Ilia State University
Faculty of Natural Sciences and Medicine
Master's Program - Applied Genetics

Curriculum

Faculty/School	Faculty of Natural Sciences and Medicine
Program Title	**Applied Genetics**
Academic Degree Acquired	**Master of Science in Applied Genetics**
Program Duration/ECTS credits	4 Semesters, 120 ECTS
Launching Date of the Program & Program Update	Program is approved by N3 (28.03.2017) Decree of Academic Council and can be subject to renewal by the start of each academic year.
Language of Instruction	English
Head/Heads of the Program	Professor Davit Tarkhnishvili

Admissions Requirements

An applicant must hold a Bachelor's Degree or equivalent, preferably in the life sciences, or a comparable degree in medicine. Georgian citizens must pass the relevant Unified Post-graduate Exams. Foreign graduates who completed their higher education outside of Georgia will be able to enter the program pursuant to order №224/N of the Ministry of Education and Science of Georgia (December 29, 2011).

The applicant should provide an internationally recognized and valid English language certificate (Common European Framework of Reference (CEFR) level B2 or higher). To demonstrate English proficiency, the applicant must submit one of the following:

a) an official international language certificate (the main certificates and minimum scores accepted are given below)*;
b) an English Proficiency Statement from the university, high school or college, confirming that English was the language of instruction;
c) a certificate issued by a local or international English language instruction provider (e.g. language school), confirming the acquisition of B2 level as a result of a language course the applicant attended.

Alternatively, applicants may take Ilia State University's institutional paper-based or online language test, a passing score indicates English competency equivalent to CEFR level B2.

Note: The English language requirement may be waived if the applicant is a native of a country, or graduated from an English language high school or university in countries where English is the native language.

*The following are the minimum English test scores for admission:

- Test of English as a Foreign Language (TOEFL) paper-based test (PBT) 513
- TOEFL internet-based test (iBT) 65
- TOEFL computer-based test (CBT) 183

IELTS

- Academic; Band score 5.5

Cambridge ESOL (English for Speakers of Other Languages)

- Certificate of Advanced English (CAE): 160/Level B2 (also grades A/B/C)

- First Certificate in English (FCE): 160/Grade C (also grades A/B)
- Business English Certificate (Higher BEC): 45/Level B2 (also grades A/B/C)
- Business English Certificate (Vantage BEC): 60/Grade C (also grades A/B)
- Business Language Testing Service (BULATS): 60 overall
- Pearson Test of English (PTE); General level 3)
- Pearson Test of English-Academic; 59-75 points

TELC (The European Language Certificates)

- TELC English B2: Pass

Michigan (Cambridge Michigan)

- Examination for the Certificate of Proficiency in English (ECPE): Low Pass
- Examination for the Certificate of Competency in English (ECCE): Pass
- Michigan English Language Assessment Battery (MELAB): B2

Overall, the applicant will be assessed during an admission interview (face-to-face or online for international applicants). Applicants are expected to demonstrate motivation, communication skills, as well as basic field-specific knowledge needed to succeed in the program. Detailed admissions requirements can be found online at www.iliauni.edu.ge

Program Objectives

The Master Program of Applied Genetics will train students in current biomolecular technology. Quite simply, use of biotechnology is now ubiquitous in commerce and research. DNA is a universal property of living organisms, and its use in investigating and manipulating biological systems is constantly expanding.

The aim of this program is to equip the graduate with in-depth knowledge and skills in DNA-based technology and related sciences, including the ability to carry out independent research, understand and apply existing methods, and use experimental results to guide decisions based upon scientific findings. Through a combination of lectures, laboratory and field-based training, students will learn not just concepts, but actual practice and procedures of applied genetics—students will acquire a suite of laboratory and analytical skills that are currently used in diverse commercial and research environments. Students' technical skills are reinforced by intensive, early participation in the design and execution of their own research projects, culminating in a master's thesis.

The knowledge and skills acquired by the end of academic studies will prepare students for careers in agricultural, industrial, or biomedical genetics applications, or in research-applications for management of forest, fish, and other natural resources—the universality of the techniques for exploring and analyzing DNA enables students to apply these skills across a broad array of disciplines. In addition to required coursework that provides the necessary technical and analytical skills, the program has an expanded list of approved electives, allowing students some latitude to tailor their own study plan according to their individual professional or interests.

Learning Outcomes

A program graduate:

1. Evaluates contemporary molecular-genetic methods and techniques; retrieves and interprets primary scientific literature, and integrates relevant technologies into their technical skillset. Develops testable hypotheses using molecular genetic approaches; proposes creative solutions to scientific problems based on solid theoretical foundations.
2. Plans and implements research projects independently across agriculture, industry and/or biomedicine, molecular ecology, and evolution; selects appropriate genetic methods or develops suitable novel genetic methods as required.

3. Applies analytical methods for genetic data collection and processing, including the use of relevant analytical software tools.
4. Applies ethical standards in research practice; demonstrates awareness of intellectual property issues and upholds academic integrity by appropriately citing, and integrating others' ideas into their work.
5. Operates laboratory equipment safely to generate valid scientific data.
6. Prepares scientific reports and presentations effectively; uses modern information and communication technologies to disseminate findings to colleagues and stakeholders.

Program Structure

A student is expected to accumulate 120 ECTS Credits by the end of his/her academic studies:

- Required courses – 42 credits
- Compulsory-elective courses – min. 36 credits
  - Living Systems Block (min. 18 credits)
  - Methodological Block (min. 12 credits)
- Elective courses – max. 12 credits
- Master Thesis - 30 credits

Teaching Methods

- Lecture
- Seminar
- Teamwork
- Case study
- Laboratory work
- Problem-based learning
- Field work

Specific teaching methods are identified for each individual program component and are listed in relevant syllabi.

Student Assessment

Student assessment should be based on a 100-point grading scale:

(A) 91-100 Excellent
(B) 81-90 Very Good
(C) 71-80 Good
(D) 61-70 Satisfactory
(E) 51-60 Sufficient
(FX) 41-50 Unsatisfactory - meaning a student needs more effort to pass an examination and is given an extra chance to pass an additional examination through independent work.
(F) Failure - 40 and less of the maximum of grades, meaning the student's effort is not enough and s/he has to take a course anew.

Note: Assessment components and criteria are detailed in the respective course syllabi.

Employability

Graduates of Applied Genetics master program will be able to work in laboratories using biotechnology on problems in industry, medicine and agriculture; management positions in government or the private sector, where molecular

genetics applications are being used, in forensics, food science, public health, or environmental science, etc.; in industry, in laboratory and management positions in the biotechnology industry.

Teaching and Learning Resources

University library;
Teaching venues;
Molecular Genetic Laboratory/ Core biodiversity research center of Ilia State University;
Computer labs and GIS resource centres;
Institute of Ecology; Institute of Zoology; Institute of Botany; Tbilisi Zoo;
Institute of Chemical Biology;
Student Management System ARGUS;
Turnitin, Elearning;
Available software: SEQUENCE ANALYSIS, GENEMAPPER, BIOEDIT, MEGA, BEAST, NETWORK, ARLEQUIN, PLINK, STRUCTURE, ADMIXTURE, Programming in R. National Center for Biotechnology Information Analysis; Tools;
Partner Organizations: NCDC/Richard Lugar Center for Public Health Research; Scientific staff from the NCDC provides instruction in several program courses, and may collaborate with MSc students on projects of joint interest.