

Course title: Project of power semiconductor converters				
Course code	Course status	Semester	Number of ECTS credits	Lecture hours
PA4104	Mandatory	I	5.5	3L+1E+0Lab

Study program:

Master studies, ELECTRICAL ENGINEERING, study program: Power systems and Control, department: Automatics (studies last for 10 semesters, 300 ECTS credits).

Postgraduate studies, ELECTRICAL ENGINEERING, study program: Power systems and Control, department: Automatics (studies last for 8 semesters, 240 ECTS credits)

Prerequisites:

No prerequisites required.

Course aims:

Extension of knowledge from power electronics, introduction with important components and effects in real power converters and application of software for analysis and projects.

Teacher(s) first and last names:

PhD Vladan Vujičić – professor

Studying method:

Lectures, exercises, individual work, practical assignments, consultations.

Course synopsis

Preliminary week	Preparation and semester enrolment.
I week	Introduction. Overview of basic types of converters.
II week	Diodes and thyristors rectifiers. Computer simulation principles.
III week	Impulse DC-DC converters. Computer simulation principles.
IV week	Regulation of impulse converters (modulator, feed back, transfer functions, regulation techniques)
V week	Impulse converters with galvanic insulation (fly-back, forward, push-pull,...). Transformer features.
VI week	<i>I colloquium</i>
VII week	Free week
VIII week	DC-AC converters (mono-phases, three-phases, voltage, current).
IX week	Basic PWM techniques of DC-AC converters (sinusoidal, hysteresis, vectors,...).
X week	Function and types of snubber circuits. Snubber circuits for diodes and thyristors.
XI week	Snubber circuits for transistors, bridge configurations and GTO thyristors.
XII week	Trigger circuits (pared, electrical insulated and cascade trigger circuits)
XIII week	<i>II colloquium</i>
XIV week	Trigger circuits (trigger circuits of thyristors, protection of power semiconductor switches)
XV week	Thermal issues, conduction of heat.
XVI week	<i>Final exam</i>
Final week	Administrative procedures.
XVIII-XXI week	Additional lessons, correction of the final exam and administrative procedures.

STUDENT WORKLOAD

<u>per week</u>	<u>per semester</u>
Working hours: 5.5 credits x 40/30 = 7 hours and 20 minutes.	Teaching and the final exam: (7hours and 20 minutes) x 16 = 117 hours and 20 minutes.
Working hours structure: 3 hours for teaching 1 hour for exercises 3 hours and 20 minutes for individual work, including consultations.	Necessary preparation (before semester): 2 x (7hours and 20 minutes) = 14hours and 40 minutes.
	Total work hours for the course: 165hours
	Additional hours for preparing correction of the final exam, including the exam taking: up to 33hours.
	Work hours structure: 117hours and 20 minutes (lectures) + 14hours and 40 minutes (preparation) + 33hours (additional work)

Lessons attendance is mandatory for students, as well as doing homework and colloquiums.

Literature:

N. Mohan, T. M. Undeland, W. P. Robbins: "Power Electronics: Converters, Applications, and Design" J.Wiley&sons, 2003.
V. Vujičić: Projektovanje energetskih poluprovodničkih pretvarača, (skripta u pripremi), Podgorica 2006.

The forms of knowledge testing and grading:

- Tests 5x2 points,
- Colloquium 2x 20 points (total 40 points)
- Final exam 50 points.

Student gets the passing grade by collecting 51 points at least.

Special remarks for the course:

One computer classroom is necessary for realization of one part of lectures as well as for student's individual work.

Teacher(s) who provided the information: PhD Vladan Vujičić

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