DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
NATIONAL INSTITUTE OF TECHNOLOGY
TIRUCHIRAPPALLI - 620 015, TAMIL NADU, INDIA

COURSE PLAN (PART I)

Name of the programme and specialization	B. Tech., ELECTRICAL AND ELECTRONICS ENGINEERING		
Course Title	Circuits and Digital Laboratory		
Course Code	EELR10	No. of Credits	02
Course Code of Pre-requisites	EEPC10 Circuit Theory		
Session	July 2025	Section (if, applicable)	B
Name of the Faculty	Dr. Dipanshu Naware	Department	EEE
E-mail	dipanshu@nitt.edu	Telephone No.	8319776878
Course Coordinator(s) (if, applicable)	Dr. Dipanshu Naware		
E-mail of Course Coordinator (s)	dipanshu@nitt.edu	Telephone No.	9723684556

Course Type (tick)	IR	Core	Programme Elective	Open Elective	Minor	Honours	Laboratory
							✓

COURSE CONTENT (as in latest curriculum)

List of Experiments:

- Verification of Kirchhoff's Current and Voltage law.
- Verification of Thevenin and Maximum Power Transfer Theorem.
- Verification of Superposition Theorem.
- Transient characteristics of R-L series circuit.
- Transient characteristics of R-C series circuit.
- Transient characteristics of R-L-C series circuit.
- Forward bias characteristics of p-n junction diode and reverse bias characteristics of zener diode.
- Design of combinational logic circuit.
- Design of Multiplexer and Demultiplexer, encoder and decoder.
- Design of synchronous sequential logic circuits.
- Mini Project.

References

- Hayt, W. H, Kemmerly J. E. & Durbin, 'Engineering Circuit Analysis', McGraw Hill Publications, 8th Edition, 2013.
- Charles K. Alexander, Matthew N.O.Sadiku, 'Fundamentals of Electric Circuits', McGraw-Hill Publications, 5th Edition, 2013.
- Joseph. A. Edminister, 'Electric Circuits - Schaum's Outline Series', McGraw-Hill Publications, 6th Edition, 2003.
- Robins & Miller, 'Circuit Analysis Theory and Practice', Delmar Publishers, 5th Edition, 2012

COURSE LEARING OBJECTIVES

- To understand and analyze the basic theorems of Circuit theory
- Understand and analyze series & parallel circuits and measurement of single and three-phase power.
- Understand and analyze different applications of diode and characteristics of Transistor.
- Understand the basics of digital design

COURSE OUTCOMES (CO)

Course Outcomes	
After successful completion of the course, the students should be able to:	
CO1	Verify the network theorems and operation of electrical and electronic circuits.
CO2	Choose the appropriate equipment for measuring the electrical quantities and verify the same for different circuits
CO3	Prepare the technical report on the experiments carried out
CO4	Design basic digital logic circuits

Aligned Programme Outcomes (PO) (Assign level – 1 or 2 or 3 or blank)

	1	2	3	4	5	6	7	8	9	10	11	12
CO1	3	2	3	3	3	2	2	3	3	3	2	3
CO2	3	2	3	3	3	2	2	3	3	3	2	3
CO3	3	2	3	3	2	2	2	3	3	3	3	3
CO4	3	2	3	3	3	2	2	3	3	3	2	3

PO1: Engineering knowledge
PO2: Problem analysis
PO3: Design/ development of solutions
PO4: Conduct investigations of complex problems
PO5: Modern tool usage
PO6: Engineer and society
PO7: Environment and Sustainability
PO8: Ethics
PO9: Individual and teamwork
PO10: Communication
PO11: Project management and finance
PO12: Life-long learning

COURSE PLAN (PART II)

COURSE OVERVIEW

In our day-to-day life, we come across various electrical and electronic equipment. This equipment revolves around us and forms an integral form of our daily routine such as ceiling fans, fluorescent tube lights, LEDs, grinders, cell phones, refrigerators, laptops/PCs, and many more. All these devices follow fundamental laws of electrical and electronics engineering and to understand the basic working/operation of these devices it is indeed important to thoroughly understand the science behind it. These requirements motivated us to frame this coursework as a general institute requirement for Production Engineering students.

The laboratory course 'Circuits and Digital Laboratory' is designed in such a way that initially, it deals with the fundamentals of electrical circuits and networks with hands-on experimentation on basic circuit elements such as active and passive, fundamental concepts of voltage, current, and power, and application of various laws & theorems in both AC and DC circuits alongside applications.

Furthermore, the students are exposed to the fundamental experimentation on analog and digital electronics, which include introduction to semiconductor devices such as diodes, and BJT characterized for several applications and exposure to Boolean laws and logic gates.

