SRM UNIVERSITY
FACULTY OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF EIE

Course Code **:** EI0302
Course Title **:** Power Electronics
Year and Semester **:**III Year & VI Semester
Course Time : Even Semester(January-April 2013)
Location **:** Tech Park

Faculty Details:

Name of the staff	Section	Office	Office Hours	Mail ID
Ms. Vibha.k	EIE-A	15th floor TECH Park	8.30-4.00 pm	vibha.k@ktr.srmuniv.ac.in
Mr.Vijay Prabhu.J	EIE-B	15th floor TECH Park	8.30-4.00 pm	vijayprabhu.j@ktr.srmuniv.ac.in

Required Text Books:

1. P.S.Bimbhra , Power Electronics, Khanna Publishers, New Delhi,2002.
2. M.H.Rashid , Power Electronics,circuits devices and applications,PHI, NewDelhi,1995.

Reference Books:

1. Mohan , Undeland and Robbins, Power Electronics,John Wiley and Sons,New York,1995.
2. P.C.Sen,Modern Power Electronics, Wheeler Publishers, New Delhi, 1998.

Web Resource:

http://digitalcontentproducer.com/mag/avinstall_ac_dc/
http://en.wikipedia.org/wiki/Inverter_%28electrical%29

Prerequisite **:**Basic Semiconductor Physics, Electronic Devices& Electronic Circuits

Objectives:

1. To learn the power semiconductor devices.
2. To study the turn on and turn off Techniques of SCR.
3. To study the power control using rectifiers.
4. To study the power control using choppers &inverters.
5. To study application of power electronics .

Tentative test dates

Cycle Test-I : 21-02-2013
Cycle Test-II : 04-04-2013
Model Examination : 03-05-2010

Test Portions

Cycle Test-I : Units 1 & 2
Cycle Test-II : Units 3 & 4
Model Examination :All five units

Assessment details

Cycle Test-I	10 marks
Cycle Test-II	10 marks
Surprise Test-I	5 marks
Modal Exam	20 marks
Attendance	5 marks
Total	50 marks

** Pass mark is calculated through Percentile*

Outcomes

Students who have successfully completed this course

Course outcome	Program outcome
• The aim of this course is to familiarize the student with the characteristics of modern power semiconductor devices , which are used as switches to perform the power conversions from ac-dc,dc-dc,dc-ac and ac-ac; • Both the fundamental principles and id-depth study of operation, analysis and design of various power converters; and. • Recent applications of power electronics.	• The Students will understand different power electronic devices like Semiconductor Devices like power diode,transistors UJT, MOSFET, SCR, UJT&IGBT • The Students will be able to design different power coverters • The Students will be able to design dc & ac drives ,SMPS &UPS.

Detailed Session Plan

Day	Name of the experiment	Reference
HOUR 1	**UNIT- I** **POWER SEMICONDUCTOR DEVICES** Power diode: V I charecteristics	Power Electronics- P.S.Bimbhra
HOUR 2	Power transistors: As a switch	Power Electronics- P.S.Bimbhra
HOUR 3	Triac: V-I characteristics	Power Electronics P.S.Bimbhra
HOUR 4	PowerMOSFET: Transfer and output characteristics	Power Electronics- P.S.Bimbra
HOUR 5	IGBT: Charecteristics	Power Electronics- P.S.Bimbra
HOUR 6	MCT ,LASCR	Power Electronics- M.H.Rashid
HOUR 7	SCR: V-I characteristics, SCR Turn –On & SCR Turn –Off	Power Electronics- M.H.Rashid
HOUR 8	Thyristor specifications	Power Electronics- M.H.Rashid
HOUR 9	protection circuits	Power Electronics- M.H.Rashid
	UNIT- II **TRGGERING AND COMMUTATION CIRCUITS**	Power Electronics M.H.Rashid

HOUR 10	Thyristor trigger circuits: R trigerring	
HOUR 11	RC triggering	Power Electronics M.H.Rashid
HOUR 12	Thyristor trigger circuits:Single pulse andtrain of pulses	Power Electronics M.H.Rashid
HOUR 13	Forced Commutation: Self Commutation	Power Electronics M.H.Rashid
HOUR 14	Forced Commutation: Complementary Commutation	Power Electronics M.H.Rashid
HOUR 15	Forced Commutation: Resonant Commutation	Power Electronics M.H.Rashid
HOUR 16	Forced Commutation: Impulse Commutation	Power Electronics M.H.Rashid
HOUR 17	Series operation of SCR	Power Electronics M.H.Rashid
HOUR 18	parallel operation of SCR	Power Electronics M.H.Rashid
HOUR 19	**UNIT III** **CONVERTERS** Natural commutation	Power Electronics- P.S.Bimbra
HOUR 20	Single phase half controlled rectifier with RL load	Power Electronics- P.S.Bimbra
HOUR 21	Single phase fully controlled rectifier with Highly Inductive load	Power Electronics- M.H.Rashid
HOUR 22	Three phase half controlled rectifier with R load	Power Electronics- P.S.Bimbra
HOUR 23	Three phase fully controlled rectifier with Highly Inductive load	Power Electronics- M.H.Rashid
HOUR 24	Effect of source Inductance	Power Electronics- M.H.Rashid
HOUR 25	Effect of load inductance	Power Electronics- M.H.Rashid
HOUR 26	Dual converter	Power Electronics- M.H.Rashid
HOUR 27	Cycloconverter	Power Electronics- M.H.Rashid
HOUR 28	**UNIT IV** **INVERTERS AND CHOPPERS** Voltage source inverter:Series inverters	Thyristors &applications-Ramamoorthy
HOUR 29	Voltage source inverter: Parrallel inverters	Thyristors &applications-Ramamoorthy
HOUR 30	Voltage source inverter: Half Bridge inverters	Power Electronics- M.H.Rashid
HOUR 31	Full Bridge inverters	Power Electronics- P.S.Bimbhra
HOUR 32	Single phase current inverters	Power Electronics- M.H.Rashid
HOUR 33	PWM inverters	Power Electronics M.H.Rashid
HOUR 34	DC choppers: step down	Power Electronics M.H.Rashid
HOUR 35	DC choppers: step up	Power Electronics P.S.Bimbhra
HOUR 36	AC choppers: R load	Thyristerised power controllers-G.K. Dubey
HOUR 37	**UNIT V** **TYPICAL APPLICATION** Torque speed charecteristics of DC drive	Seminconductor controlled devices- G.K.Dubey
HOUR 38	Speed control of DC drive	Seminconductor controlled devices –G K Dubey
HOUR 39	Torque speed charecteristics of AC drive	Seminconductor controlled devices –G K Dubey

HOUR 40	Speed control of AC drive	Seminconductor controlled devices –G K Dubey
HOUR 41	Control of stepper motor Drives	Seminconductor controlled devices –G K Dubey
HOUR 42	Control of switched relectance motor Drives	Seminconductor controlled devices –G K Dubey
HOUR 43	SMPS	Power Electronics
HOUR 44	Uninterrupted power supply	Power Electronics
HOUR 45	Induction heating	Seminconductor controlled devices –G K Dubey