



# UNIVERSITY OF NIŠ

**Course Unit Descriptor**

**Faculty**

Faculty of Mechanical Engineering

## GENERAL INFORMATION

Study Program	<b>Mechanical Engineering</b>		
Study Module (if applicable)	-		
Course Title	Theory of Plates and Shells		
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 plates and shells. The acquisition of knowledge in the field of plates and shells..

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

### Theory classes:

Bending of long rectangular plates in cylindrical surfaces. Differential equations for cylindrical bending of plates. Cylindrical bending equally loaded free supported rectangular plate, fixed rectangular plate, rectangular plate with a flexible fixed ends. Pure bending plate. The slope and curvature of small deflection plate. Relationship between offensive moments and curvature in pure bending plate. Different cases of pure bending. Energy of deformation. Symmetrical bending of circular plates. Differential equations for symmetric bending transversely loaded circular plates. Uniform load of plates, concentric, the load at the centre. Plate with a round hole in the centre. Small deflections transversely loaded plates. Differential equation of the elastic surface. Contour conditions. Another method of performing boundary conditions. The reduction of the problem to the problem of bending plate bending membranes. Free supported rectangular plate. Plates loaded by sinus area. Navier-type solution. Maurice-Levy's solution. Plates loaded to various loads. Rectangular plates with different boundary conditions. Rectangular plate bending moments along its side. Continuous rectangular plate. Plates on elastic foundation. And continuous rectangular plates on elastic foundation. Bending of anisotropic plates. Differential equations of curved plates. Determination of stiffness for various special cases. Application of the theory of lattice calculations. Bending of rectangular plates. Bending of the panels due to cross-load complex flat tension. Differential equations. Energy method. Shell deformation at which no bending occurs. General theory of cylindrical shells. Shell shaped rotating surfaces loaded symmetrically to its axis

### 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**

<b>Pre exam Duties</b>	<b>Points</b>	<b>Final Exam</b>	<b>Points</b>
<b>Activity During Lectures</b>	<b>0</b>	<b>Written Examination</b>	<b>0</b>
<b>Practical Teaching</b>	<b>40</b>	<b>Oral Examination</b>	<b>Max. 60</b>
<b>Teaching Colloquia</b>	<b>0</b>	<b>Overall Sum</b>	<b>100</b>

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