

BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI
HYDERABAD CAMPUS
SECOND SEMESTER 2018-2019
Course Handout (Part-II)

Date: 07.01.2019

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 : Prabhakar Rao

Instructors: Lectures: Prabhakar Rao, Souvik Kundu

Instructors: Tutorials:, Prabhakar Rao, Souvik Kundu, Mithun Mondal, Prasant Kumar P, Balasubramanian

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	Text Book Chapters
1	Introduction	Introduction	
2-3	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
4-5	To study circuit analysis techniques and theorems.	Nodal and Mesh Analysis	2.1, 2.3
6-7	To study circuit analysis techniques and theorems.	Thevenin's and Norton's Theorems; Maximum Power Transfer Theorem,	2.5
8-9	To study circuit analysis	Linearity and Superposition application in circuit	2.6

Lect. No.	Learning Objectives	Topics to be covered	Text Book Chapters
	techniques and theorems.	analysis, Source transformation	
10	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 Power-factors, 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	<i>pnp</i> and <i>nnp</i> 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	Transistor Amplifiers	BJT amplifiers	9.1
41-43	Digital Systems	Binary numbers, Binary Arithmetic, Digital logic circuits, Boolean Algebra	11.1-11.6, 12.1

6. Evaluation Scheme:

Component	Duration	Percentage weightage	Maximum Marks	Date & Time	Remarks
Midsem Test	1.5 hour	25%	75M	16/3 9.00 - 10.30AM	CB
Quizzes surprise/announced	45 minutes	25%	75M	-----	CB
Assignments	-----	20%	60M		OB
Comprehensive Examination	3 hrs	30%	90M	13/05 FN	CB

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.

INSTRUCTOR-IN-CHARGE

