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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) | Energetics and Process Techniques |
| Course Title | Magnetohydrodynamics |
| Level of Study | ☐ Bachelor | ☐ Master’s | ☒ Doctoral |
| Type of Course | ☐ Obligatory | ☒ Elective |
| Semester | ☒ Autumn | ☐ Spring |
| Year of Study | II |
| Number of ECTS Allocated | 10 |
| Name of Lecturer/Lecturers | Dragiša D. Nikodijević, Živojin M. Stamenković |
| Teaching Mode | ☒ Lectures | ☐ Group tutorials | ☒ Individual tutorials |
| ☐ Laboratory work | ☒ Project work | ☐ Seminar |
| ☐ Distance learning | ☐ Blended learning | ☐ Other |
| **Purpose and Overview (max. 5 sentences)** |
| *The main aim of the course is to enable students to acquire knowledge in the field of modern fluid mechanics and related to phenomena that are present in the movement of electrically conducting fluid. Also to prepare students of doctoral studies for theoretical analysis of these problems as well as for the practical application of acquired knowledge to solve issues that occur in MHD problems. Doctoral students who listen to this subject are qualified for theoretical analysis of expected tasks, as well as for the practical application of acquired knowledge in the different problems of magnetic-hydrodynamic (MHD pumps, MHD generators, flow meters, etc.).* |
| **Syllabus (brief outline and summary of topics, max. 10 sentences)** |
| Lectures:1) State of the art. 2) Electrical conductivity of the working fluid. 3) MHD of conductive gases. 4) Basic equations of MHD, magnetic induction, dimensionless parameters. 5) Maxwell Ampere Equations and Ohm's law, Lorentz force, Hall's effect, General Om's Law. 6) Basic characteristics of flow, flow in conductive channels, Hartman's flow. 7) MHD fluids. 8) Flow in closed channels, fully developed flow in the channel. 9) Flow in channels with variable magnetic field. 10) Flow in open channels. 11) Turbulent MHD flow. 12) A two-phase MHD flow - characteristics of flow. 13) Production of energy using the MHD technologies and efficiency. 14) *MHD pumps and flow meters, MHD generators, MMHD flow meters, induction MHD pumps, conducted MHD pumps.* *Research work:**Preparing students for research in the doctoral dissertation by writing a seminar paper on the topic, which is in direct correlation with the consideration of an adequate model of the task of the doctoral dissertation.* |
| **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** |