COURSE TEACHING AND LEARNING ACTIVITIES

Sl. No.	Week	Topic	Mode of Delivery
1.	2nd week of July (07/07/25 – 11/07/25)	Introduction to the laboratory, course plan discussion, mode of assessment, attendance policy, etc.	-
2.	3rd week of July (14/07/25 – 18/07/25)	Demonstration and use of Bread board, Variable regulated power supply, DSO, Multi meters, etc.	**Laboratory demonstration**
3.	4th week of July (21/07/25 – 25/07/25)	Verification of Kirchhoff's Current and Voltage law.	**Hands-on Experiment**
4.	5th week of July (28/07/25 – 01/08/25)	Verification of Thevenin's and Maximum Power Transfer Theorem.	**Hands-on Experiment**
5.	1st week of August (04/08/25 – 08/08/25)	Verification of Superposition Theorem	**Hands-on Experiment**
6.	2nd week of August (11/08/25 – 15/08/25)	• Transient characteristics of RL series circuit. • Transient characteristics of RC series circuit.	**Hands-on Experiment**
7.	3rd week of August (18/08/25 – 22/08/25)	Transient characteristics of RLC series circuit.	**Hands-on Experiment**
8.	4th week of August (25/08/25 – 29/08/25)	Forward bias characteristics of p-n junction diode and reverse bias characteristics of zener diode.	**Hands-on Experiment**
9.	1st week of Sept. (01/09/25 – 05/09/25)	Design of combinational logic circuit.	**Hands-on Experiment**
10.	2nd week of Sept. (08/09/25 – 12/09/25)	Design of Multiplexer and De-Multiplexer, Encoder and decoder.	**Hands-on Experiment**
11.	3rd week of Sept. (15/09/25 – 19/09/25)	Design of synchronous sequential logic circuits	**Hands-on Experiment**
12.	4th week of Sept. (22/09/25 – 26/09/25)	**Compensation Experiments, if required**	**Hands-on Experiment**
13.	5th week of October (27/10/25 – 28/10/25)	**Submission of Mini Project**	**Demo and Report**
14.	1st week of November (10/11/25 – 21/11/25)	**Final Assessment**	**End-semester Exam**

COURSE ASSESSMENT METHODS

Sl. No.	Mode of Assessment	Week/Date	Duration	% Weightage
1.	**Subject Entrance Test (SET)** (Based on prerequisite knowledge)	Day 1	15 minutes	NIL
2.	**Continuous Evaluation** (Prerequisite knowledge, preparedness for experiments, active participation, record book submission, and Viva-voce)	Weekly	Regular Lab Hours	40%
3.	**Surprise Test**	Week 6	Regular Lab Hours	10%
4.	**Mini Project** (Group/Individual Activity)	Week 12	Regular Lab Hours	20%
5.	**Final Assessment** **(Hands-on Experimentation and Viva-voce)**	Week 13	Four Sessions in one full day – 1.5 hours per session	30%

COURSE EXIT SURVEY (mention the ways in which the feedback about the course is assessed and indicate the attainment also)

- Feedback from the students during class committee meetings
- Feedback through the institute's online feedback system.

COMPENSATION POLICY

- Only one instance of absence is acceptable in continuous assessment, and a compensation assessment for such cases will be conducted only once.
- Compensation assessments are restricted to genuine reasons, like severe illness, and require valid proof in the form of a medical certificate issued by the NITT hospital medical officer.
- In situations where students anticipate missing assessments due to unavoidable reasons, prior intimation to the faculty is essential. If a student is unable to provide advance notice due to sudden illness or emergencies, they must communicate the reason and submit valid proof of the absence within one week of the assessment.

ATTENDANCE POLICY

- At least **75%** attendance in each course is mandatory.
- A maximum of **10%** shall be allowed under On Duty (OD) category.
- Students with less than **65%** of attendance shall be prevented from writing the final assessment and shall be awarded **'V' grade**. Students awarded **'V' grade** must compulsorily redo the course.

ACADEMIC DISHONESTY AND PLAGIARISM

Academic Dishonesty

a) Possessing a mobile phone, carrying bits of paper, talking to other students, copying from others during an assessment will be treated as punishable dishonesty
b) Zero mark to be awarded for the offenders. For copying from another student, both students get the same penalty of zero mark.
c) The department disciplinary committee constituted with the faculty member, PAC Chairperson, and the HoD, as members shall verify the facts of the malpractice and award the punishment if the student found guilty,

ADDITIONAL COURSE INFORMATION

The faculty/course coordinator is available for consultation at times as per the intimation given by the faculty. Queries may also be emailed to the course coordinator directly at dipanshu@nitt.edu

FOR APPROVAL

07/07/25	08-07-2025	8/7/2025
Course Faculty/EEE **Dr. Dipanshu Naware**	**Chairperson (Class Committee)/EEE** **Dr. Jose Thankachan**	**HoD/EEE** **Dr. Sishaj P. Simon**