UNIVERSITY OF NIŠ

Course Unit Descriptor	Faculty	Faculty of Mechanical Engineering

GENERAL INFORMATION			
Study Program	**Mechanical Engineering**		
Study Module (if applicable)	-		
Course Title	Mechanics IV - Theory of Vibration		
Level of Study	☒Bachelor	☐ Master's	☐ Doctoral
Type of Course	☒ Obligatory	☐ Elective	
Semester	☒ Autumn	☐ Spring	
Year of Study	IV		
Number of ECTS Allocated	6		
Name of Lecturer/Lecturers	Predrag Kozić, Goran Janevski		
Teaching Mode	☒ Lectures ☐ Laboratory work ☐ Distance learning	☐ Group tutorials ☐ Project work ☐ Blended learning	☒ Individual tutorials ☐ Seminar ☐ Other

Purpose and Overview (max. 5 sentences)

The main objective of the course are to develop a general mathematical framework for the analysis of a model of a physical system undergoing vibration and to illustrate how the physics of a problem is used to develop a more specific framework for the analysis of that problem. Such an analysis includes the determination of an exact solution for linear problem and approximate solutions for problems in which an exact solution is difficult to obtain. Presentation of the theory includes proofs of important results, especially proofs that are themselves instructive for a comprehensive understanding of the result. The prerequisites for such a course should include courses in statics, dynamics, mechanics of materials, and mathematics using differential equations.

Syllabus (brief outline and summary of topics, max. 10 sentences)

Modelling of single degree-of-freedom (SDOF) systems. Springs in combination. Viscous damping. Energy dissipated by viscous damping. Static deflections and gravity. Small angle or displacement assumption. Equivalent systems method. Standard form of differential equation. Free vibrations of undamped system. Critically damped free vibrations. Over damped free vibration. Forced response of an undamped system due to a single-frequency excitations. Forced response of a viscously damped system subject to a single-frequency harmonic excitation. Two degree-of-freedom systems. Natural frequencies and mode shapes. Free response of undamped systems. Free vibrations of a system with viscous damping. Dynamic vibration absorbers. Forced vibrations of two degree-of-freedom systems. Vibrations of continuous systems. General method. Second-order systems: Strings, Bars and Shafts. Transverse beam vibrations.

Language of Instruction

☒Serbian (complete course) ☐ English (complete course) ☐ Other _____________ (complete course)

☒Serbian with English mentoring	☐Serbian with other mentoring ______________

Assessment Methods and Criteria			
Pre exam Duties	**Points**	**Final Exam**	**Points**
Activity During Lectures	**5**	**Written Examination**	**50**
Practical Teaching	**5**	**Oral Examination**	**Max. 50**
Teaching Colloquia	**50**	**Overall Sum**	**100**
***Final examination mark is formed in accordance with the Institutional documents**			