



UNIVERSITY OF NIŠ

Course Unit Descriptor

Faculty

Faculty of Mechanical Engineering

GENERAL INFORMATION

Study Program	Mechanical Engineering
Study Module (if applicable)	-
Course Title	Theory of composite structures
Level of Study	<input type="checkbox"/> Bachelor <input type="checkbox"/> Master's <input checked="" type="checkbox"/> Doctoral
Type of Course	<input type="checkbox"/> Obligatory <input checked="" type="checkbox"/> Elective
Semester	<input type="checkbox"/> Autumn <input checked="" type="checkbox"/> Spring
Year of Study	I
Number of ECTS Allocated	10
Name of Lecturer/Lecturers	Ratko Pavlovic
Teaching Mode	<input checked="" type="checkbox"/> Lectures <input type="checkbox"/> Group tutorials <input checked="" type="checkbox"/> Individual tutorials <input type="checkbox"/> Laboratory work <input checked="" type="checkbox"/> Project work <input checked="" type="checkbox"/> Seminar <input type="checkbox"/> Distance learning <input type="checkbox"/> Blended learning <input type="checkbox"/> Other

Purpose and Overview (max. 5 sentences)

Introduce students to the stress and strain of composite beams. The acquisition of knowledge in the field of composite beams.

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

Theory classes:

Introduction to composite materials. Fibre, laminate and granular composites. Mechanical behaviour of composite materials. Fundamentals of fibre reinforced composite laminate. Lamella. Laminate. Macro mechanical behaviour of lamella. The relations between stress and strain for anisotropic materials. Technical constants and their limitations. Isotropic and orthotropic materials. The relations between stress and strain in an orthotropic material. The relations between stress and strain for the clutch arbitrary fibre orientation. Mechanical testing of lamella. Macro mechanical behaviour of laminate. The classical theory of laminate. Stress and strain state of the laminate. Changes in stress and strain. Forces and moments of arbitrary cross-section laminates. Special cases of laminates: a single, symmetric, antisymmetric and asymmetric laminates. Interlaminar stresses. Bending, buckling and vibrations composite plates. Differential equations of bending, buckling and vibrations. Limitations and assumptions. Differential equations of equilibrium composite plate. Differential equations of buckling of composite plates. Differential equations vibrations composite plate. Bending, buckling and vibrations specially orthotropic, symmetric angle, transverse and antisymmetric simply supported antisymmetric angle-ply laminated plates.

Guided independent research:

Prepare students for research in their doctoral dissertation.

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	0	Written Examination	0
Practical Teaching	40	Oral Examination	Max. 60
Teaching Colloquia	0	Overall Sum	100

*Final examination mark is formed in accordance with the Institutional documents