



RTU Course "Mechanical Vibration and Acoustics"

15325 Teorēt.mehānikas un materiālu pretestības katedra

General data

Code	MTM326
Course title	Mechanical Vibration and Acoustics
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	Vība Jānis
Academic staff	Januševskis Jānis Eiduks Māris Tipāns Igors
Volume of the course: parts and credits points	1 part, 3.0 Credit Points, 4.5 ECTS credits
Language of instruction	LV, EN
Possibility of distance learning	Not planned
Maximum auditorium capacity	25
Maximum number of students per semester	50
Abstract	Free non-damped and damped oscillations. Excited vibrations. Systems with discreet parameters. Vibration of rods and beams. Parametric and auto vibrations. Elements of non-linear vibrations. Propagation of sound. Equations of gas dynamics. Waves propagation, reflection and absorption. Resonators.
Goals and objectives of the course in terms of competences and skills	To acquaint students with the fundamentals of vibrations and acoustics In order to achieve this aim the following tasks should be fulfilled: 1st Analyse the fundamental relationships of the acoustics and vibrations. 2nd Teach students how to solve the task on oscillations and acoustics applying the computer programs. 3rd Improve students' knowledge of physics related to the fields of acoustics and oscillations 4th Teach students the skills required to be proficient in the assessment of the oscillations and acoustics of the machinery, construction machinery and engineering facilities.
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 vibration tasks applying the MathCAD program. 2nd Modelling the oscillation tasks applying the Working Model. 3rd Calculating air flows applying the Solid Work Program.
Recommended literature	O. Kepe, J. Vība, Teorētiskā mehānika, Rīga, Zvaigzne, 1982.g., 577lpp., J.L. Meriam, L.G. Kraige, Engineering Mechanics Dynamics, Virginia Polytechnic Institute, "John Wiley&Sons, Inc.", 2007., 142.lpp. http://lv.wikipedia.org/wiki/Akustika ;
Course prerequisites	Math. Mechanics. Physics.

Course outline

Theme	Hours
At the end of the course students will be able to assess fluctuations and acoustic processes in nature in different forms.	8
At the end of the course students will be able to provide examples of variations and acoustic objects.	8
At the end of the course students will be able to analyze sound propagation and reflections in space.	8
At the end of the course students will be able to understand the fluctuations in the interaction with acoustic audio distribution systems	8
At the end of the course students will be able to formulate the impact of sound and noise effects on living organisms.	8
At the end of the course students will be able to evaluate different acoustic system designs.	8

Learning outcomes and assessment

Learning outcomes	Assessment methods
At the end of the course students will be able to assess fluctuations and acoustic processes in nature and technology in various forms.	Laboratory work.
At the end of the course students will be able to provide examples of object movements and equilibrium.	Questions in the practical work
At the end of the course students will be able to analyze the mechanism and the machinery noise levels.	Questions at the end of the lecture
At the end of the course students will be able to distinguish between different sounds and noise levels in the environment.	Assessment test
At the end of the course students will be able to formulate the design of acoustic targets.	Assessment test

At the end of the course students will be able to assess the mechanical engineering problems in the field of acoustics and variations/fluctuations.

Exam

Study subject structure

Part	CP	ECTS	Hours per Week			Tests		
			Lectures	Practical	Lab.	Test	Exam	Work
1.	3.0	4.5	2.0	1.0	0.0		*	