RTU Course "Statistical Mechanics"

15325 Teorēt.mehānikas un materiālu pretestības katedra

General data

Code	MTM407
Course title	Statistical Mechanics
Course status in the programme	Compulsory/Courses of Limited Choice
Course level	Post-graduate Studies
Course type	Academic
Field of study	Mechanics, Mechanical Engineering, Machine Building
Responsible instructor	Grāpis Ojārs
Volume of the course: parts and credits points	1 part, 4.0 Credit Points, 6.0 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	Accidental processes play an important role in nature. Swell causes the dynamic movements of ships. The poor quality of the road pavement, which is the unevenness of a casual nature is the reason for railway car and autotransport dynamic load. These factors are taken into account at the process of vehicle design. We should be able to measure these factors and evaluate them.
Goals and objectives of the course in terms of competences and skills	To acquaint students with the fundamentals of mechanics. 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 calculations of the machinery, construction machinery and engineering facilities.
Structure and tasks of independent studies	Calculation of the oscillation system with one degree of freedom.
Recommended literature	O. Kepe J. Vība, Teorētiskā mehānika, Rīga, Zvaigzne,1982.g., 577. lpp; O.Kepe, J.Vība, Teorētiskā mehānika, Dinamika I. Rīga, RTU, 1981., 259.lpp., O. Kepe J. Vība, Teorētiskā mehānika, Dinamika II., Rīga, RTU, 1996.g., 173. lpp. Wiener N. Extrapolation, interpolation and Smoothing of Stationary time Series, John Wiley N- 4 1949; Crandall S. H., Mark W. D., Random vibration in mechanical systems, New York, Academic Press, 1963.
Course prerequisites	Physics (at the secondary school level). RTU differential and integral calculations.

Course outline

Theme	Hours
Application area of technology.	8
Random function theory. Gaussian processes.	10
Markov processes.	10
Linear system case variations. Correlation - the spectral method.	10
Vinera - Hinchina formula.	10

Learning outcomes and assessment

Learning outcomes	Assessment methods
At the end of the course students will be able to assess problems in the system with random inspiration	Questions at the end of the lecture.
At the end of the course students will be able to apply the theory of random motion	Questions at the end of the lecture.
At the end of the course students will be able to carry out the dynamic task calculations	Practical work/tasks
At the end of the course students will be able to apply the theory of mechanical system analysis	Exam

Study subject structure

Part	CP	ECTS	Hours per Week			Tests		
			Lectures	Practical	Lab.	Test	Exam	Work
1.	4.0	6.0	2.0	1.0	0.0		*	