

INSTRUCTION DIVISION
SECOND SEMESTER 2017-2018
Course Handout (Part II)

Date: 06-01-2018

In addition to Part-I (General Handout for all courses appended to the timetable) this portion gives further specific details regarding the course.

Course No. : EE111**Course Title : ELECTRICAL SCIENCES****Instructor-in-charge : RAMESHA C K****Instructors : A Amalin Prince, Shivam Verma, Sudeep Baudha , Ashish Chittora, Sarang C Dhongdi**

1. Course description: This course covers basic passive circuit elements, dependent and independent sources, network theorems, circuit analysis techniques and response of first and second order circuits. Introduction to three - phase circuits, magnetic circuits, transformers, basics of rotating machines. Semiconductors - operation of diodes, zener diodes, bipolar junction transistors and field effect transistors. Biasing techniques and applications of diodes and transistors. Introduction to operational amplifiers and applications. Introduction to Digital Electronics.

2. Scope & Objective:

This is an introductory course mandatory for all first year students admitted in any discipline. While the students of electronics, instrumentation and computer science will take more advanced courses in electronics as a follow up, this course provides the basics of electronics to students of other disciplines to pursue their own discipline courses and also to venture into interdisciplinary electives. While no special prior preparation is expected, the course requires good understanding of calculus and familiarity with concepts of the physics of electricity and magnetism. The course introduces the concepts of linear circuits, circuit analysis techniques in time and frequency domains, semiconductor devices, and the basics of transformers and motors. A brief introduction to OpAmps and digital circuits is also given. Students are exposed to simple circuit simulation tools and encouraged to explore simulation exercises further on their own.

3. Text Books

Leonard S. Bobrow, Fundamentals of Electrical Engineering, Second Edition, Oxford University Press, 2005

4. Course Plan

Lect. No.	Topics to be covered	Learning Objectives	Ref. to Text Book
1-2	Basic circuit elements and laws	Independent and dependent sources, Resistors, KCL and KVL	1.1 to 1.5
3-5	Circuit Analysis Principles	Nodal and Mesh Analysis, Thevenin's and Norton's Theorems, Linearity and Superposition	2.1 to 2.3, 2.5, 2.6
6-9	Time Domain Analysis	Inductors, Capacitors and their VI relations, Responses of First-order and Second-order Circuits	3.1 to 3.6
10-12	AC Analysis	Time- and Frequency-domain analysis, Important Power Concepts	4.1 to 4.5
13-14	Poly-phase circuits	Star-Delta connection and conversion, Power in 3-phase circuits	4.6, 4.7
15-17	Frequency response	Frequency response, Bode Plot, and Resonance in Parallel and Series Circuits	5.1, 5.2
18-19	Basics of Semiconductors	Intrinsic and doped semiconductors, PN junction	6.1 to 6.3
20-22	Diode circuits and applications	Ideal and non-ideal diode models, Zener diode, rectifiers and clippers	6.4 to 6.7

23-27	Bipolar Junction Transistors (BJT)	pnp and npn transistors, cutoff and saturation, output characteristics and load line, BJT Biasing, BJT amplifiers	7.1 to 7.3, 9.1
28-29	FETs and MOSFETs	Introduction to JFET and MOSFET devices	8.1, 8.2
30-31	Electromagnetics	Basics of Magnetic fields and circuits	14.1, 14.2
32-34	Transformers	Introduction to transformers, regulation and efficiency	14.3, 14.4
35-37	Electrical machines	Introduction to rotating-coil devices, DC machines	15.3, 15.4
38	Operational Amplifiers	Introduction to Opamps, ideal amplifiers	2.4
39-41	Digital logic circuits	Logic operations, logic gates, Realisation of Boolean functions	11.3, 11.5, 11.6

5. Evaluation Scheme

Component	Duration	Weightage	Date & Time	Remarks
Mid Semester Examination	90mts.	30%	05/03/18, Monday, 11am -12:30 pm	Closed Book
Tutorial Tests/Quizes/Tutorial Attendance	--	30%		Closed/Open Book
Comprehensive Exam	3hrs	40%	01/05/18 (AN)	Part A- Closed Book Part B- Open Book

6. Chamber consultation hours: **To be announced in the class.**

7. Make-up policy: **Make up will be granted only in genuine cases. Request for make up to be made in advance, except in cases of emergencies.**

8. Notices : Notice regarding the course will be displayed on the course website (@ moodle).

Instructor-in-Charge
EEE F111