



UNIVERSITY OF NIŠ

Course Unit Descriptor

Faculty

Faculty of Mechanical Engineering

GENERAL INFORMATION

Study Program	Mechanical Engineering		
Study Module (if applicable)	-		
Course Title	Applied Thermodynamics and Fluid Mechanics		
Level of Study	<input checked="" type="checkbox"/> Bachelor	<input type="checkbox"/> Master's	<input 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	III		
Number of ECTS Allocated	6		
Name of Lecturer/Lecturers	Mića Vukić, Mirjana Laković-Paunović, Miloš Jovanović		
Teaching Mode	<input checked="" type="checkbox"/> Lectures	<input type="checkbox"/> Group tutorials	<input type="checkbox"/> Individual tutorials
	<input checked="" 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 checked="" type="checkbox"/> Other

Purpose and Overview (max. 5 sentences)

Introduce students to the thermal and flow properties of real fluids (liquids and gases), as well as the real fluid processes in the field of mechanical engineering.

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

1) Thermodynamic properties of real fluids. 2) Thermodynamic properties of water and steam. 3) Carnot and Rankine-Clausius cycle. 5) The mixture of gases. Thermodynamic properties of moist air. 6) The processes of moist air conditioning. Processes in dryers. 7) Processes in refrigeration plants and heat pumps. 8) Planar flow. Non-free vortex (potential) flow. The significance of potential theory. The current function and the velocity potential. Vorticity, conditions of the non-free vortex flow. Cauchy- Riemann conditions. Complex velocity, complex potential, the stagnation points. Flow and circulation. 9) Determination of the force on an arbitrary contour. The source and sink. The superposition of elementary flows. Pressure coefficient. 10) The resistance to flow past the body and the thrust. Pressure distribution on the surface and thrust. Magnus Effect. 11) Energy and piezometer lines, pipe and open channel flows. 12) Steady free surface flows. Basic equations. 13) Types of cross-sections of channels, specific section energy. The criteria for the critical depth and maximum flow. Flow around the hydraulic short objects. 14) Overflows. Classification of overflows and sizing.

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 (depending on Teaching Colloquia)
Practical Teaching	5	Oral Examination	50
Teaching Colloquia	40	Overall Sum	100
*Final examination mark is formed in accordance with the Institutional documents			