

ELL101 Introduction to Electrical Engineering

Course Handout

1. **Course Instructors:** Dr. Manav Bhatnagar, Dr. Subashish Datta, Dr. Debanjan Bhaumik, Dr. Harshan Jagadeesh

2. **Suggested Texts and Reference Material**

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| <ol style="list-style-type: none">1. Circuits, Devices and Systems, 5th Ed. 2007 Richard C. Dorf and Ralph J. Smith, Wiley 2007.2. Microelectronic Circuits: Theory And Applications: 7th Ed., A. S. Sedra, K. C. Smith, Oxford University Press, 20173. Electronic circuits: Analysis and Design, Donald Neamen, McGraw Hill Education, 2006.4. Digital Design, 3rd Ed., Morris Mano, Pearson 2001.5. Electrical Engineering Fundamentals, Vincent Del Toro, Prentice Hall, 1989.6. Fundamentals of Electrical Engineering, Leonard S. Bobrow, Oxford University Press 2003.7. Electrical & Electronic Technology 10th Ed., Edward Hughes, Prentice Hall, 2008.8. Electric Machinery, A. E. Fitzgerald, C. Kingsley and S. D. Umans, 6th Ed., McGraw-Hill, 2003 |
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3. Course Objective: To introduce the students to the basic concepts of electrical engineering so as to develop skills such that they can analyze analog and digital electronic circuits.

4. **Lecture Outline** (with topics and number of lectures)

Module no.	Topic	No. of lectures
1	Elements in an Electrical circuit: R, L, C, Diode, Voltage and current sources (independent and dependent/controlled sources).	2
2	DC circuits, KCL, KVL, Mesh and nodal analysis	3
3	Network theorems	3
4	Introduction to signal waveforms, Step response in RL, RC, RLC circuits (applications of solutions to first-order and second-order differential equations)	3
5	Introduction to impedance concepts, Phasor analysis of AC circuits, Single phase and 3-phase circuits	5
6	Introduction to Digital circuits	4

7	Two port network, BJT: CE and small signal model	4
8	Operational amplifiers: Model and applications	4
9	Magnetic circuits, Energy in magnetic field.	4
10	Transformers: Modeling and analysis; parameter determination	4
11	Electromechanical energy conversion principles with examples	4
12	Principles of measurement of voltage, current and power	2
Total Lecture hours (14 times 'L')		42

NOTE: Every week recorded lectures will be uploaded on IMPARTUS for streaming and MS Teams->files for downloading

5. Brief Description of Tutorial Activities:

Module no.	Description	No. of lectures
1	Elements in an Electrical circuit: R, L, C, Diode, Voltage and current sources (independent and dependent/controlled sources).	1
2	DC circuits, KCL, KVL, Network theorems, Mesh and nodal analysis	2
3	Step response in RL, RC, RLC circuits	2
4	Phasor analysis of AC circuits, Single phase and 3-phase circuits	2
5	Introduction to Digital circuits	1
6	Two port network, BJT: CE and small signal model	1
7	Operational amplifiers: Model and applications	1
8	Magnetic circuits, Transformers: Modeling and analysis; parameter determination	2

9	Energy in magnetic field. Electromechanical energy conversion principles with examples	1
10	Principles of measurement of voltage, current and power	1
Total Tutorial hours (14 times 'T')		14

Note: Live tutorials will be held for every section in the allotted Teams group in the allotted time slot.

Tutorials will start from 23-Nov-2020.

6. Evaluation Scheme/Grading:

Component	Weightage of Marks
Minor Exam	40
Major Exam	60

7.Contact:

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8.List of TAs Associated with the Course Instructors:

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