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| **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 flows3) 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** |