

Iliia State University
 Faculty of Business, Technology and Education
 Bachelor Program: Civil Engineering (Major)
 Curriculum

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| Faculty | Faculty of Business, Technology and Education |
| ProgramTitle | Civil Engineering (Major) |
| Awarded Academic Degree/Qualification | The Degree of Bachelor of Civil Engineering |
| Program Duration/Volume (Semester, number of credits) | 8 Semesters, 252 ECTS (1 ECTS- 25 hours): <ul style="list-style-type: none"> • General Education - 56 ECTS; • Maths, Physics and Chemistry - 60 ECTS; • Major program -136 ECTS. |
| Language of Instruction | English |
| The Date of Programme Development and Update | Program is developed in 2019 and can be subject to periodic revision. |
| Admission Requirements to the Programme | |
| <p>Georgian citizens must pass the Unified National Exams. Admission for the program requires minimal competence levels in the following Unified National Exams:</p> <ul style="list-style-type: none"> • English Language - 70% + 1; • Georgian Language determined by National Assessment and Examinations Center; • Mathematics - 40% + 1 or Physics - 40%+1. <p>International applicants should follow the rules and terms defined by the Ministry of Education, Science, Culture and Sports of Georgia (http://www.mes.gov.ge/content.php?id=1131&lang=geo) according to the order №224/N (December 29, 2011). The Applicant should prove English language qualification equivalent to CEFR level B2 or higher. To prove the English qualification, the applicant must submit one of the following:</p> <p>a) an official international language certificate (the main certificates and minimum scores accepted are given below*);</p> <p>b) an English Proficiency Statement from the university, high school or college, confirming that English was the language of instruction;</p> <p>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.</p> <p>d) Or apply and take University’s institutional paper-based or online language test aligned with CEFR level B2.</p> <p>Note: The English language requirement may be waived if the applicant is a native of or graduated from an English medium high school / university in countries, official language of which is English.</p> <p>* The following are the minimum English test scores for admission: TOEFL</p> <ul style="list-style-type: none"> • paper based PBT 513 • internet based iBT 65 • computer based CBT 183 <p>IELTS</p> <ul style="list-style-type: none"> • Academic (Band 5.5) <p>Cambridge ESOL (English for Speakers of Other Languages)</p> <ul style="list-style-type: none"> • 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
- PTE (General level 3)
- PTE 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
- MELAB: B2

International Students shall undergo a paper or online-based entry test in Mathematics or Physics - Entry-Level Test 40% + 1 . The test will be administered by the University to a similar level as required by Georgian students.

Program Objectives

Mission of the Program:

The mission of the Civil Engineering at Ilia State University is to prepare our students for careers in their chosen area of specialisation. As such, the program aims to provide quality instruction, advisory services and student support to ensure students achieve their goals and gain the knowledge and experience required to succeed in the demanding field of civil engineering.

The Program Educational Objectives of the Civil Engineering program are closely aligned with Ilia University's mission of advancing science to the benefit of society locally and internationally. This is especially true in a people serving profession such as civil engineering which is entirely focused on bettering the standard of living of society at large. With an internationalised focus and teaching in English language with the aim to involve both local and international students in the program, we hope for a high level of internationalisation and future cooperation between the graduates across borders.

This program focuses on the delivery of interdisciplinary courses to create well rounded holistic thinkers, problem solvers and future leaders in the civil engineering fields of water, transport, structural and geotechnical engineering. To complement the interdisciplinary learning promoted by this program, students will have the ability to take business administration courses to acquire managerial skills that are instrumental to a successful professional career.

Within the programme, fundamental courses in maths, physics, chemistry and additional natural science electives build to later courses in engineering design. The program is structured to ensure adequate incremental practical and theoretical knowledge in the field of Civil Engineering. Programme graduates will be competitive professionals in Georgia or abroad in areas of project and engineering design and management. They will also be able to continue their education at the master level of studies.

In addition, the programme is oriented towards the development of transferable skills such as effective oral and written communication in at least one other non-native speaking language so as to develop multicultural awareness. We expect that our graduates will use these skills in whichever sector they consider advancing their careers, whether it be in the private, government or educational sector.

Program Educational Objectives:

Graduates of the Ilia University Civil Engineering Program will meet the following Program Educational Objectives:

Objective 1: Graduates will collaborate in a team environment as a civil engineer;

Objective 2: Graduates will be ready for leadership roles within the civil engineering profession;

Objective 3: Graduates will pursue life-long learning in engineering which may include a graduate degree.

