



Curriculum

Program title	Applied Biosciences (Biotechnology)
Qualification/Academic degree to be awarded	Bachelor in Applied Biosciences and Biotechnology
Faculty name	Faculty of Exact and Natural Sciences
Program Supervisor (s)/Coordinator	Doctor of Biology, Associate Professor Ketevan Chikvinidze
Program duration/volume (semesters, credits)	The program lasts for 4 years (eight semesters). The volume of the program is 240 credits : 180 credits main program + 60 credits additional (minor) program.
Language of instruction	Georgian
Program elaboration and renewal dates	Resolution of the Accreditation Council №442166, 13.05.2021 Resolution of the Academic Council №1(21/22), 17.09.2021 Resolution of the Academic Council №3 (22/23), 16.09.2022 Resolution of the Academic Council №5 (23/24), 14.09.2023
Admission prerequisites (requirements)	
➤ A document-diploma certifying complete general education and a document certifying passing the unified national exams, which grant the person a student status; ➤ Without passing the unified national exams, according to the procedure established by the Ministry of Education and Science of Georgia and within the established time frame, the following are allowed: a) For citizens of a foreign country and stateless persons who have received a complete general or equivalent education in a foreign country; b) For citizens of Georgia who received full general education or its equivalent in a foreign country and during the last 2 years of full general education studied in a foreign country; c) For persons who study/studied and received credits in a higher educational institution in a foreign country recognized by the legislation of this country. ➤ External and internal mobility	
Program analogs	
1. TSU Bachelor's program "Applied Biosciences and Biotechnology" https://tsu.ge/ka/faculty/%E1%83%96%E1%83%A3%E1%83%A1%E1%83%A2%20%E1%83%93%E1%83%90%20%E1%83%A1%E1%83%90%E1%83%91%E1%83%A3%E1%83%9C%E1%83%94%E1%83%91%E1%83%98%E1%83%A1%E1%83%9B%E1%83%94%E1%83%A2%E1%83%A7%E1%83%95%E1%83%94%E1%83%9A%E1%83%9D%20%E1%83%9B%E1%83%94%E1%83%AA%E1%83%9C%E1%83%98%E1%83%94%E1%83%A0%E1%83%94%E1%83%91%E1%83%90%E1%83%97%E1%83%90%20%E1%83%A4%E1%83%90%E1%83%99%E1%83%A3%E1%83%9A%E1%83%A2%E1%83%94%E1%83%A2%E1%83%98/programs/25 2. University of Wroclaw, Poland https://www.bachelorstudies.com/Bachelor-in-Biotechnology/Poland/UWr/ 3. Universitat Autònoma de Barcelona https://www.uab.cat/web/estudiar/ehea-degrees/study-plan/skills/biotechnology-1345467897139.html?param1=1231314915924 4. Furtwangen University, Germany https://www.hs-furtwangen.de/en/programmes/appliedbiologybachelor/details-of-programme/ 5. https://www.moderncollegegk.org/NAAC_DATA/programme_outcomes/2020/BScBiotech04.pdf 6. Newcastle University, United Kingdom ncl.ac.uk/regulations/specs/2008-2009/BIOL/C110_C111_BSc_Applied_Biology.pdf 7. University of the West of Scotland (UWS) https://www.uws.ac.uk/study/undergraduate/undergraduate-course-search/applied-bioscience/ 8. University of the South Wales https://www.southwales.ac.uk/courses/bsc-hons-applied-biosciences 9. University of Kent	

<https://www.kent.ac.uk/courses/undergraduate/2488/applied-bioscience>

10.The University of Manchester

<https://www.manchester.ac.uk/study/undergraduate/courses/2022/08662/bsc-biotechnology/course-details/>

Program aims

The bachelor's program aims to

- give students a broad theoretical and practical knowledge of fundamental disciplines of biology and the field of biotechnologies;
- teach them the structural-functional organization of living organisms, the molecular and biochemical bases of the processes taking place in them and their connection with biotechnology;
- introduce the forms of interaction with information and research technologies, working in chemical-biological laboratories, as well as the approaches and technologies used to solve biological problems;
- develop their ability to conduct quantitative analysis concerning biological systems;
- demonstrate the connection of basic principles and concepts of natural and applied exact sciences with basic aspects of applied biosciences and biotechnology;
- develop their ability to apply the acquired knowledge in practice.

Learning Outcomes

The graduate of the educational program

Knowledge and understanding	• Demonstrates broad theoretical and practical knowledge of both the fundamental disciplines of biology and applied biosciences and biotechnologies. • Connects the structural-functional organization of living organisms and the chemistry of organisms with biotechnologies. • Lists and describes basic forms of biological systems and research methods used in biotechnology. • Explains the importance of possessing the skills of problem-solving, time planning and optimal organization of activities in biotechnology for further employment. • Relates basic principles and concepts of natural and applied exact sciences to key aspects of applied biosciences and biotechnology.
Skill	• Performs a practical task independently or in a group by connecting the acquired knowledge with practical activities, using modern methods and approaches. • Performs hands-on work using appropriate safety guidelines and procedures, and basic laboratory skills. • Uses quantitative analysis methods and computer programs for data processing. • Analyzes and evaluates the information obtained using modern information and communication technologies, presents the conclusions to the audience, and gives justified argumentation.
Responsibility and autonomy	• Conducts activities in compliance with safety rules, and ethical norms and takes responsibility for his/her own actions. • Independently determines the need to acquire new knowledge and plans his/her own professional development.

