



UNIVERSITY OF NIŠ

Course Unit Descriptor

Faculty

Faculty of Mechanical Engineering

GENERAL INFORMATION

Study program	Mechanical Engineering
Study Module (if applicable)	-
Course title	Optimal Synthesis of Mechanisms
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 checked="" type="checkbox"/> Autumn <input type="checkbox"/> Spring
Year of study	II
Number of ECTS allocated	10
Name of lecturer/lecturers	Nenad D. Pavlović
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 type="checkbox"/> Seminar <input type="checkbox"/> Distance learning <input type="checkbox"/> Blended learning <input type="checkbox"/> Other

PURPOSE AND OVERVIEW (max. 5 sentences)

The purpose of this course is to gain some advanced knowledge for synthesis of new or improved mechanisms of machines and devices. Students should gain the ability to analyse complex planar or spatial linkages and to synthesize improved mechanisms of machines and devices using optimization techniques - optimization problem formulation, constraints identification, suitable optimization algorithm selection and optimization of given synthesis problem using MATLAB (Toolbox Optimization).

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

Analysis of Complex Linkages

- Analysis of Complex Planar Linkages
- Analysis of Spatial Linkages.

High Ratios Speed reducers

- Cycloidal Drive
- Strain Wave Gearing (Harmonic Drive).

Linkage Synthesis

- Type and Number Synthesis;
- Analytical Dimensional Synthesis (Function Generation, Motion Generation, Path Generation with Prescribed Timing).

Optimal Synthesis of Mechanisms

- Optimization Problem Formulation
- Unconstrained Optimization
- Constrained Optimization
- Classical Optimization Algorithms
- Analysis and Optimization of the Effect of Manufacturing Tolerances on the Mechanism Accuracy.

LANGUAGE OF INSTRUCTION

- Serbian (complete course)
 English (complete course)
 German (complete course)
- Serbian with English mentoring
 Serbian with other mentoring _____

ASSESSMENT METHODS AND CRITERIA

Pre exam duties	Points	Final exam	points
Activity during lectures		Written examination	
Practical teaching		Oral examination	Max. 30
3 term papers	3x25=75	OVERALL SUM	100

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