საქართველოს ტექნიკური უნივერსიტეტი
GEORGIAN TECHNICAL UNIVERSITY

Bachelor Educational Program

Program Title

Mechanical Engineering
მექანიკის ინჟინერია

Faculty

Faculty of Transportation and Machine-Building
სატრანსპორტო და მანქანათმშენებლობის ფაკულტეტი

Educational Program Supervisor

Associate Professor Vazha Qiria
ასოცირებული პროფესორი ვაჟა ქირია

Qualification and program credits

Intermediary Qualification of Mechanical Engineering and Technology   Will be awarded in the case of passing a short cycle of educational program (Minimum 120 credits)
შუალედური კვალიფიკაცია მექანიკის ინჟინერია და ტექნოლოგიაში   *მიენიჭება საგანმანათლებლო პროგრამაში არსებული მოკლე ციკლის გავლის შემთხვევაში (არანაკლებ 120კრედიტი)*
Bachelor in the specialty Mechanical Engineering and Technology   Will be awarded in the case of passing a short cycle of educational program and free components or/and by combination of additional specialty components (Minimum 240 credits)
მექანიკის ინჟინერიის და ტექნოლოგიის ბაკალავრი   *მიენიჭება ძირითადი სპეციალობის და თავისუფალი კომპონენტების ან/და დამატებითი სპეციალობ(ებ)ის კომბინირებით არანაკლებ 240 კრედიტის შესრულების შემთხვევაში*

Language of study

English
ინგლისური

Program Objective

Train specialists in core functional elements, - that is mechanisms and driving mechanisms (including automated, electromechanical, electro-hydro and electro- pneumo-mechanical regulation and control) - of machines and machine systems of various functional purposes (including those equipped with computer control systems), Mechatronic modules and systems and generally in modern machines (both manufacturing and technological and industrial, as well lifting and transportation, construction and road machines and other types of machines and mechanisms); in principles and methodological approaches,

methods and methodologies for developing machine systems and for designing them (calculations and design engineering), as well as train them in their testing, introducing them in manufacturing, further improving the level of the existing technical facilities, in developing technological processes and their introduction, in technical and industrial exploitation, repairing and modernizing, in designing enterprises and solving engineering issues of technical organization and train specialists focused on using state-of-art computer technologies in engineering works.

Program pre-request

A holder of state certificate verifying that he/she is a graduate of the complete secondary education or a person equalized to the holder, who has who will be enrolled on the basis of the results of national examinations, shall be entitled to take the Bachelor's program.

Learning Outcome/Competencies

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 ccritical 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 unites 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.

Forms and Methods of achieving of the learning outcomes

☒ Lecture   ☒ Seminar (group work)   ☒ Practical Work   ☒ Laboratory Work   ☒ Practice

☒ Course Work/Project   ☒ Independent Work

Student's Knowledge Assessment

Assessment is based on a 100 point grading scale.
Positive assessment is:
- **(A)** - excellent - 91% and more of the maximum grade;
- **(B)** - very good - 81-90% of the maximum grade;
- **(C)** - good - 71-80% of the maximum grade;
- **(D)** - satisfactory - 61-70% of the maximum grade;
- **(E)** - enough - 51-60% of the maximum grade;

Negative assessment is:

- **(FX)** - not passed - 41-50% of the maximum grades. It means that a student needs more individaul work, and is given one more possibility to pass the exam;
- **(F)** - failed - 40% and less of the maximum grade. It means that work performed by a student was not enough and the subject should be learnt from the beginning;

Assessment forms:
- Weekly assessment;
- Intermadiate assessment;
- Final exam;

Assessment methods:
- Testing;
- Oral exam;
- Written exam;
- Individual/group project presentation;
- Observation.

Sphere of Employment

Mechanical Engineering Bachelor may be employed 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; effective operation of existing machines and aggregates; regular and major repairs of various industrial-use machinery and facilities; specifically: in the aviation manufacturing, in building machine tools, electric locomotive and train compartment repair factories, in printing machinery factories, civil, industrial and hydro-technical construction sites, in road and construction companies, in construction materials and components manufacturing plants, in light industry and food companies, in various repair enterprises, etc.

Further development possibilities

Master's educational programs.

Required human and material resources

The program provides the appropriate human and material resources. For more information see the attached syllabuses.