Teaching methods

Verbal or oral, practical, laboratory, group work, written work, explanatory, analysis, synthesis, discussion/debate, inductive and deductive, demonstration, collaborative teaching, and action-oriented teaching methods.

Program structure

The program is based on the European Credit Transfer and Accumulation System (ECTS).

The program lasts for 4 years (eight semesters).

The program covers 240 credits (ECTS*) (60 credits per year or 30 credits per semester) - 180 credits major program + 60 credits minor program. In the VIII semester, the student does professional (field) practice - 15 credits.

180 credits of the main program are distributed as follows:

Compulsory courses corresponding to the content of the main field of study - 125 credits

Elective courses corresponding to the content of the main field of study - 20 credits

Mandatory training courses of the free component - 35 credits

Note: It is desirable to choose an additional (minor) program in chemistry.

See the study plan in Appendix 1!

Student Knowledge Assessment System and Criteria

The existing assessment system at Akaki Tsereteli State University is divided into the following components:

Out of the total points (100 points) of the evaluation component of the educational program, the share of the mid-term evaluation totals 60 points, which in its turn includes the following forms of evaluation:

- **Student activity during the academic term (includes various components of assessment) – no more than 30 points;**
- **Mid-term examination – no less than 30 points;**
- **Final examination – 40 points.**

The right to take the final exam is awarded to a student whose minimum competency threshold in the components of the midterm assessments totals **not less than 20 points**, out of which the evaluation of the activity components must be **no less than 12 points**.

The evaluation system provides for:

a) Five forms of positive assessment:

a.a) (A) Excellent – 91 – 100 points;

a.b) (B) Very good – 81 – 90 points;

a.c) (C) Good – 71-80 points;

a.d) (D) Satisfactory – 61-70 points;

a.e) (E) Sufficient – 51-60 points.

b) Two forms of negative assessment:

b.a) (FX) Could not pass – 41-50 points, which means that the student needs to work more to pass the exam and is entitled to retake the exam only once after the individual work;

b.b.) (F) Failed – 40 points and lower, which means that the work done by the student is not sufficient and she/he has to redo the course.

In case of receiving an FX in the program's educational component, a makeup examination shall be appointed no later than 5 days after the announcement of the final exam results.

The minimum threshold grade obtained by the student in the final exam **is set at 16 points**.

The number of points obtained in the final assessment is not added to the grade obtained by the student on the makeup exam.

The assessment obtained on the makeup exam is the final assessment and is reflected in the final evaluation of the training component of the educational program. Considering the grade received on the makeup exam, in case of getting 0-50 points in the final evaluation of the educational component, the student shall be assigned the grade F-0 points.

Additional criteria for assessing a student's achievement in the study course are defined in the relevant syllabus.

Employment areas

Graduates of the bachelor's program - Applied Biosciences (Biotechnology) - have a wide range of employment areas: they may be employed in laboratories of the relevant profile of clinical-diagnostic and scientific-research institutes; in the diagnostic centers of the Ministry of Internal Affairs and Justice; in expertise services; in environmental protection and monitoring services; in research and consulting services; in sanitary and environmental safety services; in the pharmacological and pharmaceutical industry; in private companies of the food industry and agricultural profile, generally, in such enterprises, where complex knowledge of methods and approaches of both fundamental and applied fields of life sciences is necessary. They will also be able to continue their studies in master's degree programs in applied biosciences and biotechnology, biology, nutrition, pharmaceuticals, toxicology and other related specialties.

Supporting conditions/resources necessary for learning

Bachelor program "Applied Biosciences (Biotechnology)" is provided with university and faculty academic and material-technical base and resources.

ATSU lecture halls, study laboratories, university library, and reading halls are used for the educational process. A foreign language learning center, Internet-enabled computer center equipped with a package of traditional programs, the university network for registering students to use the electronic library and obtain the necessary information, as well as to monitor educational process; student activity promotion services; private literature available in the department.

Cabinet-laboratories of the Department of Biology:

1. Research laboratory of higher nervous activity
2. Laboratory of genetics
3. Herbarium
4. Microbiology-virology laboratory
5. Laboratory of Human and Animal Physiology
6. Laboratory of normal human anatomy
7. Cytology, histology laboratory
8. Laboratory of Plant Biology
9. Cabinet of Zoology and Ecology
10. Museum of Zoology
11. Laboratory of Biosafety.

