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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 | Energy and Exergy Analysis in Energy and Process Engineering |
| 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 | Gradimir S. Ilić, Dejan M. Mitrović |
| Teaching Mode | ☒ Lectures | ☐ Group tutorials | ☐ Individual tutorials |
| ☐ Laboratory work | ☐ Project work | ☐ Seminar |
| ☐ Distance learning | ☐ Blended learning | ☐ Other |
| **Purpose and Overview (max. 5 sentences)** |
| *To introduce students to the: analyses based on the second law of thermodynamics; principles of exergy analysis; mechanisms of entropy generation and exergy destruction during heat transfer, fluid flow, mixing, chemical processes and other thermo-fluid processes and exergo-economics.* |
| **Syllabus (brief outline and summary of topics, max. 10 sentences)** |
| Analysis based on the second law of thermodynamics; The concept of entropy and negentropy; The entropy of the environment; Criteria of spontaneous processes; The mass, energy and entropy balances for open thermodynamic systems; Exergy analysis of processes; The concept of exergy; Concept and models of environment in defining the exergy; Gouy-Stodola theorem; Exergy destruction of thermodynamic cycles and systems; Mechanisms of entropy generation and exergy destruction during heat transfer, fluid flow, mixing, chemical processes and other thermo-fluid processes; Analysis of thermal flow processes with exergy methods and tools; Overall principles of exergy analysis; Integration of processes by error elimination method based on second law of thermodynamics; Thermal and exergo-economics; Definition and objectives of exergoeconomics; Costs of energy and exergy losses; Exergeconomic optimization procedure for energy systems; Method of entropy generation minimization. |
| **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** | **-** | **Written Examination** | **-** |
| **Practical Work** | **70** | **Oral Examination** | **Max. 30** |
| **Teaching Colloquia or Seminar** | **-** | **Overall Sum** | **100** |
| **\*Final examination mark is formed in accordance with the Institutional documents** |