | 5 | 125 | 45 | 3 | 77 | 2/1/0/0 |  |  |  |  |  |  |  |  | 3.9  3.18 |
| 4.3.2 | Diagnostics of Genome | 3 | 5 | 125 | 45 | 3 | 77 | 2/1/0/0 |  |  |  |  |  |  |  |  | 3.18 |
| 4.3.3 | Foreign Language 3 | 3 | 5 | 125 | 45 | 3 | 77 | 0/3/0/0 |  |  |  |  |  |  |  |  |  |
|  | **Elective Module – 4 5** | | | | | | | | | | | | | | | | | |
| 4.4.1 | Human Biology | 3 | 5 | 125 | 45 | 3 | 77 | 2/1/0/0 |  |  |  |  |  |  |  |  | 3.13  3.18  3.19 |
| 4.4.2 | Enzymology | 3 | 5 | 125 | 45 | 3 | 77 | 1/2/1/0 |  |  |  |  |  |  |  |  | 3.12 |
| **Total:** | | **12** | **20** | **500** | **180** | **12** | **308** | **-** |  |  |  |  |  |  |  |  |  |
| **Free Credits** | | 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** |  |

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|  | | **Program Components** |  |  |  |  |  |  |  |  |  |  |  |  |
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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Courses** | | **Credits** | **Semesters** | | | | | | | |
| **I** | **II** | **III** | **IV** | **V** | **VI** | **VII** | **VIII** |
| 1 | **University courses (Foreign language)** | | 15 | 5 | 5 | 5 |  |  |  |  |  |
| 2 | **Faculty elective courses** | | 20 | 25 |  |  |  |  |  |  |  |
| 3 | **Specialization courses** | **Compulsory** | 120 |  | 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.