Learning Outcomes and Competencies

The following Learning Outcomes will be assessed for each student:

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics;
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors;
3. An ability to communicate effectively with a range of audiences;
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts;
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives;
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions;
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Teaching Methods

- Lectures and Seminars/Written and verbal method;
- Laboratory Work;
- Practical Work;
- Project Work Individually and in Teams.

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

Program Structure

Structure of Civil Engineering Bachelor Program:

Maths, Physics and Chemistry - 60 ECTS

General Education - 56 ECTS (including 24 ECTS of electives from business administration and natural sciences; minimum of 6 ECTS natural science and 6 ECTS business administration)

Major program - 136 ECTS (including 24 ECTS of electives)

Besides the 252 ECTS that students are expected to accumulate during the course of their studies, they will to pass a **Comprehensive Knowledge Exam** designed to test student's knowledge on all prior Major Course subject areas. The Exam will include 150 either multiple choice questions or questions split into sub-questions (i.e. a question may need to show many steps of mathematical equations – these questions will be split into sub-questions for each mathematical step. Students must achieve 33% on the test. In case students meet the designated threshold, they will be eligible to proceed with their CIVE 495 Senior Design Project in the final semester of their studies. In case students fail to achieve the threshold, they will be excluded from the program. Each student will be

allowed to re-sit the exam one additional time (test will be different) in case their achievement on the test falls short of the benchmark.

Maths, Physics and Chemistry Foundation Courses:

60 ECTS of Foundation Maths, Physics and Chemistry with associated laboratories ensures a good base for continued advanced learning for our civil engineering students.

General Education:

General Education includes courses (56 ECTS) in line with the philosophical direction of Ilia State University including “Construction and Culture” specifically tailored for engineers and the following language courses:

— Practical Course of Georgian for Foreigners / Practical Course of German/English - 12 ECTS *

** International students must pass both Practical Courses of Georgian; local students must pass Practical Courses of German or English language.*

Approved Electives within the General Education component:

The approved electives within the general education module are designed to give each student an individual direction and pursue subjects according to their interest in the areas of Natural Science and Business Administration. Students will choose four elective courses with at least one approved business course and one natural sciences course to strengthen their depth in science and business and to assist our students with their future leadership and career development goals.

Major Program:

Mandatory courses of Civil Engineering Bachelor program – 108 ECTS (including 8 design ECTS)

Mandatory/elective courses Civil Engineering Bachelor Program – 24 ECTS

Internship – 4 ECTS

Mandatory/elective course choices: Students choose four courses from the following six areas (no more than 1 in each area – this ensures a broad knowledge base that can be further specified in graduate studies).

Water and Environmental – Civil Engineering (Applied Hydrology).

Transportation – Civil Engineering (Traffic Engineering, Highway Engineering).

Structural – Civil Engineering (Structural Engineering – 2 options).

Geotechnical – Civil Engineering (Geotechnical Engineering).

Environmental Engineering (Environmental Management)

Construction Engineering (Construction and Management)

Capstone Design Project and Internship:

During the last two semesters of study, students must participate in an internship (4 ECTS) and a Senior Capstone Design Project (8 ECTS). The main purpose of both the design and internship experience is to prepare students for the real-world challenges in the field of Civil Engineering by exposing them to industry and allowing them to use their developed problem-solving skills to find engineering design solutions to industry problems. The students will also develop their managerial skills through planning, design and meeting deadlines together with industry participation. Finally, students will improve their communication, presentation and teamwork skills during these practical components of the programme.

Senior-design teams will generally consist of 3 to 6 students under the direction of a faculty mentor/supervisor and with an agreed industry sponsor that will be involved in the forerunning semester for collaboration with the students in the Project Concept Development phase and in the final semester as Project Reviewer. Even though students will be working in groups, each student will need to submit an individual activity report showing which tasks they have were assigned by the group and agreed by the Faculty advisor and how they have managed to complete their individual tasks. All group members will also evaluate each other anonymously as to each group members active involvement, availability and ability to meet team set deadlines.

The Internship (4 ECTS) may or may not be within the industry partner organization sponsoring the Capstone project. Detailed description and assessment of Internship is described in the syllabus.

Student Evaluation

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 he has to learn the subject anew.

Note: The detailed assessment components and criteria are described in more details in the respective syllabus of each course of the program.

