



RTU Course "Engineering Mechanics Problems"

15325 Teorēt.mehānikas un materiālu pretestības katedra

General data

Code	MTM205
Course title	Engineering Mechanics Problems
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	Grāpis Ojārs
Academic staff	Eiduks Māris
Volume of the course: parts and credits points	1 part, 3.0 Credit Points, 4.5 ECTS credits
Language of instruction	LV, RU
Possibility of distance learning	Not planned
Maximum auditorium capacity	25
Maximum number of students per semester	50
Abstract	Use of theoretical laws and engineering methods for investigation of real typical systems. Role of chooses of a precision of calculation of model in a case of incomplete model parameter information. Tasks on static and dynamic loading and mechanical stresses. Problems of optimisation in a pneumatics and electromechanical systems.
Goals and objectives of the course in terms of competences and skills	To acquaint students with the fundamentals of calculation software applied in the field of mechanical engineering. In order to achieve this aim the following tasks should be fulfilled: 1st Analyse the fundamental relationships of the kinematics, statics and dynamics. 2nd Teach students how to solve the task on mechanics applying the computer programs. 3rd Improve students' knowledge of physics related to the field of mechanics. 4th Teach students the skills required to be proficient in the calculation of the machinery, construction machinery and engineering objects.
Structure and tasks of independent studies	Within the framework of the present course the students should perform independent work on the following themes: 1st Solving the static tasks applying the MathCAD program. 2nd Modelling the dynamic tasks applying the Working Model. 3rd Calculating force and stress applying the Solid Work Program.
Recommended literature	O. Кеpe, J. Vība, Teorētiskā mehānika, "Zvaigzne", Rīga 1982; E. Lavendelis, Materiālu pretestība, Rīga, "Zvaigzne", 1986., 340.lpp; Спрвочник ВИБРАЦИЙ В ТЕХНИКЕ, том 3, - Колебания машин, конструкций и их элементов, Москва, Машиностроение, 1980; Системы автоматизированного проектирования машиностроение, Сборник трудов научных, Рига, РТУ, 1990.г., 141.стр., ISBN 5-7970-0070-9.
Course prerequisites	Physics (at the secondary school level). RTU differential calculations, integral calculation.

Course outline

Theme	Hours
Specific problems in the field of railway transport	4
Specific problems in the field of road transport	4
Insights into alternative non-contact high-speed transport development	4
Case fluctuation motion factor of road and rail transport	4
Road roughness power spectral density as the numerical characteristic of the motion factor	4
Static and dynamic load calculation models of choice in various stages of design	4
Tasks in the pneimohidro- and electro-mechanical systems	4
Bernoulli's equation	4

Learning outcomes and assessment

Learning outcomes	Assessment methods
At the end of the course students will be able to assess the problems of railroad transport	Questions at the end of the lecture
At the end of the course students will be able to assess the problems of autotransport	Questions at the end of the lecture
At the end of the course students will be able to compare the non-contact vehicles to conventional vehicles	Questions at the end of the lecture
At the end of the course student will be able to explain cases of motion factor for transport	Questions in the practical work
At the end of the course students will be able to use the motion characteristics for the volatility calculation	Questions in the practical work
At the end of the course students will be able to formulate methods of calculation for transport choice	Questions at the end of the lecture

At the end of the course students will be able to assess the challenges in the electro mechanical systems	Questions in the practical work
At the end of the course students will be able to assess the challenges in the pneumatic - hydraulic systems	Exam

Study subject structure

Part	CP	ECTS	Hours per Week			Tests		
			Lectures	Practical	Lab.	Test	Exam	Work
1.	3.0	4.5	1.0	1.0	0.0		*	