Study Plan 2023-2024

Name of the Program: Bachelor's Educational Program "Applied Biosciences (Biotechnology)"

Qualification to be awarded: Bachelor of Applied Biosciences and Biotechnology

	Course Title	Cr	The volume of the workload in hrs.				L/p/lab/gr	Semester								Admission Prerequisite
			Total	Contact		Ind		I	II	III	IV	V	VI	VII	VIII	
				Classroom	Midterm Exams											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	Compulsory courses of the free component (35 credits)															
1.1	Foreign language I	5	125	60	3	62	0/60/0/0	5								-
1.2	Foreign language II	5	125	60	3	62	0/60/0/0		5							1.1
1.3	Foreign language III	5	125	60	3	62	0/60/0/0			5						1.2
1.4	Foreign language IV	5	125	60	3	62	0/60/0/0				5					1.3
1.5	Calculus	5	125	60	3	62	30/30/0/0	5								
1.6	Introduction to Computing and Computer Skills	5	125	60	3	62	15/0/45/0	5								
1.7	Academic Writing	5	125	45	3	77	15/30/0/0	5								
	Total	35	875	405	21	449		20	5	5	5					
2	Compulsory courses of the main field of study (125 credits)															
2.1	Introduction to Biology	5	125	45	3	77	30/15/0/0	5								
2.2	Chemistry 1 (General and Inorganic Chemistry)	5	125	45	3	77	30/0/15//0	5								
2.3	Cell Biology	5	125	45	3	77	15/30/0/0		5							2.1
2.4	Chemistry 2 (Physical and Colloidal Chemistry)	3	75	30	3	42	15/0/15/0		3							2.2

	Course Title	Cr	The volume of the workload in hrs.				L/p/lab/gr	Semester								Admission Prerequisite
			Total	Contact		Ind		I	II	III	IV	V	VI	VII	VIII	
				Classroom	Midterm Exams											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
2.5	Chemistry 3 (Organic Chemistry)	3	75	30	3	42	15/0/15/0		3							2.2
2.6	Physics	5	125	45	3	77	15/30/0/0		5							-
2.7	Biodiversity I (Plants)	5	125	45	3	77	30/15/0/0		5							2.1
2.8	Biodiversity II (Animals)	4	100	45	3	52	30/15/0/0		4							2.1
2.9	General Physiology I (Plants)	5	125	45	3	77	15/30/0/0			5						2.7
2.10	Biochemistry I	5	125	45	3	77	10/13/22/0			5						2.5
2.11	Microbiology-Virology	5	125	60	3	62	15/15/15/0			5						2.3
2.12	Genetics and Molecular Biology I	5	125	45	3	77	15/30/0/0				5					2.10
2.13	Biochemistry II	5	125	45	3	77	13/13/19/0				5					2.10
2.14	General Physiology II (Human and Animal)	5	125	45	3	77	30/15/0/0				5					2.1
2.15	Genetics and Molecular Biology II	5	125	45	3	77	15/30/0/0					5				2.12
2.16	Biophysics	5	125	45	3	77	30/15/0/0					5				2.3, 2.6
2.17	Biotechnology 1	5	125	45	3	77	15/30/0/0					5				2.11; 2.12
2.18	Basics of Laboratory Research	5	125	45	3	77	15/0/30/0						5			2.13
2.19	Enzymatic Technologies	5	125	45	3	77	15/30/0/0						5			2.10
2.20	Biotechnology 2	5	125	45	3	77	15/30/0/0						5			2.17
2.21	Bioethics	5	125	45	3	77	30/15/0/0							5		
2.22	Laboratory Research Methods in Biotechnology	5	125	60	3	62	10/17/33/0							5		2.17; 2.1
2.23	Waste Management and Biotechnology	5	125	45	3	77	30/15/0/0							5		2.20
2.24	Professional practice	15													15	
Total		125						10	25	15	15	15	15	15	15	

	Course Title	Cr	The volume of the workload in hrs.				L/p/lab/gr	Semester								Admission Prerequisite
			Total	Contact		Ind		I	II	III	IV	V	VI	VII	VIII	
				Classroom	Midterm Exams											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
3	Elective courses of the main field of study (20 credits)															
3.1	Human Morphology	5	125	45	3	77	30/15/0/0					5				
3.2	Medical Microbiology and Virology	5	125	45	3	77	15/15/15/0									2.11
3.3	Ecology	5	125	45	3	77	30/15/0/0									2.7; 2.8
3.4	Human Ontogenesis	5	125	45	3	77	30/15/0/0					5				
3.5	Medical Ecology	5	125	45	3	77	30/15/0/0									
3.6	Environmental Monitoring	5	125	45	3	77	30/0/15/0									
3.7	Immunology	5	125	45	3	77	30/15/0/0									2.14
3.8	Bioconservation and Protected Areas	5	125	45	3	77	30/15/0/0						5			2.7; 2.8
3.9	Cell Signalling Systems	5	125	45	3	77	30/15/0/0									2.16
3.10	Cellular and Genetic Pathologies	5	125	45	3	77	30/15/0/0									2.15
3.11	GMOs and Environmental Safety	5	125	45	3	77	15/30/0/0									2.20
3.12	Nutrition and Health	5	125	45	3	77	30/15/0/0								5	2.14
3.13	Man and Environment	5	125	45	3	77	30/15/0/0									
	Total	25	625	225	15	385						5	5	5	5	
	Sum	180	4500					30	30	20	20	20	20	20	20	
	Additional (Minor) program	60								10	10	10	10	10	10	