Employment Opportunities

Graduated students can be employed in a variety of organizations related to planning, design, construction, management, maintenance, repair and renewal of infrastructure components such as building, transportation, energy and water systems. The employment scope can include:

- Construction management and engineering design of houses and industrial buildings;
- Transportation construction and asset management of roads and railways with associated tunnels and bridges, Traffic analysis and transportation planning;
- Water supply, sewerage, wastewater treatment and reservoirs design and construction;
- Inspection and assessment of existing buildings and strengthening of them;
- Public Enterprises such as Municipalities, and government owned infrastructure companies;
- Diagnostics and repair of a wide range of engineering equipment (household, medical, military, etc.);
- Renewable energy systems design and construction management.

Necessary Auxiliary Conditions /Resources For Learning

The faculty has the **material resources** that are used in teaching and technical preparation:

- Auditoriums for lecture;
- Civil Engineering teaching laboratories;
- Computer classes;
- University Library;
- Electronic platform of the University – Argus;

- Teaching and Learning Staff Development Center.

Partner organizations, supporting development and implementation of the program:

San Diego State University Georgia;

PROGRESI Ltd. (Engineering Center of Computer Aided Design);

Caucasus Road Project Ltd. (Road Construction Company);

Saunders Group Ltd Infrastructure Consultants;

Cubicon LTD Structural Engineering Design;

ILF Consulting Engineers;

EPTISA Consulting Engineers;

CIVIL ENGINEERING PROGRAMME

| 1st Term (Fall) | | | | | |
|-------------------|--|--|------------|-----------|--|
| Code | Course Title | Prerequisites | Cnt.hrs | ECTS | Instructor |
| | Introduction to Modern Thought I | | 29 | 6 | Gia Nodia, Tamar Tolordava |
| | Practical Course of Georgian (German/English Georgian) | | 52 | 6 | Maiia Damenia/Nino Tsulaja/Nino Rukhadze |
| CIVE 100 | Introduction to Civil Engineering | | 17 | 2 | Michael Saunders |
| CHEM 100 | Introduction to General Chemistry | | 62 | 8 | Ketevan Kupatadze |
| CIVE 121 | Computer Graphics for the Built Environment | | 62 | 6 | Ia Kupatadze |
| CONE 101 | Construction and Culture | | 17 | 2 | Choong Hoon Lee |
| Total | | | 222 | 30 | |
| 2nd Term (Spring) | | | | | |
| Code | Course Title | Prerequisites | Cnt.hrs | ECTS | Instructor |
| | Introduction to Modern Thought II | | 31 | 6 | Gia Nodia, Tamar Tolordava |
| MTH 150 | Calculus I | Precalculus or ISU Test | 62 | 6 | Giorgi Khimshiashvili |
| | Practical Course of Georgian (German/English Georgian) | Practical Course I | 50 | 6 | Maiia Damenia/Nino Tsulaja/Nino Rukhadze |
| | Academic Techniques | | 34 | 6 | Maiia Rogava |
| PYS 195 | Physics I including Lab | conc. MTH 150 | 77 | 8 | Giorgi Dalakishvili |
| Total | | | 254 | 32 | |
| 3rd Term (Fall) | | | | | |
| Code | Course Title | Prerequisites | Cnt.hrs | ECTS | Instructor |
| MTH 151 | Calculus II | MTH150 Calculus I | 62 | 6 | Nino Manjavidze |
| STAT 250 | Probability and Statistics | MTH150 Calculus I | 48 | 6 | Nato Jorjishvili |
| CIVE 202 | Statics | PYS195, conc. MTH 151 | 47 | 6 | Mark Donghak Kim |
| CIVE 220 | Civil Engineering Computer Applications | MTH150 Calculus I | 47 | 6 | Mikhail Elashvili |
| CHEM 200 | General Chemistry II | CHEM 100 Introduction to General Chemistry | 62 | 8 | Ketevan Kupatadze |
| Total | | | 266 | 32 | |
| 4th Term (Spring) | | | | | |
| Code | Course Title | Prerequisites | Cnt.hrs | ECTS | Instructor |
| PYS 196 | Physics II | MTH151 Calculus II | 47 | 6 | Giorgi Dalakishvili |
| MTH 252 | Calculus III | MTH151 Calculus II | 62 | 6 | Giorgi Khimshiashvili |
| ME 220 | Dynamics | CIVE 202 Statics | 47 | 6 | Mark Donghak Kim |
| CIVE 218 | Surveying for Civil Engineering and Construction | MTH 151, STAT 250 | 47 | 6 | Mikhail Elashvili |
| AE 280 | Numerical Analysis | MTH151 Calculus II | 47 | 6 | David Tutberidze |
| Total | | | 250 | 30 | |
| 5th Term (Fall) | | | | | |
| Code | Course Title | Prerequisites | Cnt.hrs | ECTS | Instructor |
| CONE 330 | Principles of Engineering Economy | MTH151 Calculus II | 47 | 6 | Dimitri Japaridze |
| ME 240 | Introduction to Engineering Materials | CHEM 200, CIVE 202 | 47 | 6 | Mark Donghak Kim |
| AE 340 | Fluid Mechanics | MTH151, ME 220 | 47 | 6 | Ozgur Kisi |
| CIVE 301 | Introduction to Solid Mechanics (Including Lab) | CIVE 202 Statics | 77 | 8 | Igor Timchenko |
| | Approved Elective | | 32 | 6 | |
| Total | | | 250 | 32 | |
| 6th Term (Spring) | | | | | |
| Code | Course Title | Prerequisites | Cnt.hrs | ECTS | Instructor |
| CIVE 481 | Introduction to Transportation Engineering | STAT 250, CIVE 218 | 47 | 6 | Michael Saunders |
| CIVE 321 | Structural Analysis I | CIVE 301 Intro to Solid Mechanics | 47 | 6 | Igor Timchenko |
| ENV 355 | Environmental Engineering | CHEM 200 | 48 | 6 | Ketevan Kupatadze |
| CIVE 444 | Applied Hydraulics (Including lab) | AE 340 Fluid Mechanics | 77 | 8 | Ozgur Kisi |
| | Approved Elective | | 32 | 6 | |
| Total | | | 251 | 32 | |

