BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI
HYDERABAD CAMPUS
SECOND SEMESTER 2019-2020
Course Handout (Part-II)

Date: 06.01.20

In addition to general handout for all courses appended to the time table, this portion gives further specific details regarding the course.

Course No. : EEE F111
Course Title : ELECTRICAL SCIENCES
Instructor-in-charge : R. N. Ponnalagu
Instructors: Lectures: R. N. Ponnalagu, Mithun Mondal
Instructors: Tutorials: R. N. Ponnalagu, Mithun Mondal, Sayan Kanungo, S. T. P. Srinivas

1. **Course Description:**

   Course covers basic passive and active circuit elements; network theorems and analysis; introduction to single and three phase systems; magnetic circuits; transformers; electrical machines; semi-conductor diodes and applications; transistors and applications; Digital electronics and commonly used measuring instruments.

2. **Scope and objective of the Course**:

   A basic understanding of the working of electrical and electronic circuits and instruments is essential for all engineers and scientists. This course is designed to give the students of all branches a preliminary exposure to this field. The need for basic understanding in this field will come for non-electrical or electronic students at a later stage in their career growth. For EEE, ECE and E&I students this course acts as a good starting point for their CDCs.
   To obtain basic knowledge on:
   a. Electrical and Magnetic circuits.
   b. Electrical machines.
   c. Semiconductor Diodes and BJTs ; Digital Electronics.

3. **Text Book**: Leonard S. Bobrow: Fundamentals of Electrical Engineering, Oxford University Press, Second Edition, 2005.

4. **Reference Book**:
   Hughes: Electrical and Electronic Technology, Pearson Education, Ninth Edition, 2008.

5. **Course Plan**:

Lect. No.	Learning Objectives	Topics to be covered	Chapter in the Text Book
1	Introduction	Introduction	
2	To study basic circuit elements and the laws;	Voltage and current sources, Independent and Dependent sources resistors and ohm's law, KCL, KVL; Current divider, Voltage divider rule, Instantaneous power	1.1 to 1.5
3-4	To study circuit analysis techniques and theorems.	Nodal and Mesh Analysis	2.1, 2.3
5-6	To study circuit analysis techniques and theorems.	Thevenin's and Norton's Theorems; Maximum Power Transfer Theorem,	2.4, 2.5

Lect. No.	Learning Objectives	Topics to be covered	Chapter in the Text Book
7-8	To study circuit analysis techniques and theorems.	Linearity and Superposition application in circuit analysis, Source transformation	2.6
9	Inductors and Capacitors	Inductors and capacitors and their integral relationships;	3.1 to 3.2
11-13	To study response of circuits having energy storing elements	First order circuits and natural response; First order circuits and complete response Second Order Circuits	3.3 to 3.6
14-18	Alternating current circuits	A.C. Voltage & Current, Complex numbers, Frequency and time domain analysis	4.1-4.3
19-21	Alternating current circuits	Power and Powerfactor, Poly-Phase circuits	4.4 to 4.7
22-23	Magnetic Circuits	Fundamentals of Electromagnetics, Magnetic fields and their effects, Magnetic Circuits and Materials	14.1-14.2
24-25	Transformers	Introduction , Ideal transformer; Equivalent circuit; Non-ideal transformer;	14.3 -14.5
26-27	Electrical Machines	Motors and generators	15.4
28-31	Principles and Applications of Semiconductor Diodes, Diode Circuits	Semiconductors, doping, Diodes, Zener diodes, effects of capacitance, Half-wave and full wave rectifiers	6.1-6.7
32-35	Bipolar Junction Transistors	*pnp* and *npn* transistors, Characteristics and Applications of BJTs, Application to digital logic circuits	7.1-7.4
36-38	Field Effect Transistors	JFET, MOSFET	8.1-8.2
39-40	Digital Systems	Binary numbers, Binary Arithmetic, Digital logic circuits, Boolean Algebra	11.1-11.6, 12.1
41-43	Circuit Simulation using LTspice		

6. Evaluation Scheme:

Component	Duration	Weightage		Date & Time	Nature of Component
		%	Marks		
Midsem Test	1.5 hour	30	90	4/3 11.00 -12.30 PM	CB
Quizzes surprise/announced	-	30	90	------	CB
Comprehensive Examination	3Hours	20	60	06/05 FN	CB
		20	60		OB
		100	**300**		

7. **Make-up policy**: Make-up will be given only under **exceptional circumstances** and with **prior permission**. No makeup will be given for a Quiz evaluation component.

8. Chamber consultation hour: To be announced in the class

9. Notices: Notices concerning the course will be displayed in the CMS.

10.Academic Honesty and Integrity Policy: Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.

Dr. R. N. Ponnalagu

INSTRUCTOR-IN-CHARGE
EEE F111