



## RTU Course "Vibrotechnology and Vibromachines"

15325 Teorēt.mehānikas un materiālu pretestības katedra

### General data

Code	MMP539
Course title	Vibrotechnology and Vibromachines
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	Vība Jānis
Academic staff	Zakrčevskis Mihails Beresņevičs Vitālijs
Volume of the course: parts and credits points	1 part, 4.0 Credit Points, 6.0 ECTS credits
Language of instruction	LV, EN, RU
Possibility of distance learning	Not planned
Maximum auditorium capacity	25
Maximum number of students per semester	50
Abstract	Typical vibrotechnologies and machines. Fundamentals of the system. Nonlinear effects. Optimal design. Vibroisolation tasks. Optimal vibro-protection of machines and constructions. Complexes. Rotor dynamics. Design and calculations.
Goals and objectives of the course in terms of competences and skills	To introduce students to the fundamentals of vibrotechnics. In order to achieve this goal the following tasks are fulfilled: 1st To analyze the fundamental relationships of the vibrotechnics, kinematics and dynamics. 2nd To teach students how to solve the vibrotechnical tasks in computer programs. 3rd To improve students' knowledge of physics related to the vibrotechnics and machinery. 4th To teach students the skills required to perform calculations of techniques, vibromachine and engineering facilities.
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 vibrotechnical tasks using the the MathCAD program. 2nd Vibromachine modelling tasks using the Working Model program. 3rd The force calculations using the Solid Work program.
Recommended literature	O.Kepe,J.Vība. Teorētiskā mehānika. Rīga,Zvaigzne,1982.g.577lpp., Teorētiskā mehānika. Dinamika I. Rīga,RTU,1944.-259. O.Kepe,J.Vība. Teorētiskā mehānika. Dinamika II. Rīga,RTU,1996.-173. E. Lavendelis, Vibrācijas tehnikā 4, Maskava, "Mašīnbūve", 1981, 509.lpp.
Course prerequisites	Math. Mechanics. Physics.

### Course outline

Theme	Hours
Introduction in vibrotechnics and machines	8
Vibro Transport Theory	8
Vibro transport system modelling with computer	8
Engine vibration analysis, optimization and synthesis	8
Vibro technological machinery modelling	8
Forging and piles process modelling	8
Construcyion vibromachine modelling	8
Vibrotechnics application for the needs of the household	8

### Learning outcomes and assessment

Learning outcomes	Assessment methods
At the end of the course students will be able to evaluate the vibro processes in nature in different forms.	Questions at the laboratory work.
At the end of the course students will be able to provide examples of the object vibration conditions.	Questions at the practical tests.
At the end of the course students will be able to analyze the mechanisms and machinery.	Questions at the end of the lecture.
At the end of the course students will be able to distinguish between technical and technological challenges.	Questions at the end of the lecture.
At the end of the course students will be able to formulate a mechanical object of analysis tasks.	Assessment test
At the end of the course students will be able to evaluate the mechanical engineer problems.	Exam.

### Study subject structure

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