

Syllabus

Code/Name	Sec 401.37 / Static Power Conversion 1
Type	Elective
Credit/ECTS	6/6
Hour per Week	3
Level/Year	Undergraduate/4
Semester	Fall
Classroom	A103
Content	Power switches and their characteristics. Power converter definitions, midpoint and bridge rectifiers: non-ideal commutation, harmonics, input power factor, utility-factor, winding utilization and unbalances in rectifier transformers. Applications.
Prerequisites	None
Textbooks	<i>Primary</i> Power Electronics, N. Mohan, T. M. Undeland, W.P. Robbins, John Wiley Publishing Co., 2003 <i>Supplementary</i> Fundamentals of Power Electronics, R.W. Erickson and D. Maksimovic, Kluwer, 2001.
Objectives	<ul style="list-style-type: none"> • To comprehend basic power electronics conversion principles • To determine the basic components of switching matrix • To determine the periodic switching rules • To use the switching rules to achieve a specific power conversion target
Course Outcomes	In this course you will be able to: CO1 Understand and characterize the terminal properties of power semiconductor devices and use these characteristics in design of power converters CO2 Evaluate the structure, material, and control properties of the power semiconductors CO3 Characterize the rectifier output voltage waveforms, calculate the average and ripple values CO4 Characterize the rectifier input current waveforms, calculate the harmonic and rms values CO5 Evaluate the harmonics ad distortion values and compare with standards

Weekly Schedule of Topics

W	Topic
1	Multidisciplinary nature of power electronics, fields of power electronics
2	Switching rules, basic operating rules for switching circuits, volt-seconds rule, ampere-seconds rule
3	Power Diodes.
4	Thyristors
5-8	Rectifier principles, single switch, uncontrolled, semi controlled, analysis
9	Input/Output Harmonics and Filtering
10	Computer Simulations of Power ElectronicCircuits
11	Precharge Circuits, Inrush Currents, Thermal Management and Design
12-13	Control of Rectifiers.

14 Protection, snubbers, gate driving

Contribution to Program Outcomes*

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	2	1	1	1	0	0	1	1	1	0	0
CO2	1	2	1	1	0	0	1	1	1	0	0
CO3	3	1	1	1	0	0	1	1	1	0	0
CO4	0	1	0	0	0	0	1	1	0	0	0
CO5	0	0	1	1	0	0	1	1	0	0	0

* Contribution Level | 0: None | 1: Very Low | 2: Low | 3: Medium | 4: High | 5: Very High

Requirements	Basic knowledge of Electromagnetic Field Theory	
Course Policy	<ul style="list-style-type: none">• Be in the class on time.• English should always be used to communicate with one another.• At least 70% attendance is required, otherwise a grade of DZ will be assigned.	
Cheating & Plagiarism	<ul style="list-style-type: none">• Copying or letting someone copy your work on exams, assignments, or reports is cheating.• Cutting and pasting text, figures and tables from web sources or any other electronic source is plagiarism.• The consequence of academic dishonesty is to receive a grade of FF for the course.	
Evaluation	Midterm	40%
	Final Exam	60%
	Total	100%

Instructor

Name/Surname	Akın Uslu	Email	akin.uslu@alanya.edu.tr
Room	209	Office Hours	W 11.30-12.30 F 13.30-14.30

Prepared by Akın Uslu on June 10th, 2024.