The number of attached syllabuses: 51
The short-cycle subject load of program

№	Course code	Course	Pre-requisite	I Year		II Year		III Year		IV Year	
				Semesters							
				I	II	III	IV	V	VI	VII	VIII
1	MAT0108	Mathematics 1	Don't have	5							
2	PHY0108	Physics 1	Don't have	4							
3	CHE0104	Chemistry	Don't have	4							
4	DGEOM05	Basics of projection drawing	Don't have	4							
5	CSAT105	Fundamentals of information	Don't have	4							

№	Course code	Course	Pre-requisite	I	II	III	IV	V	VI	VII	VIII
				ECTS Credits							

№	Course code	Course	Pre-requisite	ECTS Credits							
				I Year		II Year		III Year		IV Year	
				Semesters							
				I	II	III	IV	V	VI	VII	VIII
		technologies 1									
6	GL10007	Georgian Language 1	Don't have	3							
7	EMPRE04	Environment protection and ecology	Don't have	3							
8	LSEM003	Industrial safety and emergency control	Don't have	3							
9	MAT0208	Mathematics 2	Mathematics 1		5						
10	PHY0108	Physics 2	Physics 1		5						
11	PDRAV05	Engineering drawing	Don't have		3						
12	CSAT205	Fundamentals of information technologies 2	Don't have		4						
13	GL20007	Georgian Language 2	Georgian Language 1								
14											
14.1	GEHIS07	History of Georgia	Don't have								
14.2	SOC0007	Sociology			3						
14.3	INPHI07	Psychology									
15	TMAMS05	Materials science	Chemistry, physics, mathematics		5						
16	TMECH15	Theoretical mechanics 1	Mathematics 1, 2.		5						
17	MAT0308	Mathematics 3	Mathematics 1, 2.			5					
18	STROM01	Strength of materials	Physics 1			5					
19	TMM1005	Theory of mechanisms and machines 1	Theoretical Mechanics			5					
20	HAETR05	Thermo dynamics and heat processes	Physics, Mathematics			5					
21	CD00005	Computer graphics	Don't have			5					
22	ELAEN12	Electrical engineering and electronics 1	Don't have			5					
23	MELTM15	Machinery parts 1	Don't have				5				
24	CDME105	Computer design and modeling in mechanical engineering 1	Don't have				5				
25	TMECH25	Theoretical mechanics 2	Theoretical mechanics 1				5				
26	HPD1005	Hydro and pneumo drives 1	Don't have				5				
27	ELAEN22	Electrical engineering and electronics 2	ELAEN12				5				
28	ISTM005	Interchangeability, standardization and technical measuring	Don't have				5				
29	FAT0005	Fundamentals of oscillations applied theory	Don't have				5				

№	Course code	Course	Pre-requisite	ECTS Credits							
				I Year		II Year		III Year		IV Year	
				Semesters							
				I	II	III	IV	V	VI	VII	VIII
30	MELTM25	Machine parts 2	MELTM15					5			
31	HTG0005	Hoisting transport gears	Don't have					5			
32	TMM2005	Theory of mechanisms and machines 2	TMECH25					5			
33	MCT0005	Material cutting tools	Don't have					5			
34	CDME205	Computer design and modeling in mechanical engineering 2	CDME105					5			
35	FACT005	Fundamentals of automatic control theory	Don't have					5			
36	ME00005	Manufacturing engineering	Don't have						5		
37	CDME305	Computer design and modeling in mechanical engineering 3	CDME105, CDME205						5		
38	HPD2005	Hydro and pneumo drives 2	HPD1005						5		
39	CS00005	Control systems	Don't have						5		
40	MDRT005	Machines durability and rapture theory	Don't have						5		
41	TMC1005	Technological machines and complexes 1	Don't have						5		
42	DCTM105	Designing and calculation of technological machines 1	Don't have							6	
43	RTERM15	Research, testing, exploitation and repair of technological machines 1	Don't have							6	
44	FM00005	Fundamentals of mechatronics	Don't have							6	
45	JACD08-LP	Job Analysis and Competency design	Don't have							6	
46	MCT0005	Metal Cutting Technologys	Don't have							6	
47	TMC2005	Technological machines and complexes 2	TMC1005								6
48	DCTM205	Designing and calculation of technological machines 2	DCTM105								6
49	RTERM25	Research, testing, exploitation and repair of technological machines 2	RTERM15								6
50	FMS0005	Flexible Manufacturing Systems	Don't have								6
51	INT0005	Internship	Don't have								6
			In semester	30	30	30	30	30	30	30	30
			In year	60		60		60		60	
			Total	240							

