



Course: Fundamentals of Control Engineering

Study program:	Professional level 1st cycle study program "Applicative Electrical Engineering"	Študijski program:	Visokošolski strokovni dodiplomski študijski program 1. stopnje Aplikativna elektrotehnika
Code:	64645	Šifra:	64645
Title:	Fundamentals of Control Engineering	Naslov:	Osnove regulacijske tehnike
Year:	2nd	Letnik:	2.
Semester:	Summer	Semester:	poletni
ECTS credits:	5	Kreditne točke ECTS:	5
Lectures (hours):	45	Predavanja (ur):	45
Tutorial (hours):	0	Avditorne vaje (ur):	0
Lab. work (hours):	15	Laboratorijske vaje (ur):	15

Title: Fundamentals of Control Engineering

Lecturer: Prof. Dr. David Nedeljković

Aim of the course:

Student will master fundamental topics in the field of control engineering and linear systems. He will meet a variety of methods to design control systems and learn to use corresponding state-of-the-art software tools.

Student will become aware of the modeling inadequacies and will develop a critical approach to design of control systems, especially in the field of power electronics and electrical drives.

Required (pre)knowledge:

Mathematics I-II, Physics I-II, Electrical Engineering Fundamentals I-II, Measurements, Fundamentals of Electrical Machines.

Contents:

Linear systems and their descriptions: differential equations, Laplace transform and transfer function, frequency response (Bode, Nyquist, Nichols plots), step response.

Block diagrams, open-loop, closed-loop systems and corresponding transfer functions.

Stability, steady state error, dynamic error.

Features of elements of control systems in power electronics and electrical drives.

PID controllers, their realization with operational amplifiers and microcontrollers.

Optimization of controllers' parameters.

Basics of simulations.

Examples of control systems in power electronics and electrical drives.

Selected references:

Gene F. Franklin, J. David Powell, Abbas Emami-Naeini: Feedback Control of Dynamic Systems, Addison-Wesley, 1994.

Dogan Ibrahim: Microcontroller Based Applied Digital Control: J. Wiley & Sons, 2006.

Werner Leonhard: Control of Electrical Drives, Springer; 2001.