საქართველოს ტექნიკური უნივერსიტეტი
GEORGIAN TECHNICAL UNIVERSITY

Approved by
Academic Board of GTU
2013. 28. 06
Order № 942
Modified Program
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Order № 01-05-04/106

Bachelor's Educational Program

Name of the program

Biomedical Engineering
ბიოსამედიცინო ინჟინერია

Faculty

Faculty of Informatics and Control Systems
ინფორმატიკის დამართის სისტემების ფაკულტეტი

Program Supervisor

Professor Irine Gotsiridze

Qualification and program credits

Bachelor of Engineering in Instrumentation, Automation and Control Systems Will be awarded in case of passing 240 credits of the program. ინჟინერიის ბაკალავრი ხელსაწყოთმშენებლობას, ავტომატიზაციასა და მართვის სისტემებში *მიენიჭება საგანმანათლებლო პროგრამაში არსებული 240 კრედიტის შესრულების შემთხვევაში*

The language of teaching

English

Precondition for admission to the program

An applicant has the right of teaching on foreign educational program when he has the permission in accordance with Georgian legislation. The applicant must have the certificate confirming the knowledge of English on the level not less than B1 or must present international certificate TOEFEL (The Test of English as a

Foreign Language) of II certification level. The applicant is free from the necessity of presenting a certificate confirming his/her competence at having completed course in the foreign language that is educational language of the program was english. At not having appropriate certificate or other analogous document, the applicant will have an interview in English. The interview will be implemented with the temporary commission which part the staff of GTU.

Description of the program

The program is drawn up with ECTS system, 1 credit is equal to 25 hours, which include the contact and independent working hours. The distribution of credits is presented in the curriculum. The program duration is 4 years (8 semesters) and includes 240 credits (ECTS). Content, training methods and number of the credits of learning courses of the program provides achievement of a goal and results.

To obtain the B.S. in Engineering, a student must obtain different course credits in: Mathematics, Basic Sciences, Engineering Analysis, Engineering Design, Basic Engineering, Quality Control, Biomedical Engineering Core and Elective Courses, Social Sciences and Humanities Courses.

The distribution of hours is presented in the educational plan. Educational program consists from required and elective courses. Elective Courses consists from University Elective and Professional Elective Courses.

The annual learning process:

The annual learning process contains two semesters, with duration 21 weeks. Students assessment is made by Current Activity, Mid-Term Exams And Final/Additional exams. Teaching and one intermediate estimations are realized during 16 weeks (I-XVI weeks). Dates of Mid-Term Exams and Final Exams are regulated by decree of Academic Council each year. The right to pass the final exam has a student that collected no less than 21 points in intermediate estimations. The minimum positive estimation of final/extra exam is 7.5 points. A semester contains 30 credits and, accordingly, a year contains 60 credits.

Evaluating Student Performance

Student Performance is evaluated a maximum of 100 scores. 30 of which is current assessment during 15 weeks (homework, quizzes, presentation in the class, team or individual projects). Midterm and final exams can be evaluated by tests, presentation in the class, team or individual projects. Forms of a midterm and final exam evaluation may vary for different subjects. Students' work and study success are evaluated according to the syllabus of each course, which is a combination of midterm and final exams.

During I semester students are required to take six courses among them: Mathematics & Science Courses, Core Biomedical Engineering and Information Technologies Courses – in total 30 credits.

During II-V semester students are required to take five courses (in total 25 credits) of Mathematics & Science Courses, Core Biomedical Engineering and Core Engineering and University Elective Courses -5 credits. In total 30 credits for each semester

During VI semester students are required to take five obligatory and one university elective courses, Total 30 credits for semester.

During VII semester students are required to take obligatory course of Team Project (6 credits) and professional elective Biomedical Engineering (24 Credits). In total 30 credits for semester.

During VIII semester three professional elective courses (each 6 credits) and Capstone Project (12 credits) . In total 30 credits for semester.

Program is prepare according ABET http://www.abet.org requirement and has analogs.

1. Illinois Technological University https://engineering.iit.edu/bme
2. Luiziana Technological University USA http://coes.latech.edu/biomedical-engineering
3. John Hopkins University USA https://www.bme.jhu.edu/undergraduate/degree-requirements
4. Michigan Technological University Michigan http://www.mtu.edu/biomedical/department/what-is

In development and carrying out monitoring of the program is included " Committee of Support for Developing of BME Study", which is founded at the "Biomedical and Clinical Society of Georgia", Committee is comprised with 5 permanent members.

