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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 | Б.6.4-И.10-6- Hydraulic and pneumatic control systems |
| 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 | Vlastimir D. Nikolić |
| 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 basics of the analysis and design of the modern hydraulic and pneumatic control systems, especially with their specific advantages and possible applications.**The course is targeting both the theoretical and practical aspects of analysis and designing the hydraulic and pneumatic control systems.* |
| **SYLLABUS (brief outline and summary of topics, max. 10 sentences)** |
| *1) Hydraulic and pneumatic servo systems. Servo systems in mechatronics. 2) Detectors of boundary positions, position sensors, speed sensors, pressure sensors, temperature sensors. 3) Actuators. Basic control principles of the hydraulic and pneumatic actuators. Examples of construction of control systems in mechatronics, electro hydraulics and electro pneumatics. Speed and position control of the engines. The pressure regulation. The temperature regulation. 4)* *Disturbances in servo systems. Methods for the eliminations of the disturbance. Typical nonlinearity of servo systems.* *Hydraulic control elements. Control based on the model.* *Linearization. The control based on the model. 5) Hydraulic model. Hydraulic actuators, pumps and motors. Hydraulic control elements. Data transmission elements. 6) Electro hydraulic servo valves and mechanisms. Control concepts at hydraulic control systems. Methods of analysis of electro hydraulics control systems.* *Nonlinearities in hydraulic control systems. Analysis of typical cases. 7)* *Properties of the air. Ensuring of pressure, transmission and control.* *Pneumatic valves, compressors, pneumatic cylinders and motors, pneumatic drive.* *Techniques of pneumatic control. Fluidic amplifiers. 8)* *The application of computer tools in the analysis and design of hydraulic and pneumatic control systems. 9)* *Independent development and analysis of typical class of hydraulic and pneumatic control systems.* |
| **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** | **10** | **Written examination** | **25** |
| **Practical teaching** | **10** | **Oral examination** | **25** |
| **Teaching colloquia** | **30** | **OVERALL SUM** | **100** |
| **\*Final examination mark is formed in accordance with the Institutional documents** |