№	Course code	Course	Knowledge and inquire	Ability to apply knowledge in practice	Ability to make conclusion	Ability to communicate	Ability to learn	Valuation
			General and sectoral competences					
1	MAT0108	Mathematics 1	+	+	+		+	
2	PHY0108	Physics 1	+	+	+		+	
3	CHE0104	Chemistry	+	+	+		+	
4	DGEOM05	Basics of projection drawing	+	+	+			
5	CSAT105	Fundamentals of information technologies 1	+	+			+	
6	GL10007	Georgian Language 1	+	+		+		
7	EMPRE04	Environment protection and ecology	+	+	+			+
8	LSEM003	Industrial safety and emergency control	+	+	+			
9	MAT0208	Mathematics 2	+	+	+		+	
10	PHY0108	Physics 2	+	+	+		+	
11	PDRAV05	Engineering drawing	+	+	+			
12	CSAT205	Fundamentals of information technologies 2	+	+				
13	GL20007	Georgian Language 2	+	+		+		
14		*Selective Humanities*	+		+	+	+	+
14.1	GEHIS07	History of Georgia	+		+	+	+	+
14.2	SOC0007	Sociology	+		+	+	+	
14.3	INPHI07	Physiology	+			+		+
15	TMAMS05	Materials science	+	+	+			
16	TMECH15	Theoretical mechanics 1		+				
17	MAT0308	Mathematics 3	+	+	+		+	
18	STROM01	Strength of materials	+	+	+		+	

19	TMM1005	Theory of mechanisms and machines 1	+	+	+			
20	HAETR05	Thermo dynamics and heat processes	+	+			+	
21	CD00005	Computer graphics	+	+			+	
22	ELAEN12	Electrical engineering and electronics 1	+	+			+	
23	MELTM15	Machinery parts 1	+	+			+	
24	CDME105	Computer design and modeling in mechanical engineering 1	+	+			+	
25	TMECH25	Theoretical mechanics 2	+	+			+	
26	HPD1005	Hydro and pneumo drives 1	+	+			+	
27	ELAEN22	Electrical engineering and electronics 2	+	+			+	
28	ISTM005	Interchangeability, standardization and technical measuring	+	+			+	
29	FAT0005	Fundamentals of oscillations applied theory	+	+			+	
30	MELTM25	Machine parts 2	+	+			+	
31	HTG0005	Hoisting transport gears	+	+				
32	TMM2005	Theory of mechanisms and machines 2	+	+				
33	MCT0005	Material cutting tools	+	+				
34	CDME205	Computer design and modeling in mechanical engineering 2	+	+				
35	FACT005	Fundamentals of automatic control theory	+	+	+			
36	ME00005	Manufacturing engineering	+	+	+		+	
37	CDME305	Computer design and modeling in mechanical engineering 3	+	+	+			
38	HPD2005	Hydro and pneumo drives 2	+	+				
39	CS00005	Control systems	+	+				
40	MDRT005	Machines durability and rapture theory	+	+	+			
41	TMC1005	Technological machines and complexes 1	+	+			+	
42	DCTM105	Designing and calculation of technological machines	+	+			+	
43	RTERM15	Research, testing, exploitation and repair of technological machines 1	+	+			+	
44	FM00005	Fundamentals of mechatronics	+	+			+	
45	JACD08-L	Job Analysis and Competency design	+	+			+	
46	MCT0005	Technology of mechanical engineering 2	+	+			+	
47	TMC2005	Technological machines and complexes 2	+	+	+	+	+	
48	DCTM205	Designing and calculation of technological machines	+	+			+	
49	RTERM25	Research, testing, exploitation and repair of technological machines 2	+	+			+	
50	FMS0005	Flexible computerized mechanical engineering manufacturing	+	+			+	
51	INT0005	Internship	+	+			+	