Educational Program Website;
http://biomedeng.gtu.ge/programebi.html

https://bmegtu.wordpress.com

The purpose of the program

To provide education that prepares students to lead, innovate, and self-educate through their careers in bioengineering and biomedical professions and industries. Using a knowledge base with a core foundation in engineering and biology, students will be able to apply their skills to a variety of challenges in their chosen field. Biomedical Engineering (BME) program graduates will demonstrate skills such as innovation, creativity, adaptability, and critical thinking to solve problems in biomedical industry, medicine, academia, and consulting. Graduates will demonstrate leadership in their chosen fields, and make decisions that are socially and ethically responsible. Graduates will function effectively in multidisciplinary team environments and communicate effectively to a variety of audiences. Program graduates will build and expand upon their undergraduate foundations by engaging in learning opportunities throughout their careers.

Learning Outcome/Competencies

- Knowledge and understanding

- wide knowledge of the sphere of biomedical engineering, interpretation of theories and principles, in particular, theoretical and practical knowledge of biotechnical systems which is basis of the development of necessary abilities for the clinical engineers for the service of the medical devices;
- knowledge of design and conduct experiments (including making measurements) on, as well as to analyze and interpret data from living systems;
- understanding addressing the problems associated with the interaction between living and non-living materials and systems;
- understanding and identify examples of the industrial and academic aspects of Bioengineering, including basic and applied research.;
- understanding response ability of Clinical Engineer for providing high quality of Health Care.
- understand complex questions of the sphere of Biomedical Engineering;
- understanding of professional and ethical responsibility;
- an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability;
- knowledge of contemporary issues ;
- understanding of biology and physiology as related to biomedical engineering needs.

- Applying knowledge

- to apply knowledge of mathematics (including differential equations and statistics), science, and engineering to solve problems at the interface of engineering and biology;
- to solve biomedical engineering related problems in electrical circuits, mechanics, systems engineering and fluid and mass transport using mathematics;
- to take part in projection, elaboration, integration and introduction of biotechnical systems;
- independent exploitation, service and installation of medical systems, among them the software if computer based medical systems;
- design and conduct experiments, as well as to analyze and interpret biomedical data;
- an ability to make measurements and interpret data from living systems;
- an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice;

- Making judgments

- data collection characterized for the sphere of biomedical engineering, their analysis and explanation, analysis of alienated data and/or situation as well with standard and some special methods and formation of argued conclusion on their basis;
- argued judgment about basic information and fundamental principles of the sphere of biomedical engineering;
- ability to identify, formulate, and solve biomedical engineering problems;
- purposeful education for decision-making with the purpose to make the inferences.;
- using relevant information and individual judgment to determine whether events or processes comply with laws, regulations, or standards;
- judging the qualities of devices, services or people - assessing the value, importance, or quality of things or people.

- **Communication skills**
  - conduct research, along with life scientists, chemists, and medical scientists, on the engineering aspects of the biological systems;
  - Teach biomedical engineering or disseminate knowledge about the field through writing or consulting;
  - Manage teams of engineers by creating schedules, tracking inventory, creating and using budgets, and overseeing contract obligations and deadlines;
  - conduct training or in-services to educate clinicians and other personnel on proper use of equipment.
  - write documents describing protocols, policies, standards for use, maintenance, and repair of medical equipment.
  - public presentation of own thoughts with the appropriate knowledge and logic and their clear argumentation as with experts so with non experts;
  - creative use of modern informational and communicational technologies;
  - knowledge of media production, communication, and dissemination techniques and methods. This includes alternative ways to inform and entertain via written, oral, and visual media.
  - an ability to function on multidisciplinary and diverse teams and provide leadership;

- **Learning skills**
  - to determine the learning directions with taking into account existed environment and priorities;
  - consequent and multilateral estimation of own learning process;
  - to decide the necessity of future training;
  - a recognition of the need for, and an ability to engage in life-long learning ;
  - ability of search, assimilation of the relevant information for the purpose of extension of area of knowledge and experience in the medicine sphere. the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context

- **Values**
  - the protection of professional values (accuracy, punctuality, objectivity, transparency, good organization and others);
  - the protection of accepted norms of ethics;
  - participation in the process of values formation and aspirations to their sustainable implementation;
  - understanding of professional and ethical responsibility of the Biomedical Engineer. Observance of norms of ethics and moral responsibility and values in formation of this process.

