UNIVERSITY OF NIŠ

Course Unit Descriptor	Faculty	Faculty of Mechanical Engineering

GENERAL INFORMATION	
Study Program	Mechanical Engineering
Study Module (if applicable)	-
Course Title	Advanced course in fluid mechanics with boundary layer theory
Level of Study	☐Bachelor ☐ Master's ☒ Doctoral
Type of Course	☐ Obligatory ☒ Elective
Semester	☐ Autumn ☒ Spring
Year of Study	I
Number of ECTS Allocated	10
Name of Lecturer/Lecturers	dr Dragiša Nikodijević, dr Živojin Stamenković
Teaching Mode	☒ Lectures ☐ Group tutorials ☐ Individual tutorials ☐ Laboratory work ☒ Project work ☒ Seminar ☐ Distance learning ☐ Blended learning ☐ Other

Purpose and Overview (max. 5 sentences)

Students should acquire knowledge in theory in the field of steady and unsteady, laminar, turbulent and boundary layer flow. Students acquire skills for theoretical analysis and application on applied problems.

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

1) Steady flow of viscous incompressible fluids 2) Solutions of Poiseuille, Couette and Poiseuille-Couette flows 3) Flow in not cylindrical in cross-section ducts 4) Two-dimensional flow, hydrodynamic stability of flow 5) Unsteady flow of viscous incompressible fluids 6) Plate started impulsively from rest in fluid 7) Body started from rest and moving with constant velocity in fluid 8) Fluid flow due to the oscillating plate 9) Flow development in a pipe 10) Flow around the body and in the variable cross section ducts 11) Fluid flow due to the motion of circular cylinder 12) Fluid flow due to the movement of the sphere 13) Flow in convergent and divergent channels 14) Two-dimensional flow in a circular and rectangular cross –section bends 15) Boundary layer theory, Prandtl equations. Exact solutions of Prandtl equations for some classes of problems. The approximated parametric methods. Unsteady boundary layer. Two-dimensional spatial boundary layer. Three-dimensional boundary layer 15) Some problems of the theory of three-dimensional boundary layer. MHD boundary layer. Temperature and diffusion boundary layer. Turbulent boundary layer

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	Max 40, 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			