Course Unit Descriptor

Study Programme: Technical Mechanics and Technical Design			
Course Unit Title: Theory of oscillation			
Course Unit Code: M2411			
Name of Lecturer(s): Zvonko Rakaric			
Type and Level of Studies: Bachelor level			
Course Status (compulsory/elective): compulsory			
Semester (winter/summer): winter			
Language of instruction: English			
Mode of course unit delivery (face-to-face/distance learning): face-to-face			
Number of ECTS Allocated: 5			
Prerequisites: None			
Course Aims: To acquire basic knowledge in the theory of oscillation and in the phenomena of oscillatory motion.			
Learning Outcomes: To acquire knowledge necessary for a modern mechanical engineer			
Syllabus: Linear and nonlinear spring. Free oscillations with one degree-of-freedom of motion. Equivalent rigidity. Kinetic and potential energy of the one degree-of-freedom system. Lagrange equations for motion of the one degree-of-freedom system. Riley`s procedure for determining circular frequencies. Curled and transversal oscillations of massive girders. Free oscillations with viscous friction force and sliding force in the one degree-of-freedom system. Forced oscillations in the one-degree-of-freedom system. Forced oscillations under Dirak and Heaviside forces. Kinetic and potential energy of the two degree-of-freedom system. Lagrange motion equations for the two degree system. Integration of the motion equation of the two degree-of-freedom system. Forced oscillations of the two degree-of-freedom system. Resonance. Dynamic buffer. Influence of viscous friction on small oscillations in the two degree-of-freedom system. Definition on the stability of motion. Transversal oscillations of a string. Longitudinal oscillations of a beam. Curled oscillations of a beam. Transversal oscillations of a beam. Critical speeds of elastic shafts. Laval`s paradox.			
Required Reading: Relevant literature in English, tbd			
Weekly Contact Hours: 4	**Lectures: 2**	**Practical work: 2**	
Teaching Methods: Lectures and practice.			
Knowledge Assessment (maximum of 100 points):			

Pre-exam obligations	points	**Final exam**	points
Group Assignment		Examination Assignment	
Exercises			

Test			
Test			
The methods of knowledge assessment may differ; the table presents only some of the options: written exam, oral exam, project presentation, seminars, etc.			