

Program : Diploma in Electrical and Electronics Engineering	
Course Code : 5039B	Course Title: Applied Electronics Laboratory
Semester : 5	Credits: 1.5
Course Category: Program Elective	
Periods per week: 3 (L:0 T:0 P:3)	Periods per semester: 45

Course Objectives:

- To familiarize with various applications of Op-Amps
- To identify the power electronics devices and their circuits in electrical engineering.
- To know about industrial applications of power electronics

Course Prerequisites:

Topic	Course Code	Course Name	Semester
Basic semiconductor device operation		Fundamentals of Electrical & Electronics Lab	2
Transistors and OP-amps		Analog & Digital Electronics circuits	3
Basics of electronic circuits		Electronics Lab	3
Power semiconductor devices		Power Electronics	4

Course Outcomes :

On completion of the course, the students will be able to:

CO _n	Description	Duration (Hours)	Cognitive level
CO1	Develop various op - amp circuits using IC 741C	9	Applying
CO2	Identify various power semiconductor devices and plot the V-I characteristics of SCR	6	Applying

CO3	Build controlled rectifier circuits using SCR and set up a triac firing circuit.	9	Applying
CO4	Construct various industrial control circuits using power semiconductor devices.	15	Applying
	Lab Exam	6	

CO-PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1				3			
CO2				3			
CO3				3			
CO4				3			

3-Strongly mapped, 2-Moderately mapped, 1-Weakly mapped

Course Outline

Module Outcomes	Name of Experiment	Duration (Hours)	Cognitive Level
CO1	Develop various op - amp circuits using IC 741C		
M1.01	Adder circuit	1.5	Applying
M1.02	Integrator	1.5	Applying
M1.03	Differentiator	1.5	Applying
M1.04	Comparator	1.5	Applying
M1.05	Zero Crossing Detector	1.5	Applying
M1.06	Schmitt trigger	1.5	Applying
CO2	Identify various power semiconductor devices and plot the V-I characteristics of SCR		
M2.01	Identify various terminals and check the following power semiconductor devices (a)SCR (b) DIAC (c)TRIAC (d)UJT (e)IGBT (d)	1	Applying

	MOSFET		
M2.02	Set up a UJT relaxation oscillator circuit and observe the waveform	2	Applying
M2.03	Plot the VI characteristics of SCR	3	Applying
	Lab Exam	3	
CO3	Build controlled rectifier circuits using SCR and set up a triac firing circuit.		
M3.01	Construct a single phase half wave controlled rectifier circuit using SCR for resistive load and observe the waveforms across load and SCR.	3	Applying
M3.02	Construct a single phase half controlled rectifier circuit using SCR with R load and observe the waveforms across load and SCR.	3	Applying
M3.03	Set up a TRIAC Firing circuit Using DIAC and observe the waveforms across TRIAC and load	3	Applying
CO4:	Construct various industrial control circuits using power semiconductor devices.		
M 4.01	Set up a DC motor speed control circuit using SCR and verify the output	3	Applying
M 4.02	Set up an emergency lamp circuit using SCR	3	Applying
M 4.03	Setup a of battery charger circuit using thyristors.	3	Applying
M 4.04	Assemble a fan regulator using thyristors	3	Applying
M 4.05	Construct an automatic street lamp circuit using LDR	3	Applying
	Lab Exam	3	

Text / Reference:

T/R	Book Title/Author
T1	K.A Navas , Electronics Lab Manual - Vol 1 PHI Learning,ISBN : 9788120351424
T2	K.A Navas , Electronics Lab Manual - Vol 2,PHI Learning, ISBN : 9789388028080

R1	Ramamoorthy M., An Introduction to Thyristors and their applications, East-West Press Pvt. Ltd., New Delhi, ISBN: 8185336679
R2	Sugandhi, Rajendra Kumar and Sugandhi, Krishna Kumar, Thyristors: Theory and Applications, New Age International (P) ltd. Publishers, New Delhi, ISBN: 978-0-85226-852-0.
R3	Bhattacharya, S.K., Fundamentals of Power Electronics, Vikas Publishing House Pvt. Ltd. Noida. ISBN: 978-8125918530
R4	Zbar, Paul B., Industrial Electronics: A Text –Lab Manual, McGraw Hill Publishing Co. Ltd., New Delhi, ISBN: 978-0070728226.
R5	Singh, M. D. and Khanchandani, K.B., Power Electronics, Tata McGraw Hill Publishing Co. Ltd, New Delhi, 2008 ISBN: 9780070583894.
R6	Grafham D.R., SCR Manual, General Electric Co., ISBN: 978-0137967711.
R7	Jain & Alok , Power Electronics and its Applications, Penram International Publishing (India) Pvt. Ltd, Mumbai, ISBN: 978-8187972228.
R8	Rashid , Muhammad, Power Electronics Circuits Devices and Applications, Pearson Education India, Noida, ISBN: 978-0133125900.

Online Resources:

SI No	Website Link
1	www.circuitstoday.com
2	wikipedia.org
3	NPTEL >> Courses >> Electrical Engineering
4	www.youtube.com
5	http://www.electronicsteacher.com
6	https://www.allaboutcircuits.com/textbook/experiments

Student Activity

Suggested Open-ended Experiments:

Students can do open ended experiments as a group of 3-5. There is no duplication in experiments in between groups. This is mainly for the purpose of continuous internal evaluation Students should prepare a separate report on open ended experiment of their choice.

Example : Design and develop power electronic circuits for various domestic applications.

Design a rectifier circuit using Op-Amps