Course Unit Descriptor

Study Programme: Power, Electronic and Telecommunication Engineering (Power Engineering - Power Electronics and Electric Machines)

Course Unit Title: Energy Converter Control

Course Unit Code: EE425

Name of Lecturer(s): Stevan Grabić

Type and Level of Studies:Bachelor level

Course Status (compulsory/elective): compulsory

Semester (winter/summer): summer

Language of instruction:english

Mode of course unit delivery (face-to-face/distance learning): face-to-face

Number of ECTS Allocated:4

Prerequisites: none

Course Aims:

Basic course objective is to acquire knowledge about techniques of power electronic converter control, analysis of all elements in the controlled structure of the device, their modeling, calculation of the controller parameters, simulation of the device operation and finally entering and adjusting parameters in the real system and checking the obtained results. The goal is to unite these elements into a specific system of the power converter for the application in electromotor drives and elsewhere.

Learning Outcomes:

Students are trained to know the methods of energy converter control, methods of control system analysis, methods and tools for converter modeling and to acquire the ability to measure properties on the specific devices and test their performance, and apply such device in the modern electromotor drives.

Syllabus:

Introduction. Basic components of management-control circuits. Sensors and adjusting circuits. Working principles and selection of control circuits. Structure and programme realization of digital control circuit. Management in electromotor drives – principles, methods, hardware. Management-control circuit for phase controlled converters. Principles, types and classification techniques of pulse-width modulation (PWM). Management-control circuits for power converters with PWM control (PWM chopper, PWM inverter). Modulation of space vector. Inverter control in the drive with electric machine and inverter connected to the electrical network. U/F, scalar, vector control. Alternating converter contro

Required Reading: Relevant literature in English TBD

Weekly Contact Hours:3	**Lectures:2**	**Practical work:1**

Teaching Methods:

The course consists of the presentation of theoretical operation and design principles in the lectures, through practical work in the laboratory and independent work on designing the given project.

Knowledge Assessment (maximum of 100 points):100

Pre-exam obligations	points	**Final exam**	points
Lecture attendance	5	Written part of the exam	30
Laboratory exercise attendance	5		

Laboratory exercise defence	30		
Test	10		
Test	10		
Homework	5		
Homework	5		
The methods of knowledge assessment may differ; the table presents only some of the options: written exam, oral exam, project presentation, seminars, etc.			