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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 | Applied Thermodynamics and Fluid Mechanics |
| Level of Study | ☒Bachelor | ☐ Master’s | ☐ Doctoral |
| Type of Course | ☐ Obligatory | ☒ Elective |
| Semester | ☒ Autumn | ☐ Spring |
| Year of Study | III |
| Number of ECTS Allocated | 6 |
| Name of Lecturer/Lecturers | Mića Vukić, Mirjana Laković-Paunović, 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)** |
| *Introduce students to the thermal and flow properties of real fluids* ([liquids](https://en.wikipedia.org/wiki/Liquid) and [gases](https://en.wikipedia.org/wiki/Gas)), *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** |