| CIVIL ENGINEERING PROGRAMME | | | | | |
|---|---|-----------------------------------|------------|-----------|---------------------|
| 7th Term (Fall) | | | | | |
| Code | Course Title | Prerequisites | Cnt.hrs | ECTS | Instructor |
| CIVE 494 | Senior Design Project: Conception | 80 ECTS in Major Program | 18 | 2 | Michael Saunders |
| CIVE 462 | Geotechnical Engineering (Including Lab) | CIVE 301 Intro to Solid Mechanics | 92 | 8 | Archil Magalashvili |
| | Approved Elective | | 32 | 6 | |
| | Internship | | 77 | 4 | |
| | Elective 1 (Major - Mandatory) | | | 6 | |
| | Elective 2 (Major - Mandatory) | | | 6 | |
| Total | | | 219 | 32 | |
| 8th Term (Spring) | | | | | |
| Code | Course Title | Prerequisites | Cnt.hrs | ECTS | Instructor |
| CIVE 495 | Senior Design Project | CIVE 494, Compr.Knowledge Exam | 50 | 6 | Michael Saunders |
| CIVE 421 | Reinforced Concrete Design | CIVE 321 Structural Analysis I | 47 | 6 | Igor Timchenko |
| | Elective 3 (Major - Mandatory) | | | 6 | |
| | Elective 4 (Major - Mandatory) | | | 6 | |
| CIVE 401 | Civil Engineering and Society | | 17 | 2 | Michael Saunders |
| | Approved Elective | | 32 | 6 | |
| Total | | | 146 | 32 | |
| Elective Courses (for Major) | | | | | |
| Code | Course Title | Prerequisites | Cnt.hrs | ECTS | Instructor |
| CV521 Fall | Structural Analysis II | CIVE 321 Structural Analysis I | 47 | 6 | Igor Timchenko |
| CV525 Fall | Design of Steel Structures | CIVE 321 Structural Analysis I | 47 | 6 | Igor Timchenko |
| CV445 Spr. | Applied Hydrology | CIVE 444 Applied Hydraulics | 62 | 6 | Ozgur Kisi |
| CN401 Spr. | Construction Planning and Scheduling | CIVE 321, STAT 250 | 77 | 6 | Choong Hoon Lee |
| CV482 Fall | Highway Engineering | CIVE 481 Intro to Transpor. Eng | 47 | 6 | Michael Saunders |
| CV580 Fall | Traffic Engineering Design | CIVE 481 Intro to Transpor. Eng | 47 | 6 | Michael Saunders |
| EN441 Spr. | Water Treatment Engineering (incl. Wastewater) | ENV 355, CIVE 444 | 47 | 6 | Katevan Kupatadze |
| CV465 Spr. | Foundation Eng. And Earth Retaining Structures | CIVE 462 Geotechnical Eng. | 47 | 6 | David Giginashvili |
| Elective Courses (for Business Administration (Tourism, Management) (Major)) | | | | | |
| Code | Course Title | Prerequisites | Cnt.hrs | ECTS | Instructor |
| Fall | Business Communications | | 32 | 6 | Givi Chanukvadze |
| Fall | Essentials of Management | | 32 | 6 | Nino Tandilashvili |
| Spring | Introduction to Marketing | | 32 | 6 | Natalia Shlegia |
| Spring | Basics of Business | | 32 | 6 | Nino Tandilashvili |
| Fall | Basics of Entrepreneurship | Basics of Business | 32 | 6 | Irine Guruli |
| Spring | Introduction to Organizational Behaviour | Essentials of Management | 32 | 6 | Berika Shukakidze |
| Elective Courses (for Natural Sciences) | | | | | |
| Code | Course Title | Prerequisites | Cnt.hrs | ECTS | Instructor |
| Biol 100 | Biology for Engineers | | 32 | 6 | Elene Zhuravliova |
| Ecol 100 | Ecology - Ecosystem | | 32 | 6 | Archil Magalashvili |
| Geol 100 | Geology | | 32 | 6 | Archil Magalashvili |
| 60 | Foundation Maths and Science | | | | |
| 24 | Approved Elective | | | | |
| 32 | Compulsory GE | | | | |
| 112 | Major (includes 8 design ECTS) | | | | |
| 24 | Major Electives | | | | |
| 252 | | | | | |
| Note: | *Comprehensive Knowledge Exam as a prerequisite | | | | |
| Note: | Approved electives must include at least one Natural Science elective and one Business Administration elective | | | | |
| Note: | Math 140 (Precalculus) is compulsory for all students in the first semester unless passing an ISU administered Pre-Calculus test before beginning the semester; | | | | |
| | This course does not count for credit to the degree | | | | |

