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| **UNIVERSITY OF NIŠ** |
| **Course Unit Descriptor** | **Faculty** | Faculty of Mechanical Engineering |
| **GENERAL INFORMATION** |
| Study Program | **Energy and Process Engineering** |
| Study Module (if applicable) | - |
| Course Title | Numerical Simulations 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 | 7 |
| Name of Lecturer/Lecturers | Gradimir S. Ilić, Predrag M. Živković, Miloš M. Jovanović, 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)** |
| *Introducing students to the basic principles of numerical solving of heat and mass transfer problems in energy and process engineering.* |
| **Syllabus (brief outline and summary of topics, max. 10 sentences)** |
| 1) Heat and mass transfer conservation equations. Initial and boundary conditions. 2) General transport equation. 3) Finite difference method for convective-diffusion problems. 4) Finite volume method for diffusion problems. 5) Finite volume method for convective-diffusion problems. Steady 1D convection-diffusion. 6) Discretization scheme properties: Conservativeness, Boundedness, Transportiveness, Accuracy. 7) Central difference scheme and application. 8) Upwind difference scheme and application. 9) Hybrid difference scheme and application. 10) Higher order difference schemes and stability problems. 11) Solution algorithms for discretized equations. Tri-diagonal matrix algorithm. 12) SIMPLE algorithm. |
| **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** | **-** (or max 70 depending on Pre exam Duties) |
| **Practical Teaching** | **5** | **Oral Examination** | **Max. 30** |
| **Project work** | **60** | **Overall Sum** | **100** |
| **\*Final examination mark is formed in accordance with the Institutional documents** |