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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 | Thermodynamics |
| Level of Study | ☒Bachelor | ☐ Master’s | ☐ Doctoral |
| Type of Course | ☒ Obligatory | ☐ Elective |
| Semester | ☐ Autumn | ☒ Spring |
| Year of Study | II |
| Number of ECTS Allocated | 7 |
| Name of Lecturer/Lecturers | Mića V. Vukić |
| 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 principles and limitations of thermal energy transformation. Practical applications. Mechanisms of heat transfer.* |
| **Syllabus (brief outline and summary of topics, max. 10 sentences)** |
| 1) Introductory concepts and definitions. Describing thermodynamic systems and their behaviour. Ideal gas model. (p–v–T) relation. 2) Ideal gas mixtures. (p–v–T) relation for ideal gas mixtures. 3) Energy and the first law of thermodynamics. Internal energy and specific heat of ideal gases. Work and heat. Energy transfer by heat. Energy balance for closed systems. (p,v) diagram. 4) Open thermodynamic systems. Kinetic energy. Potential energy. Enthalpy. Steady-state flow processes. Conservation of mass for a control volume and conservation of energy for a control volume. 5) Polytropic and other process of an ideal gas. Thermodynamic cycle. 6) Introducing entropy and the second law of thermodynamics. 7) (T,s) diagram. Defining entropy change. Heat transfer and work in internally reversible. 8) Isentropic processes. Isentropic efficiencies. 9) Real gasses. Steam power systems. Analyzing steam power systems – Rankin’s cycle. Other cycles. Refrigeration and heat pump cycles. 10) Energy transfer. Conduction. Fourier’s law. 11) Convection. Newton’s law. 12) Thermal radiation. Stefan–Boltzmann’s law. |
| **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** | **0** (or max 60 depending on Pre exam Duties) |
| **Practical Teaching** | **15** | **Oral Examination** | **Max. 30** (depending on Teaching Colloquia) |
| **Teaching Colloquia** | **50** | **Overall Sum** | **100** |
| **\*Final examination mark is formed in accordance with the Institutional documents** |