Forms and Methods of achieving the learning outcomes

☒ Lecture ☒ Seminar (working in the group) ☒ Practical classes ☒ laboratory classes
☒ Practice ☒ Course work/project ☒ Consult ☒ Independent work

Based on the specific course of study in the learning process, the relevant below listed activities of the teaching-learning methods are used, which are reflected in the relevant training courses (syllabus): (Discussion, debate, presentation, group work, etc.)

1. **Discussion/debates.** This is the most widely spread method of interactive teaching. A discussion process

greatly increases the quality of students' involvement and their activity. A discussion may turn into an argument and this process is not merely confined to the questions posed by the teacher. It develops students' skills of reasoning and substantiating their own ideas.

2. **Cooperative teaching** is a teaching strategy in the process of which each member of a group not only has to learn the subject himself, but also to help his fellow-student to learn it better. Each member of the group works at the problem until all of them master the issue.
3. **Collaborative work**; using this method implies dividing students into separate groups and giving each group its own task. The group members work at their issues individually and at the same time share their opinions with the rest of the group. According to the problem raised, it is possible to shift the functions among the group members in this process. This strategy ensures the students' maximum involvement in the learning process.
4. **Problem based learning** is an activity which uses a specific problem as theinitial stages of obtaining new knowledge and integration process.
5. **Case study** – the teacher discusses concrete cases together with the students and they study the issue thoroughly. E.g., in the sphere of engineering safety it can be a discussion of a concrete accident or catastrophe, or in political science it can be a study of a concrete problem conflict.
6. **Brain storming** – this method implies forming and presenting as many radically different ideas and opinions on a given topic as possible. This method sets conditions for developing a creative approach towards a problem. This method is effective in a large group of students and consists of the following stages:
    - using a creative approach for defining a problem/issue;
    - for a certain period of time listing (mainly on the blackboard) students' ideas on the problem without any criticism;
    - determining the evaluation criteria for stating the correspondence of the idea to the aim of the research;
    - evaluating the chosen ideas according to the previously determined criteria;
    - selecting the ideas that most of all correspond to the given issue by applying the method of exclusion;
    - revealing the best idea for solving the given problem
7. **Demonstration method** implies presenting information with the help of visual aids. It is quite effective in reaching the required result. It is frequently advisable to present the material simultaneously through audio and visual means. The material can be presented both by a teacher and a student. This method helps us to make different steps of perceiving the teaching material more obvious, specify what steps the students are supposed to take independently; at the same time this strategy visually shows the essence of an issue/problem. Demonstration can be very simple.
8. **Inductive method** determines such a form of conveying any kind of knowledge when in the process of learning the train of thought is oriented from facts towards generalization, i.e. while presenting the material the process goes from concrete to general.
9. **Deductive method** determines such a form of conveying any kind of knowledge which presents a logical process of discovering new knowledge on the basis of general knowledge, i.e. the process goes from general to concrete.
10. **Analytical method** helps us to divide the whole teaching material into constituent parts. In this way the detailed interpretation of separate issues within the given complex problem is simplified.
11. **Synthetic method** implies forming one issue from several separate ones. This method helps students to develop the ability of seeing the problem as a whole.
12. **Verbal or oral method** comprises a lecture, narration, conversation, etc. During the process the teacher conveys, explains the material verbally, and students perceive and learn it by comprehending and memorizing.
13. **Written method** implies the following forms of activity: copying, taking notes, composing theses, writing essays, etc.
14. **Role and situational games** – games that are fulfilled according to predefined scenario allow students to look at the issue differently. It helps them to develop an alternative viewpoint. Like discussions, these games also formulate the student's ability to express and protect his/her position independently.
15. **Activity-oriented teaching** implies teachers' and students' active involvement in the teaching process,

when practical interpretation of the theoretical material takes place.

16. **Designing and presenting a project.** While designing a project a student applies the knowledge and skills he has acquired for solving a problem. Teaching by means of designing projects increases students' motivation and responsibility. Working on a project involves the stages of planning, research, practical activity and presenting the results according to the chosen issue. The project is considered to be completed if its results are presented clearly, convincingly, and correctly. It can be carried out individually, in pairs or in groups; also, within the framework of one or several subjects (integration of subjects); on completion the project is presented to a large audience.

Concrete teaching methods are reflected in appropriate courses programs (syllabuses).

Student knowledge assessment system

Grading system is based on a 100-point scale.

Positive grades:

- **(A)** - Excellent - the rating of 91-100 points;
- **(B)** – Very good - - the rating of 81-90 points
- **(C)** - Good - the rating of 71-80 points
- **(D)** - Satisfactory - the rating of 61-70 points
- **(E)** - Enough - the rating of 51-60 points

Negative grades:

- **(FX)** - Did not pass - 41-50 points of rating, which means that the student needs more work to pass and is given the right to take the exam once more with independent work;
- **(F)** – Failed - 40 points and less, which means that the work carried out by the student is not enough and he/she has to learn the subject from the beginning.

Each form and component of the evaluation from the general score of the assessment (100 points) has a definitive share in the final assessment. In particular, the maximum score of the intermediate score is 60, and the maximum score of the final exam ¬ 40. In each form of assessment the minimum competence limit is defined. Minimum positive score for final evaluation is 10, maximum score of midterm exam 30. Minimum positive assessment is 7.5 points, maximum current score of 30, minimum positive positive - 15 points.

The forms of assessment:

- Intermediate Assessment
- Final/extra exams

Intermediate assessment components are:
• Current Activity
• Mid-Semester Exam
One Mid-semester exam is conducted during the semester. It is obligatory component of interim assessment.
Assessment methods and criteria are detailed in the syllabus of courses,

Field of employment

Biomedical engineers are employed in industry, in hospitals, in research facilities of educational and medical institutions, in teaching, and in government regulatory agencies. They often serve a coordinating or interfacing function, using their background in both the engineering and medical fields. In industry, they may create designs where an in depth understanding of living systems and of technology is essential. They may be involved in performance testing of new or proposed products. Government positions often involve product testing and safety, as well as establishing safety standards for devices. In the hospital, the biomedical engineer may provide advice on the selection and use of medical equipment, as well as supervising its performance testing and maintenance. They may also build customized devices for special health care or research needs. In research institutions, biomedical engineers

supervise laboratories and equipment, and participate in or direct research activities in collaboration with other researchers with such backgrounds as medicine, physiology, and nursing. Some biomedical engineers are technical advisors for marketing departments of companies and some are in management positions
In representative firms of vendors of medical devices,for carrying out of markteting and service. Also as Health Information Technology (HIT) specialists of information technologies for processing of medical information.

Opportunity to continue learning

Master's educational programs.

Human and material resources necessary for the implementation of the program

The program provides the appropriate human and material resources. In the program implementation, there are involved professors from West Pomeranian University of Technology according the Co-Operation Agreement between the Georgian Technical University and West Pomeranian University of Technology. For more information see the attached syllabi and other attachment documentation

Number of attached syllabus: 54

Program subject load

№	Course	Precondition of admit	ECTS Credits							
			I Year		II Year		III Year		IV Year	
			I	II	III	IV	V	VI	VII	VIII
1	Engineering Mathematics 1	Don't have	6							
2	Physics A	Don't have	5							
3	Introduction to general and organic chemistry	Don't have	5							
4	Programming in Visual Studio	Don't have	4							
5	Introduction to Biomedical Engineering	Don't have	5							
6	Electrophysiology	Don't have	5							
7	Engineering Mathematics 2	Engineering Mathematics 1		6						
8	Physics B	Physics A		5						
9	Biomechanics of Human Body	Electro physiology		4						
10	Human Physiology	Electrophysiology		5						
11	Object-oriented Programming - 1(based on C#)	Don't have		5						
12	**University Elective 1**									
12.1	Georgian History and Culture	Don't have		5						
12.2	Art Trough the age	Don't have								
13	Engineering Mathematics 3	Engineering Mathematics 2			6					

№	Course	Precondition of admit	ECTS Credits							
			I Year		II Year		III Year		IV Year	
			I	II	III	IV	V	VI	VII	VIII
14	Physics C	Physics B			5					
15	Electrical Circuits 1	Physics B			5					
16	Biomedical Measurements	Introduction to Biomedical Engineering			5					
17	Lab View Programming Methods	Object-oriented Programming - 1(based on C#)			4					
18	Biomedical Instrumentation	Introduction to Biomedical Engineering			5					
19	Linear Algebra	Engineering Mathematics 2				6				
20	Biophysics	Physics A				5				
21	Electrical Circuits 2	Electrical Circuits 1				5				
22	Medical device design	Biomedical Instrumentation				5				
23	Biomedical Transducers	Biomedical Measurements				4				
24	**University Elective 2**					5				
24.1	Design and Society	Don't have								
24.2	Principles of Contemporary Management	Don't have								
25	Basics of Medical Electronics	Electrical Circuits 2					6			
26	Control Systems in Biology and Medicine	Linear Algebra					5			
27	Bioinformatics In Matlab	Electrophysiology					5			
28	Materials for Medical Devices	Introduction to general and organic chemistry					4			
29	Elements of Mathematics for Business	Don't have					5			
30	Modeling in Electronic Workbench	Basics of Medical Electronics					5			
31	Health Care Management and Economics	Elements of Mathematics for Business						5		
32	Clinical Practice	Medical devices design Biomedical Instrumentation						6		
33	Quality Control Of Medical	Basics of Medical						5		

№	Course	Precondition of admit	ECTS Credits							
			I Year		II Year		III Year		IV Year	
			I	II	III	IV	V	VI	VII	VIII
	Devices	Electronics								
34	CAD Systems	Don't have						5		
35	Fundamentals of Business Communication	Don't have						4		
36	**University Elective 3**									
36.1	Introduction to Ergonomics	Don't have						5		
36.2	Job Analysis Methods	Don't have								
37	Team Project	Clinical Practice							6	
38	**Professional Electives 1**									
38.1	Microprocessor Medical Systems	Object-oriented Programming - 1(based on C#) Basics of Medical Electronics							6	
38.2	Biomedical Signal and Image Processing	Linear Algebra								
39	**Professional Electives 2**									
39.1	Clinical Diagnostic Laboratory Devices	Clinical practice							6	
39.2	Interfaces Of Medical Systems	Object-oriented Programming - 1(based on C#) Basics of Medical Electronics								
40	**Professional Electives 3**									
40.1	Mobile Health Systems	Lab View Programming Methods							6	
40.2	Telemedicine	Lab View Programming Methods								
41	**Professional Electives 4**									
41.1	Hospital Administration And Management	Health Care Management and Economics							6	
41.2	Distance Medical Systems	Biomedical Transducers								
42	**Professional Electives 5**									

№	Course	Precondition of admit	ECTS Credits							
			I Year		II Year		III Year		IV Year	
			I	II	III	IV	V	VI	VII	VIII
42.1	Medical Informatics	Health Care Management and Economics								6
42.2	Medical Sensors	Electrophysiology Biophysics								
43	**Professional Electives 6**									6
43.1	Radiological Physics & Dosimetry	Physics C, Biophysics								
43.2	MRI Tomography	PhysicsC , Biophysics								
44	**Professional Electives 7**									6
44.1	Artificial Organs	Human Physiology, Materials for Medical Devices								
44.2	Mathematical Models in Biology and Medicine	Engineering Mathematics 3								
45	Capstone Design Project	Team Project								12
		Per semester	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**
		Per year	**60**		**60**		**60**		**60**	
		Total	**240**							

Map of learning outcomes

№	Subject	Knowledge and understanding	Ability to use knowledge in practice	Making judgments	Communication skill	Ability to learn	Values
1	Engineering Mathematics 1	X	X			X	
2	Physics A	X		X		X	
3	General Chemistry	X	X	X		X	
4	Programming in Visual Studio	X	X	X			
5	Introduction to Biomedical Engineering	X	X				X
6	Electrophysiology	X	X	X		X	
7	Engineering Mathematics 2	X	X			X	
8	Physics B	X		X		X	
9	Biomechanics of Human Body	X	X	X			
10	Human Physiology	X	X			X	
11	Programing C++	X	X			X	
12.1	Georgian History and Culture	X	X		X	X	
12.2	Art Trough the age	X	X	X	X	X	X
13	Engineering Mathematics 3	X	X			X	
14	Physics C	X		X		X	
15	Electrical Circuits 1	X	X	X		X	
16	Biomedical Measurements	X	X	X			
17	Lab View Programming Methods	X	X			X	
18	Biomedical Instrumentation	X	X	X			
19	Linear Algebra	X	X			X	
20	Biophysics	X	X	X			
21	Electrical Circuits 2	X	X	X			
22	Medical device design	X	X	X			
23	Biomedical Transducers	X	X	X			
24.1	Design and Society	X	X	X	X	X	X
24.2	Principles of Contemporary Management	X	X	X			X
25	Basics of Medical Electronics	X	X		X		
26	Control Systems in Biology and Medicine	X	X	X			
27	Bioinformatics In Matlab	X	X	X	X	X	
28	Materials for Medical Devices	X	X	X		X	
29	Elements of Mathematics for Business	X	X			X	
30	Modeling in Electronic Workbench	X	X	X			
31	Health Care Management and Economics	X	X	X	X	X	

32	Clinical Practice	X	X	X	X		
33	Quality Control Of Medical Devices	X	X			X	
34	CAD Systems	X	X			X	
35	Fundamentas Business Correspondence	X	X	X	X		
36.1	Introduction to Ergonomics	X	X		X	X	
36.2	Job Analysis Methods	X	X		X		X
37	Team Project	X	X	X	X	X	
38.1	Microprocessor Medical Systems	X	X	X			
38.2	Biomedical Signal and Image Processing	X	X	X	X		
39.1	Clinical Diagnostic Laboratory Devices	X	X	X			
39.2	Interfaces Of Medical Systems	X	X	X			
40.1	Mobile Health Systems	X	X		X		X
40.2	Telemedicine	X	X		X		X
41.1	Hospital Administration And Management	X	X		X		X
41.2	Distance Medical Systems	X	X	X			
42.1	Medical Informatics	X	X		X		
42.2	Medical Sensors	X	X	X			
43.1	Radiological Physics & Dosimetry	X	X		X		X
43.2	MRI Tomography	X	X		X		
44.1	Artificial Organs	X	X	X		X	
44.2	Mathematical Models in Biology and Medicine	X	X	X			
45	Capstone Design Project	X	X	X	X	X	X

Program curriculum

№	Subject code	Subject	ECTS Credit/Hours	Hours								
				Lecture	Seminar (work in the group)	Practical	Laboratory	Practice	Course paper/project	Mid-semester exam	Final exam	Independent work
1	MAS30108E1-LP	Engineering Mathematics 1	6/150	30		30				1	2	87
2	PHS50708E1-LB	Physics A	5/125	15			30			1	2	77
3	PHS17308E1-LS	General Chemistry	5/125	15	30					1	2	77
4	ICT19208E1	Programming in Visual Studio	4/100				30			1	2	67
5	EET30308E1-LP	Introduction to Biomedical Engineering	5/125	15		30				1	2	77
6	BRS10208E1-LPs	Electrophysiology	5/125	15	30					1	2	77
7	MAS30208E1-LP	Engineering Mathematics 2	6/150	30		30				1	2	87

