Program:	**Diploma in Electrical and Electronics Engineering**
Course Code: **4036**	Course Title: **Electronics Lab**
Semester: **4**	Credits: **1.5**
Course Category: **Program Core**	
Periods per week: **3 (L: 0 T: 0 P:3)**	Periods per semester: **45**

Course Objectives:

- To impart the knowledge about electronic circuits and components used in Electronics engineering.

- To familiarize with power electronics circuit components used in Electrical engineering.

Course Prerequisites:

Topic	Course code	Course name	Semester
Knowledge of active and passive components		Fundamentals of Electrical & Electronics	2
Knowledge of transistor biasing, op-amps, digital circuits		Analog & Digital Circuits	3

Course Outcomes:

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

COn	Description	Duration (Hours)	Cognitive Level
CO1	Experiment with various analog circuits using transistors.	9	Applying
CO2	Develop various analog circuits using op-amps.	9	Applying
CO3	Construct various sequential and combinational digital circuits.	12	Applying
CO4	Develop various triggering circuits for SCR and observe waveforms.	9	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 Outcome	Name of Experiment	Duration (Hours)	Cognitive Level
CO1	**Experiment with various analog circuits using transistors.**		
M1.01	Identify the values of various resistors, capacitors and inductors	1.5	Applying
M1.02	Identify various terminals and check the following semiconductor devices (a) Diode (b) Zener diode (c) Transistor (d) SCR (e) UJT	1.5	Applying
M1.03	Develop a single stage RC coupled CE amplifier with potential divider bias Observe the phase difference between input and output waveforms Plot its frequency response and determine the bandwidth	3	Applying
M1.04	Construct RC phase shift oscillator and observe the frequency of oscillation	3	Applying
CO2	**Develop various analog circuits using op-amps.**		
M2.01	Inverting amplifier	3	Applying
M2.02	Non inverting amplifier	3	Applying
M2.03	Voltage follower	3	Applying
	Lab Exam - I	3	

CO3	**Construct various sequential and combinational digital circuits.**		

M3.01	Verify the truth table of following gates
	  (a) AND (b) OR (c) NOT
	  (d) XOR (e) NAND (f) NOR
		3	Applying

M3.02	Construct a half adder using logic gates.	1.5	Applying
M3.03	Construct a half-subtractor using logic gates.	1.5	Applying
M3.04	Construct J-K flip flop using NAND gates.	3	Applying
M3.05	Construct MOD-10 asynchronous counter using flip flops	3	Applying
CO4	**Develop various triggering circuits for SCR and observe waveforms.**		
M4.01	Develop and apply trigger circuits using R and observe the firing angle of SCR with changing values of R.	3	Applying
M4.02	Develop and apply trigger circuits using RC and observe the firing angle of SCR with changing values of R and C.	3	Applying
M4.03	Develop a UJT triggering circuit and observe the effect of variation in values of R and C	3	Applying
	Lab Exam - II	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	V.K.Mehta. Principles of Electronics. S Chand &co.
R2	R.S. Sedha. Applied Electronics. S Chand &co
R3	Floyd and Jain-Digital fundamentals- Pearson
R4	M Morris Mano and Michael Cilettio-Digital Design-PEARSON
R5	P.S. Bimbhra, Power Electronics, Khanna Publications,
R6	M.D.Singh and Khanchandani K.B, Power Electronics. Second edition, McGraw Hill Publishing Co.Ltd

Online Resources:

Sl.No	Website Link
1	http://vlabs.iitb.ac.in/vlab/electrical/index.html#
2	http://vlabs.iitkgp.ac.in/be/
3	http://vlabs.iitkgp.ac.in/dec/
4	www.electrical4u.com
5	www.nptel.ac.in
6	www.swayam.gov.in

Student Activity

Suggested Open-ended Experiments:

Students can do open-ended experiments as a group of 3-5. There is no duplication in experiments between groups. This is mainly for the purpose of continuous internal evaluation and a score of 15 marks. Students should prepare a separate report on the open-ended experiment of their choice.

Example:

1. Construct a DC power supply with 0 to 30 variable voltage.
2. Construct a smart street lighting system using motion sensors.
3. Develop and test the performance of the battery charger using thyristors.
4. Construct an inverter circuit and observe the waveforms.
5. Develop full adder/full subtractor using Multiplexer ICs.
6. Develop an oscillator using UJT
7. Experiment with simulation software on any basic circuit and examine its waveforms