RTU Course "Mechanics"

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General data

Code	MMP169
Course title	Mechanics
Course status in the programme	Compulsory/Courses of Limited Choice
Course level	Undergraduate Studies
Course type	Academic
Field of study	Mechanics, Mechanical Engineering, Machine Building
Responsible instructor	Jānis Vība
Academic staff	Olga Kononova Svetlana Sokolova Vladislavs Jevstigņejevs Ivans Griņevičs
Volume of the course: parts and credits points	1 part, 2.0 Credit Points, 3.0 ECTS credits
Language of instruction	LV, EN
Annotation	Tangible objects, their mathematical models. Mechanical motion. Space, time, mechanical interaction, the force system. Newton's basic laws of mechanics. State-in dynamics and challenges, its relationship to computing. Deformable body models. Strain and stress determination. Strength. Persistence. Durability. Vibration and acoustics.
Goals and objectives of the course in terms of competences and skills	To introduce students to the fundamentals of mechanics. In order to achieve this goal the following tasks are fulfilled: 1st To analyze the fundamental relationships of the statics, kinematics and dynamics. 2nd To teach students how to solve the mechanical tasks in computer programs. 3rd To improve students' knowledge of physics related to the mechanics. 4th To teach students the skills required for the calculation of technical, mechanical and engineering objects.
Structure and tasks of independent studies	Within the framework of the present study course the students should perform the independent works on the following topics: 1st Solving the static tasks using the the MathCAD program. 2nd Modelling the dynamics tasks using the Working Model program. 3rd The force and stress calculations using the Solid Work program.
Recommended literature	O. Kepe, J. Vība, Teorētiskā mehānika, Rīga, "Zvaigzne", 1982.g. 577 lpp. R. C. Hibbeler, Mechanics of Materials, SI Edition, Pearson Prentice Hall, 2003, 840 lpp.
Course prerequisites	Physics (at the secondary school level). RTU differential and integral calculations.

Course outline

Theme	Hours
Introduction to mechanics. Laws.	4
Newton's laws. Equations.	4
Static axioms and equations record.	4
Subject movement kinematics record.	4
Dynamic object relationships.	8
Strength of materials. GEM theory. Stability relationships.	8

Learning outcomes and assessment

Learning outcomes	Assessment methods
Student will be able to evaluate the mechanical processes in nature in different forms.	Related questions in the laboratory work.
Student will be able to provide examples of object motion and equilibrium.	Related questions in the practical work.
Student will be able to analyze the mechanisms and machinery.	Related questions at the end of the lecture.
Student will be able to distinguish between static and dynamic tasks.	Related questions in the assessment test
Student will be able to formulate a mechanical object of analysis tasks.	Related questions in the assessment test
Student will be able to evaluate the mechanical engineer problems.	Related questions in the exam

Study subject structure

Part	CP	Hours per Week			Tests		
		Lectures	Practical	Lab.	Test	Exam	Work
1.	2.0	1.0	0.0	1.0		*	