



### Course Handout (Part II)

Dated: 07 / 01 /2016

In addition to part-I (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** : ABHIJIT ASATI (abhijit\_asati@pilani.bits-pilani.ac.in)  
**Team of Instructors** : Navneet Gupta Dheerendra Singh, Parikshit K Singh, Hitesh Dutt Mathur, A Anand Kumar, G Meenakshi Sundaram, Hari Om Bansal, Kusum Lata, Anshuman Dalvi, Subhashis Gangopadhyay, Praveen Kumar A V, Rajneesh Kumar, Lucky Sharan Harshvardhan S, Ananth Krishna Chintapalli, Devesh Samaiya, Ashish Patel, Rahul Singhal, KK Gupta, K Srinivas Reddy.

- Course Description:** Course covers Basics of electrical circuit elements, Kirchhoff's law, Network analysis and Network theorems, Transient analysis of first order and second order circuits, Semiconductors and diodes, Basic operation and characterization of transistors (BJT and FET), Basics of operational amplifiers and its application, AC circuit analysis, Frequency response, Filters, Magnetic circuits and B-H curves, Transformer, Overview of electrical machines.
- Scope and Objective of the course:** The principal objective of this course is to teach the principles of three different aspects of electrical sciences (1) Circuits (2) Electronics and (3) Electro magnetics to the student composed of mixed disciplines.
- Text Books:**  
**Leonard S. Bobrow and Navneet Gupta**, Foundations of Electrical Engineering, Oxford University Press, Asian Edition, 2013.  
**Reference Books:**  
1. Allan R Hambley, Electrical Engineering: Principles and Applications; 5<sup>th</sup> Edition, Prentice Hall of India, 2011.

#### 4. Course Plan:

Lec.	Learning Objective	Coverage	Ref.(TB)
1-2	To study basic circuit elements and the laws	Basic circuit elements (Voltage, current sources, and Resistors), Kirchhoff's law (KCL and KVL), Current division, voltage division, instantaneous power, Inductors, Capacitor	1.1 -1.7
3	To study the types of sources in network analysis	Independent and Dependent sources, Source transformation	1.8
4-5	To study circuit analysis techniques	Nodal analysis and Mesh analysis	2.1- 2.3
6-8	To study various network theorems	Network Theorems (Thevenin's, Norton's, Maximum Power Transfer Theorem and Superposition)	2.4,2.6
9-12	To study circuits having energy storing elements	Transient response of first and second order circuit (Natural and Forced)	3.2-3.5
13-14	To study about phasors and phasor algebra.	Time-domain analysis, Waveforms, Form factor, Phasor representation of alternating quantities, j operator and Phasor algebra, frequency-domain analysis	4.1,4.2, 4.3
15-17	To study the concept of power in AC circuits	Average Power, apparent power and complex power	4.4,4.5
18-19	To study the poly-phase	Three phase Circuits (Y & Δ connections)	4.6





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	circuits		
20-22	To study the frequency response and resonance	Frequency response, Filters (Low Pass, High Pass and Band Pass), Resonance & Quality factor	5.1,5.2
23-25	To study basics of semiconductors and diodes	Basics of Semiconductors, PN junction, Junction diode, ideal diode and applications (rectifiers and clippers)	6.2(partly), 6.3, 6.4
26-27	To study the breakdown mechanisms in semiconductor diodes	Zener diodes (its model and application as voltage regulation and clipper)	6.6
28-30	To study the construction and operation of Bipolar Junction Transistors	Basic operation and characteristics of BJT	7.1-7.3
31-33	To study the construction and operation of Field Effect Transistors	Basic operation and characteristics of JFET and MOSFET	8.1,8.2
34	To study circuit analysis techniques with OPAMP	Basics of operational amplifier and its application	10.1
35-36	To study the fundamentals of electromechanics	Analogy between electrical & magnetic circuits, B-H curves	13.1, 13.2 (partly) 13.3-13.4
37-38	To study the magnetic effects associated with transformer	Lenz's law, Transformers, Ideal transformer	13.8-13.9
39-40	To study the physical structure and basic working of DC/ AC machines	Basics of rotating machines	15.1 -15.2 (Partly)

5. Evaluation Scheme:

S No.	Evaluation Component	Duration	Marks (300)	Weightage	Date & Time	Nature of Component
1.	Mid-Sem Test	90 min.	105	35%	16/3 11:00 - 12:30 PM	Closed Book
2.	Surprise quiz	10 min	60	20%	During Common Hour	Closed Book
3.	Comprehensive	3 hrs.	135	45%	7/5 AN	Closed + Open Book

6. **Chamber Consultation Hour:** Will be displayed on the notice board of FD-II.

7. **Course Notices:** All notices of this course will be displayed on the **FD-II notice board only**

8. **Make-up Examination:** No make-up will be given for surprise quizzes, however for other components; make-up will be given **ONLY** in cases of sickness (hospitalization) or urgency for going out of station. In such case student must produce the sufficient proof or must have taken the prior permission from the IC.

Instructor-in-Charge  
**EEE F111**



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