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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 | Computational fluid dynamics |
| Level of Study | ☒Bachelor | ☐ Master’s | ☐ Doctoral |
| Type of Course | ☐ Obligatory | ☒ Elective |
| Semester | ☒ Autumn | ☐ Spring |
| Year of Study | IV |
| Number of ECTS Allocated | 6 |
| Name of Lecturer/Lecturers | Miloš Jovanović  |
| Teaching Mode | ☒ Lectures | ☐ Group tutorials | ☐ Individual tutorials |
| ☐ Laboratory work | ☒ Project work | ☐ Seminar |
| ☐ Distance learning | ☐ Blended learning | ☐ Other |
| **Purpose and Overview (max. 5 sentences)** |
| *The aim of the course is to introduce all students with numerical solving of equations, which describes the flow of fluids. The course is targeting the theoretical aspects of numerical solving of differential equations and practical aspects modern CFD software.*  |
| **Syllabus (brief outline and summary of topics, max. 10 sentences)** |
| 1) Introduction. Benefits of computational fluid dynamics. Typical practical problems 2) Complex geometry, simple physics problems. A simpler geometry domain, complex physics problems. 3) Partial differential equations. Boundary and initial conditions 4) Hyperbolic, parabolic and elliptic PDE-physical interpretation, boundary and initial conditions. 5) The equations of motion. The equation of continuity. Momentum equation. 6) Dynamic similarity. A useful simplification. 7) Incompressible, inviscid flow. Panel method 8) Numerical methods for implementation of panel method 9) Finite element method. Airfoil problem. 10) Viscous incompressible fluid. Boundary layer of incompressible fluid. The laminar boundary layer, turbulent boundary layer. The separation of the boundary layer. 11) The implicit scheme. Keler box scheme 12) Flow in the rectangular channel. Flow in a curved rectangular channel |
| **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** |
| **Lecture (participation)**  | **5**  | **Written Examination** | **0\* (50)** |
| **Homework** | **5** | **Oral Examination** | **Max. 50**  |
| **Project work** | **40** | **Overall Sum** | **100** |
| **\*** **Refers to students who have already gained points by completing pre-exam requirements** |