Mapping of Major Courses to Learning Outcomes

| Learning Outcomes \ Courses | | CIVE 100 | CIVE 121 | CIVE 202 | CIVE 220 | CIVE 218 | ME220 | CIVE 301 | CONEB30 | ME240 | AEB40 | CIVE 321 | ENVEB55 | CIVE 401 | CIVE 421 | CIVE 444 | CIVE 462 | CIVE 465 | CIVE 481 | INTERNSHIP | CIVE 494 | Comprehensive Knowledge Exam | CIVE 495 | CONE 101 | | | | | | | | |
|--|---|----------|----------|----------|----------|----------|-------|----------|---------|-------|-------|----------|---------|----------|----------|----------|----------|----------|----------|------------|----------|------------------------------|----------|----------|--|--|---|---|---|---|---|---|
| 1 | An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics. | | x | x | x | x | x | x | x | x | x | x | x | | x | x | x | x | x | x | | 2.5 | x | | | | x | x | x | x | x | x |
| 2 | An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors. | x | x | x | x | x | | x | x | | x | x | | | x | x | | x | x | | x | 2.5 | 2.5 | | | | x | x | x | x | x | |
| 3 | An ability to communicate effectively with a range of audiences. | | x | | x | | | | | | | | x | x | | | | | x | x | x | | 2.5 | x | | | | | x | | | |
| 4 | An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts. | x | | | | | x | | | | | | x | x | | | | | x | x | | 2.5 | x | x | | | | x | | | | |
| 5 | An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives. | x | | | | | | | | | | | | | | | | | | x | 2.5 | | x | x | | | | x | | | | |
| 6 | An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions. | | x | | x | x | | x | x | | | x | | | x | 2.5 | x | x | | | | 2.5* | x | | | | x | x | x | x | x | |
| 7 | An ability to acquire and apply new knowledge as needed, using appropriate learning strategies. | | | | | | | | | | | | | x | x | | | | | 2.5 | x | | x | | | | x | | | x | | |
| <i>Benchmarked Courses (benchmark measured from 5)</i> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NOTE: | <i>Comprehensive Knowledge Exam tests student's knowledge on all prior Major Course subject areas - each area tested is converted to result from 5 with benchmark 2.5.</i> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | <i>* In the comprehensive exam, test data is provided and student has to analyse this data and produce conclusions</i> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |