



საქართველოს ტექნიკური უნივერსიტეტი
GEORGIAN TECHNICAL UNIVERSITY

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Bachelor's Educational Program

Name of the program

მექანიკის ინჟინერია

Mechanical Engineering

Faculty

სატრანსპორტო და მანქანათმშენებლობის ფაკულტეტი

Faculty of Transportation and Mechanical Engineering

Program manager

Associate Professor Vazha Qiria

Qualification and program credits

Bachelor in the specialty Mechanical Engineering and Technology

Will be awarded in the case of passing educational program (Minimum 240 credits)

The language of teaching

English

Precondition for admission to the program

The right to study has a person who has a General education diploma or a document equating to it, which will be credited according to the rules of the legislation of Georgia.

Description of the program

The bachelor's program mechanical engineering was created based on the experience of leading educational institutions and taking into account the requirements of the labor market.

The program is created by the system ECTS, 1 credit is equal to 25 hours, which implies both contact and independent working hours. The program lasts for 4 years (8 semesters) - consists of 240 ECTS credits.

The program contains: General education courses 59 ECTS credits; General technical courses 79 ECTS credits; courses on specialty 87 ECTS credits; practice 5 ECTS credits; bachelor's work 10 ECTS credits.

the purpose of the practice is to acquaint students with the future situation of professional activity, to strengthen the practical skills and to provide information on bachelor's work.

The purpose of the program

Training of specialists in the basic functional elements are mechanisms and driving mechanisms (including the automated, mechanical, hydraulically and pneumatically drives) - machines and machine systems of various functional purpose (including those which are equipped with computer control systems), Mechatronic modules and systems and, as a rule, in modern machines (both in production, and technological and industrial, and also hoisting-transport, construction and road machines and other types of equipment and mechanisms); in the principles and methodological approaches, methods and techniques of developing machine systems and their design (calculations and design) as well as teaching them testing, implementation into production, to further improve the existing technical means, development of technological processes and their implementation, technical and industrial exploitation, repairing and modernization in the design of enterprises and solution of engineering technical organisation and the training of specialists, focused on the use of modern computer technologies in mechanical engineering works.

Outcomes/competences (general and sectoral)

Knowledge and Understanding:

- Broad theoretical knowledge of engineering mechanics;
- Critical evaluation of the current achievements and novelties in engineering mechanics;
- Understanding the relationship between the main areas of engineering mechanics;
- Knowledge of the terminology in engineering mechanics.
- Knowledge and understanding of planning and management of technological processes, targeted technological processes, and methods for planning workshops of mechanical plants;
- Knowledge of designing principles of lifting and transportation machinery and norms of maintenance and exploitation, and understating of all international standards, diagnostics, and recent achievements in the area;
- Knowledge and understanding of mechatronic modules of systems of core functional elements, - that is driving mechanisms (including, automated, electro-mechanical, hydro and pneumo-mechanical and those containing digital elements of automation), - of modern machines and machine complexes, their regulation and management modules and systems; principles to develop automated technical means and flexible automated complexes and to make practical use thereof, a methodological approach, methods and methodologies for designing and making calculations.
- Knowledge and understanding of structural designing of technological machines and machine systems of mechanical engineering, kinematic and force calculations, design engineering, technical and industrial exploitation, repairing machines and organizing repairs, including knowledge and undressing of main principles and methods to carry out repairs works of machines

and its parts, and designing repair workshops.

Ability to apply knowledge in practice:

- Justification-based critical understanding of Mechanical engineering elements and principles;
- Ability to obtain and process new technical and technological information in Mechanical Engineering and ability to develop machine design drawings;
- Ability to use Mechatronic modules and systems, maintenance services of machines and equipment, methods for calculating units and for design engineering;
Ability to conduct force and dynamic calculations and to analyze them, kinematic analysis of special mechanisms, and to make structural analysis of mechatronic modules and systems.
- Ability to determine timeframes for achieving the goals identified;
- Ability to design flexible manufacturing structure according to the preliminary instructions, and to organize industrial firms and to conduct normal operations thereof.
- Ability to use modern methods of quality management system.
- Ability to give a correct direction and offer business related suggestions to the subordinates in course of implementation of the given work.
- Participate in kinematic, force and dynamic calculations and design engineering of core functional elements, - that is machine parts, units, mechanisms, and driving systems, - of modern machines and machine systems as well participate in identifying the features of the machines and equipments, in regulating, making a dynamic analysis, technical exploitation, repairing, modernizing, and developing structural and design layouts of machines and machine systems.
- Carry out engineering works related to designing of targeted technological processes for manufacturing parts and practical implementation thereof.

Ability to make a conclusion;

- Analyze new and stand alone data and/or cases in order to solve mechanical engineering problems and work out a justified conclusion based on the analysis.
- Work out a conclusion and offer an explanation on maintenance and technological process for repairing the given object, as well on technical condition and operability of the machinery and equipment.
- Ability to obtain new information and process it;

Ability to communicate

- Ability to use creatively information-communication technological resources in order to achieve the objectives identified;
- Ability to write clearly and concisely on professional issues;
- Ability to prepare presentations, or written information.
- Ability to communicate verbally and in writing information for specialists and for laymen both in the mother tongue and in a foreign language;

Ability to learn

- Knowledge and experience in order to enrich their learning process with consistent and versatile, self-assessment of knowledge and education on the need for the second stage (MA) to determine the need for continuing education; Make a consistent and multi-aspect evaluation of one's own learning process in order to further knowledge and experience; make a self-evaluation in respect of brushing up the knowledge and identify the need to continue studying at the second stage (at the Master's program);

Values:

- Knowledge of Mechanical engineering principles and values ;
- Observe the professional ethical norms and values recognized;
- Observe the moral standards recognized;
- Ability to inspire in order to participate in working out values, moral norms and values and to introduce them.

Methods of achieving learning outcomes (teaching and learning)

Lecture Seminar (team working) Practice Laboratory Practice
 Course paper/project Consultation 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.)

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.

Students have the right to pass the exam if they overcome the minimum competence (22.5), as well as if they perform and pass the documentary material.

During the semester evaluation of students ' activity is carried out as follows:

- The maximum score Intermediate examination is 30 points, minimal 7,5 points.
- Maximum current activity score 30 points, minimal 15 points.
- Maximum score finishing exam is 40 points, minimal 8 points.

Students can pass an additional exam only once.

Field of employment

Bachelor of Mechanical Engineering will be work in a state or private enterprises and organizations, the activities of which are related to developing new type of manufacturing machines and equipment in any field of economy in the country; in there where need maintenance and repairs of various industrial-use machinery and facilities such as the aviation manufacturing, building machine tools; civil, road and construction companies, in light industry and food companies, in various repair enterprises, etc.

Opportunity to continue learning

Master's Educational Programs

Human and material resources necessary for the implementation of the program

The programme is provided with adequate material and human resources. See the attached documents for more information.(attachment 2-human resource; attachment 3- material resource; attachment 4- contracts).

Number of attached syllabus: 44

Program subject load

№	Subject	Precondition of admit	ECTS Credits										
			I Year		II Year		III Year		IV Year				
			Semester										
			I	II	III	IV	V	VI	VII	VIII			
1.	Engineering Mathematics 1	No prerequisites	6										
2.	General Physics A	No prerequisites	4										
3.	General Chemistry	No prerequisites	4										
4.	Descriptive Geometry	No prerequisites	3										
5.	Fundamentals of information technologies	No prerequisites	6										
6.	Georgian Language	No prerequisites	4										
7.	Industrial safety and emergency control	No prerequisites	3										
8.	Engineering Mathematics 2	Engineering Mathematics 1		6									
9.	General Physics B	General Physics A		5									
10.	Projective Drawing	No prerequisites		3									
11.	Environment protection and ecology	No prerequisites		3									
12.	Fundamentals of Hydraulics	No prerequisites		3									
13.	General Materials Science	No prerequisites		5									
14.	Theoretical mechanics 1	No prerequisites		5									
15.	Engineering Mathematics 3	Engineering Mathematics 2			6								
16.	Strength of materials	No prerequisites			5								
17.	Computer Engineering Graphics / AUTODESK AutoCAD Mechanical	Projective Drawing			4								
18.	Theory of mechanisms and machines	Theoretical mechanics 1			5								

19.	Thermo dynamics and heat processes	No prerequisites			5				
20.	Theoretical mechanics 2	Theoretical mechanics 1			5				
21.	Electrical engineering and electronics	General Physics B;			6				
22.	CAD/CAE technology using Autodesk Inventor	Engineering drawing			6				
23.	Machinery parts 1	Engineering drawing , Theoretical mechanics , Theory of mechanisms and machines			6				
24.	Fundamentals of Programming (C)	No prerequisites			6				
25.	Introduction to Nanotechnology	Engineering Mathematics 1, General Physics A; Chemistry,			6				
26.	Machinery parts 2	Machine Parts 1				6			
27.	Interchangeability, standardization and technical measuring in Mechanical Engineering	Machine Parts 1				5			
28.	Mechanical Vibrations	Theory of mechanisms and machines.				5			
29.	Hydraulics and Pneumatics	General Physics A				6			
30.	Programmable Logical Controllers	Fundamentals of Programming (C)				8			
31.	Pneumatics LAB	Hydraulics and Pneumatics					8		
32.	Hydraulics LAB	Hydraulics and Pneumatics					7		
33.	MatLab_Simulink	No prerequisites					4		
34.	Georgian History and Culture	No prerequisites					5		
35.	Manufacturing engineering 1	Interchangeability, standardization and technical measuring					6		
36.	Sensors	Machinery parts 2; Electrical engineering and electronics						8	
37.	Manufacturing Engineering 2	Manufacturing engineering 1						6	
38.	Fundamentals of Electrohydraulics and Electropneumatics .	Hydraulics and Pneumatics; Electrical engineering and electronics						8	
39.	Use LabView in Mechanical Engineering	Electrical engineering and electronics,						8	
40.	Cutting machines and CNC machin's programming	Manufacturing engineering 2;							6
41.	International Management	No prerequisites							4
42.	Flexible Manufacturing Systems	Manufacturing engineering 2;							5
43.	Bachelor's work	Sensors, Manufacturing Engineering 2, Fundamentals							10

		of Electrohydraulics and Electropneumatics .									
44.	Intership	Sensors, Manufacturing Engineering 2, Fundamentals of Electrohydraulics and Electropneumatics .								5	
Per semester			30	30	30	30	30	30	30	30	
Per year			60	60	60	60	60	60	60	60	
Total			240								

Map of learning outcomes

Nº	Subject	Knowledge and understanding	Ability to use knowledge in practice	Making judgments	Communication skill	Ability to learn	Values
1.	Engineering Mathematics 1	+	+			+	
2.	General Physics A	+		+		+	
3.	General Chemistry	+	+			+	
4.	Descriptive Geometry	+	+	+			
5.	Fundamentals of information technologies	+	+			+	
6.	Georgian Language	+	+		+	+	
7.	Industrial safety and emergency control	+		+			+
8.	Engineering Mathematics 2	+	+			+	
9.	General Physics B	+		+		+	
10.	Projective Drawing	+	+	+			
11.	Environment protection and ecology	+	+				+
12.	Fundamentals of Hydraulics	+	+			+	
13.	General Materials Science	+	+	+			+
14.	Theoretical mechanics 1	+	+	+		+	
15.	Engineering Mathematics 3	+	+			+	
16.	Strength of materials	+	+	+		+	
17.	Computer Engineering Graphics / AUTODESK AutoCAD Mechanical	+			+	+	+
18.	Theory of mechanisms and machines	+	+	+		+	
19.	Thermo dynamics and heat processes	+	+	+		+	
20.	Theoretical mechanics 2	+	+	+		+	
21.	Electrical engineering and electronics	+	+			+	

22.	CAD/CAE technology using Autodesk Inventor	+	+			+	
23.	Machinery parts 1	+	+			+	
24.	Fundamentals of Programming (C)	+	+			+	
25.	Introduction to Nanotechnology	+	+	+		+	
26.	Machinery parts 2	+	+			+	
27.	Interchangeability, standardization and technical measuring in Mechanical Engineering	+	+			+	
28.	Mechanical Vibrations	+	+			+	
29.	Hydraulics and Pneumatics	+	+			+	
30.	Programmable Logical Controllers	+	+			+	
31.	Pneumatics LAB	+	+			+	
32.	Hydraulics LAB	+	+			+	
33.	MatLab_Simulink	+	+			+	
34.	Georgian History and Culture	+		+	+		
35.	Manufacturing engineering 1	+	+	+		+	
36.	Sensors	+	+			+	
37.	Manufacturing engineering 2	+	+			+	
38.	Fundamentals of Electrohydraulics and Electropneumatics	+	+			+	
39.	Use LabView in Mechanical Engineering	+	+			+	
40.	Cutting machines and CNC machin's programming	+	+			+	
41.	International Management	+	+		+		
42.	Flexible Manufacturing Systems	+	+			+	
43.	Bachelor's work	+	+	+	+	+	
44.	Intership	+	+	+	+	+	

Program curriculum

№	Subject code	Subject	ECTS Credit/Hours	Hours								
				Lecture	Seminar (work in the group)	Practical classes	Laboratory	Practice	Course work/project	Mid-semester exam	Final exam	Independent work
1.	MAS30108E1	Engineering Mathematics 1	6	30	-	30	-	-	-	1	2	87
2.	PHS54408E1	General Physics A	4	15	-	-	15	-	-	1	2	67
3.	CHE0104	General Chemistry	4	15	-	-	15	-	-	1	1	68
4.	EET70105E2	Descriptive Geometry	3	15	-	15	-	-	-	1	1	43
5.	EET74705E2	Fundamentals of information technologies	6	15	-	45	-	-	-	1	1	88
6.	LEH14412E1	Georgian Language	4	-	-	30	-	-	-	1	1	68

