

Program : Diploma in Electrical and Electronics Engineering	
Course Code : 6039B	Course Title: Modelling and Simulation Lab
Semester : 6	Credits: 1.5
Course Category: Program Elective	
Periods per week: 3 (L:0 T:0 P:3)	Periods per semester: 45

Course Objectives:

- To simulate and test various electrical and electronics circuits
- To study the behaviour of various electrical and electronics circuits

Course Prerequisites:

Topic	Course code	Course name	Semester
Basics of electronics		Fundamentals of Electrical & Electronics Engineering	2
Basic idea of electric networks		Fundamentals of Electrical Circuits	3
Transistors and digital circuits		Analog & Digital Circuits	3
power semiconductor devices		Power Electronics Devices and Circuits	4

Course Outcomes:

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

CO _n	Description	Duration (Hours)	Cognitive Level
CO1	Develop simulations to demonstrate basic electrical circuits.	12	Applying
CO2	Develop simulations to demonstrate basic electronic circuits.	6	Applying
CO3	Build simulation models for power electronic circuits	12	Applying

CO4	Construct simulation models to implement various combinational logic circuits	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)	Blooms Taxonomy Level
CO1	Develop simulations to demonstrate basic electrical circuits.		
M1.01	Simulation of systems using Computers-Use standard simulation tools like Matlab/Simulink/ Pspice/Lab view	3	Understanding
M1.02	Generation of various standard signals - Sinusoidal ,Square signal and plot them	3	Applying
M1.03	Simulate a dc circuit and determine the node voltages(circuit with maximum two loops only)	3	Applying
M1.04	Simulate a dc circuit and verify any one network theorem.	3	Applying
CO2	Develop simulations to demonstrate basic electronic circuits.		
M2.01	Plot input output characteristics of diode.	1.5	Applying
M2.02	Plot input output characteristics of npn/pnp transistor.	1.5	Applying

M2.03	Simulate any one diode rectifier with and without filter.	3	Applying
	Lab Exam – I	3	
CO3	Build simulation models for power electronic circuits		
M3.01	Plot the output of single phase ac voltage controller	3	Applying
M3.02	Plot the output of dc chopper circuit	3	Applying
M3.03	Simulate the DC motor speed control system	3	Applying
M3.04	Simulate Battery charger circuit	3	Applying
CO4	Construct simulation models to implement various combinational logic circuits		
M4.01	Simulate various logic gates	3	Applying
M4.02	Develop a model of half adder and full adder circuit	1.5	Applying
M4.03	Develop a model of 3 bit multiplexer	1.5	Applying
M4.04	Develop a model of RS, D, JK and T Flipflops	3	Applying
	Lab Exam – II	3	

Text / Reference:

T/R	Book Title/Author
R1	MATLAB Primer by MATHWORKS:
R2	Agamkumar Tyagi, MATLAB and Simulink for Engineers , Oxford Higher Education, 2011
R3	Muhammad H. Rashid, Introduction to PSpice Using OrCAD for Circuits and Electronics
R4	Brian R. Hunt, Ronald L. Lipsman, Jonathan M. Rosenberg, A guide to MATLAB : for beginners and experienced users , Cambridge Press,

Online Resources:

SI No	Website Link
1.	http://www.mathworks.com/help/releases/R2014b/pdf_doc/matlab/getstart.pdf
2	https://www.mathworks.com/content/dam/mathworks/mathworks-dot-com/moler/exm/book.pdf
3	https://www.mccormick.northwestern.edu/documents/students/undergraduate/introduction-to-matlab.pdf
4	https://www.electronicsforu.com/electronics-projects/image-processing-using-matlab-part-1

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

Simulate three phase voltage controller

Simulate the speed control of BLDC motor