8	PHS50808E1-LB	Physics B	5/125	15			30			1	2	77
9	BRS10108E1-LS	Biomechanics of Human Body	4/100	15	15					1	2	67
10	BRS10308E1 –LB	Human Physiology	5/125	15			30			1	2	77
11	ICT10408G1-LP	Programing C++	5/125	15		30				1	2	77
12.1	HEL21508E1-LS	Georgian History and Culture	5/125	15	30					1	2	77
12.2	ART30809E1-LS	Art Trough the age	5/125	30	15					1	1	78
13	MAS30308E1-LP	Engineering Mathematics 3	6/150	30		30				1	2	87
14	PHS50908E1-LB	Physics C	5/125	15			30			1	2	77
15	EET38508E1-LB 1.	Electrical Circuits 1	5/125	15			30			1	2	77
16	EET30408E1-LB	Biomedical Measurements	5/125	15			30			1	2	77
17	EET37908E1-PB 1.	Lab View Programming Methods	4/100			15	15			1	2	67
18	EET30208E1-LP	Biomedical Instrumentation	5/125	15		30				1	2	77
19	MAS30808E1-LP	Linear Algebra	6/150	30		30				1	2	87
20	BRS10208E1-LP	Biophysics	5/125	15		30				1	2	77
21	EET38608E1-LB 2.	Electrical Circuits 2	5/125	15			30			1	2	77
22	EET38008E1-LP 2	Medical device design	5/125	15		30				1	2	77
23	EET30108E1-LB	Biomedical Transducers	4/100	15			15			1	2	67
24.1	ART22309E1-LS	Design and Society	5/125	30		15				1	2	77
24.2	BUA31408E2-LP	Principles of Contemporary Management	5/125	15		15				1	2	92
25	EET04308E1-LB	Basics of Medical Electronics	6/150	30			30			1	2	87
26	EET31208E1-LB	Control Systems in Biology and Medicine	5/125	15			30			1	2	77
27	ICT11308E1-LB	Bioinformatics In Matlab	5/125	15			30			1	2	77
28	EET31108E1-LS	Materials for Medical Devices	4/100	15	15					1	2	67
29	MAS30708E1-LP	Elements of Mathematics for Business	5/125	15		30				1	2	77
30	EET62608E1-PB	Modeling in Electronic Workbench	5/125			15	30			1	2	77
31	EET38208E1-LS 8-	Health care management and Econimics	5/125	15	30					1	2	77
32	EET30808E1-LR	Clinical Practice	6/150					60		1	2	87
33	EET30508E1-LP	Quality Control Of Medical Devices	5/125	15		30				1	2	77
34	ICT19408E1-PB	CAD Systems	5/125			15	30			1	2	77
35	LEH16108E1-P	Fundametals of Business Correspondence	4/100			30				1	2	67
36.1	INERG09EA3-LS	Introduction to Ergonomics	5/125	15	30					1	1	87
36.2	BUA31308E2-LP	Job Analyzing Methods	5/125	15		30				1	2	77
37	EET31008E1-K	Team Project	6/150						60	1	2	87
38.1	EET39608E1-LP	Microprocessor Medical	6/150	30		30				1	2	87

		Systems										
38.2	EET38408E1-LP	Biomedical Signal and Image Processing	6/150	30		30				1	2	87
39.1	EET30608E1-LP	Clinical Diagnostic Laboratory Devices	6/150	30		30				1	2	87
39.2	EET04508E1-LP	Interfaces Of Medical Systems	6/150	30		30				1	2	87
40.1	ICT10608E1-LP	Mobile Health Systems	6/150	30		30				1	2	87
40.2	ICT10908E1-LP	Telemedicine	6/150	15		45				1	2	87
41.1	BUA30308E1-LP	Hospital Administration And Management	6/150	15		45				1	2	87
41.2	ICT10608E1-LP	Distance Medical Systems	6/150	15		45				1	2	87
42.1	ICT10708E1-LP	Medical Informatics	6/150	30		30				1	2	87
42.2	EET04408E1-LP	Medical Sensors	6/150	30		30				1	2	87
43.1	BRS10208E1-LP	Radiological Physics & Dosimetry	6/150	30		30				1	2	87
43.2	EET30708E1-LP	MRI Tomography	6/150	30		30				1	2	87
44.1	EET04608E1-LP	Artificial Organs	6/150	30		30				1	2	87
44.2	EET38308E1-L	Mathematical Models in Biology and Medicine	6/150	30		30				1	2	87
45	EET30908E1-K	Capstone Design Project	12/300						120	1	2	177

Program Supervisor — Irine Gotsiridze

Informatics and Control Systems Faculty

Head of Quality Assurance Service — Zurab Baiashvili

Dean of the Faculty — Zurab Tsveraidze

Approved by

Informatics and Control Systems Faculty

At the meeting of Faculty Board № 1

25. 04. 2013

Chairman of the Faculty Board — Zurab Tsveraidze

Agreed with

Quality Assurance Service of GTU — Irma Inashvili

Modified

Informatics and Control Systems Faculty

At the meeting of Faculty Board № 3

02. 04. 2018

Chairman of the Faculty Board — Zurab Tsveraidze