7.	HHS28303E1	Industrial safety and emergency control	3	15	-	15	-	-	-	1	1	43
8.	MAS30208E1	Engineering Mathematics 2	6	30	-	30	-	-	-	1	2	87
9.	PHS54508E1	General Physics B	5	15	-	-	30	-	-	1	2	77
10.	EET70205E2	Projective Drawing	3	-	-	30	-	-	-	1	1	43
11.	ENVPR04EA1	Environment protection and ecology	3	15	-	-	15	-	-	1	1	43
12.	AAC94301E1	Fundamentals of Hydraulics	3	15	-	-	15	-	-	1	2	43
13.	GMATS04 EA1	General Materials science	5	15	-	-	30	-	-	1	1	78
14.	MAS40401E1	Theoretical mechanics 1	5	15	-	30	-	-	-	1	1	78
15.	MAS30308E1	Engineering Mathematics 3	6	30	-	30	-	-	-	1	2	87
16.	EET73201E2	Strength of materials	5	30	-	30	-	-	-	1	1	78
17.	EET70805E2	Computer Engineering Graphics / AUTODESK AutoCAD Mechanical	4	-	-	30	-	-	-	1	1	68
18.	EET74805E2	Theory of mechanisms and machines	5	15	-	30	-	-	-	1	1	78
19.	HEATR05	Thermo dynamics and heat processes	5	15	-	30	-	-	-	1	1	78
20.	MAS40501E1	Theoretical mechanics 2	5	15	-	30	-	-	-	1	1	78
21.	EET40202E1	Electrical engineering and electronics	6	30	-	15	15	-	-	1	1	88
22.	EET74905E2	CAD/CAE technology using Autodesk Inventor	6	-	-	60	-	-	-	1	1	88
23.	EET75105E2	Machinery parts 1	5	15	-	15	15	-	-	1	1	78
24.	ICT32308E2	Fundamentals of Programming (C)	6	30	-	30	-	-	-	1	1	88
25.	EET75005E2	Introduction to Nanotechnology	6	30	-	30	-	-	-	1	1	88
26.	EET75205E2	Machinery parts 2	5	15	-	30	-	-	-	1	1	78
27.	EET75305E2	Interchangeability, standardization and technical measuring in Mechanical Engineering	5	15	-	-	30	-	-	1	1	78
28.	EET75405E2	Mechanical Vibrations	5	30	-	15	-	-	-	1	1	78
29.	EET75505E2	Hydraulics and Pneumatics	5	45	-	-	-	-	-	1	1	78
30.	ICT32408E2	Programmable Logical Controllers	8	30	-	30	30	-	-	1	1	108
31.	EET75605E2	Pneumatics LAB	8	-	-	-	90	-	-	1	1	108
32.	EET75705E2	Hydraulics LAB	7	-	-	-	75	-	-	1	1	98
33.	EET75805E2	MatLab_Simulink	4	15	-	15	-	-	-	1	1	68
34.	HEL21508E1	Georgian History and Culture	5	15	30	-	-	-	-	1	2	77
35.	EET75905E2	Manufacturing engineering 1	5	15	-	-	30	-	-	1	1	78
36.	EET76105E2	Sensors	8	30	-	-	60	-	-	1	1	108
37.	EET76005E2	Manufacturing Engineering 2	6	30	-	-	30	-	-	1	1	88
38.	EET76205E2	Fundamentals of Electrohydraulics and Electropneumatics	8	15	-	-	75	-	-	1	1	108
39.	EET76305E2	Use LabView in Mechanical Engineering	8	-	-	-	90	-	-	1	1	108
40.	EET76405E2	Cutting machines and CNC machine's programming	6	30	-	30	-	-	-	1	1	88

41.	BUA38405E1	International Management								1	1	
42.	EET76505E2	Flexible Manufacturing Systems	5	30	-	15	-	-	-	1	1	78
43.	EET76605E2	Bachelor's work	10	-	-	-	-	-	120	1	1	128
44.	EET76705E2	Intership	5	-	-	-	-	45	-	1	1	78

Program manager

Vazha Qiria

Faculty of Transportation and Mechanical Engineering

Head of Quality Assurance Service

Manana Moistsraphishvili

Dean of Faculty

Otar Gelashvili

Agreed with
Quality Assurance Service of GTU

Irma Inashvili

Approved by
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Modified by
At the meeting of Faculty Board
№4 on 30.03.2018
Chairman of the Faculty Board

Otar Gelashvili