



UNIVERSITY OF NIŠ

Course Unit Descriptor

Faculty

Faculty of Mechanical Engineering

GENERAL INFORMATION

Study program

Mechanical Engineering

Study Module (if applicable)

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Course title

B.6.4-II.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