Map of study results

№	Course code	Course	ECTS Credit\Hour	Lecture	Seminar (group work)	Practical Work	Laboratory Work	Practice	Course Work/Project	Independent Work
1	MAT0108	Mathematics 1	5/135	30		30				75
2	PHY0108	Physics 1	4/108	15			30			63
3	CHE0104	Chemistry	4/108	15			30			63
4	DGEOM05	Basics of projection drawing	4/108	15		30				63
5	CSAT105	Fundamentals of information technologies 1	4/108	15			30			63
6	GL10007	Georgian Language 1	3/81			30				51
7	EMPRE04	Environment protection and ecology	3/81	15			15			51
8	LSEM003	Industrial safety and emergency control	3/81	15			15			51
9	MAT0208	Mathematics 2	5/135	30		30				75
10	PHY0108	Physics 2	5/135	30			30			75
11	PDRAV05	Engineering drawing	3/81			30				51
12	CSAT205	Fundamentals of information technologies 2	4/108	15			30			63
13	GL20007	Georgian Language 2	3/81			30				51
14		*Selective Humanities*	3/81							
14.1	GEHIS07	History of Georgia		15	15					51
14.2	SOC0007	Sociology		15	15					51
14.3	INPHI07	Psychology		15	15					51
15	TMAMS05	Materials science	5/135	30			30			75
16	TMECH15	Theoretical mechanics 1	5/135	30		30				75
17	MAT0308	Mathematics 3	5/135	30		30				75
18	STROM01	Strength of materials	5/135	30		15	15			75
19	TMM1005	Theory of mechanisms and machines 1	5/135	30		15	15			75
20	HAETR05	Thermo dynamics and heat processes	5/135	30		30				75
21	CD00005	Computer graphics	5/135	30		30				75
22	ELAEN12	Electrical engineering and electronics 1	5/135	30		15	15			75
23	MELTM15	Machinery parts 1	5/135	30		15	15			75
24	CDME105	Computer design and modeling in mechanical engineering 1	5/135	30			30			75
25	TMECH25	Theoretical mechanics 2	5/135	30		30				75

№	Course code	Course	ECTS Credit\Hour	Lecture	Seminar (group work)	Practical Work	Laboratory Work	Practice	Course Work/Project	Independent Work
26	HPD1005	Hydro and pneumo drives 1	5/135	30		15	15			75
27	ELAEN22	Electrical engineering and electronics 2	5/135	30		15	15			75
28	ISTM005	Interchangeability, standardization and technical measuring	5/135	30		15	15			75
29	FAT0005	Fundamentals of oscillations applied theory	5/135	30		30				75
30	MELTM25	Machine parts 2	5/135	30		30				75
31	HTG0005	Hoisting transport gears	5/135	30		30				75
32	TMM2005	Theory of mechanisms and machines 2	5/135	30		15	15			75
33	MCT0005	Material cutting tools	5/135	30		15	15			75
34	CDME205	Computer design and modeling in mechanical engineering 2	5/135	30			30			75
35	FACT005	Fundamentals of automatic control theory	5/135	30		30				75
36	ME00005	Manufacturing engineering	5/135	30		30				75
37	CDME305	Computer design and modeling in mechanical engineering 3	5/135	30			30			75
38	HPD2005	Hydro and pneumo drives 2	5/135	30		30				75
39	CS00005	Control systems	5/135	30		30				75
40	MDRT005	Machines durability and rapture theory	5/135	30		30				75
41	TMC1005	Technological machines and complexes 1	5/135	30		15	15			75
42	DCTM105	Designing and calculation of technological machines 1	6/162	30		30				102
43	RTERM15	Research, testing, exploitation and repair of technological machines 1	6/162	30			30			102
44	FM00005	Fundamentals of mechatronics	6/162	30		30				102
45	JACD08-L	Job Analysis and Competency design	6/162	30			15			102
46	MCT0005	Technology of mechanical engineering 2	6/162	30			15		30	87
47	TMC2005	Technological machines and complexes 2	6/162	45		30				87
48	DCTM205	Designing and calculation of technological machines	6/162	30					45	87
49	RTERM25	Research, testing, exploitation and repair of technological machines 2	6/162	30			45			87
50	FMS0005	Flexible computerized mechanical engineering manufacturing	6/162	45			30			87

№	Course code	Course	Hours	ECTS Credit\Hour	Lecture	Seminar (group work)	Practical Work	Laboratory Work	Practice	Course Work/Project	Independent Work
51	INT0005	Internship		6/162					75		87

Educational Program   Supervisor   Vazha Qiria

A Head of Quality Assurance Service at the faculty   Manana Moistsrapishvili

Faculty of Transportation and Machine-building   Otar Gelashvili

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Accepted at
Faculty of Transportation and Machine-Building
Faculty Council Meeting

Faculty Council Chairman   № 15   Otar Gelashvili
03.07.2012

Agreed with
GTU Quality Assurance Service   Giorgi Dzidziguri