ECE101

Basics of Electrical & Electronics Circuits

Spring 2025

Prof. Dinkar Prasad

Sr. Professor, Electrical Engineering

Shiv Nadar Institution of Eminence, India

Class: B315, 9am -10am MWF

Office: C- 216E, Office Hours: Mon & Wed 12 pm to 1pm

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INSTITUTION OF EMINENCE DEEMED TO BE UNIVERSITY

DELHI NCR

Madhur Deo Upadhayay

ECE101

Basics of Electrical & Electronics Circuits

Spring 2025

Dr. Madhur Deo Upadhayay (SMIEEE, LMISTE, LMIETE)
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School	**S.O.E.**
Department	Electrical Engg.
Course Code	ECE101
Course Title	Basics of Electrical & Electronics Circuits
Credits (L:T:P)	3:1:1
Contact Hours (L:T:P)	3:1:2
Prerequisites	none
Course Coordinator/ Instructor(s)	Prof. Dinkar Prasad (L1 -B315) Dr. Madhur Deo Upadhayay (L2 -B016)
Major Core for	B Tech CSE/ Elect & Comp Engg/Mech
Major Elective for	NA
UWE	Yes

Co- Instructors for Tutorial & Lab

T1	Prof. R. K. Bansal	D106	3pm	Fri
T2	Prof. R. K. Bansal	D006	2pm	Mon
T3	Dr. Jitendra	B011	3pm	Wed
T4	Dr. Jitendra	D110	3pm	Fri
T5	Dr. Rohit	D226	3pm	Mon
T6	Dr. Rohit	D110	3pm	Wed
T7	Dr. Kamal Agrawal	B219	1pm	Mon
T8	Dr. Kamal Agrawal	A316	2pm	Mon

P1	Dr. Upendra	C201	1pm	Mon
P2	Dr. Upendra	C201	3pm	Mon
P3	Dr. Upendra	C201	1pm	Wed
P4	Prof. Dinkar	C201	3pm	Wed
P5	Prof. Dinkar	C201	1pm	Fri
P6	Dr. Sandeep Soni	C201	3pm	Fri
P7	Prof. Govind Sharma	C201	1:30pm	Tu
P8	Prof. Govind Sharma	C201	1:30pm	Thus

Enrolment/ blackboard/ ERP/ attendance related query : Mr. Ashraf Saeed (ashraf.saeed@snu.edu.in),

Office of Dean Academics

Course Summary

The topics covered in this course give an overview of basic principles of electrical and electronic circuits. The emphasis is on teaching the basic principles which will be the basis for more advanced courses in Electrical and Electronics Engineering curriculum. Moreover, the knowledge about these basic circuits will help students of other engineering departments too in understanding many interdisciplinary subjects. To supplement the theory part the course also has laboratory component as well as hands-on learning component in the form of several short projects.

Course Aims

- To teach the working principle of basic electrical and electronic circuits.
- To teach the methods required for analysis of electrical and electronic circuits.
- To provide students an opportunity to explore the exciting world of electrical and electronic circuits by doing hands-on type project work.
- To familiarize students with the basic electrical components, measuring devices and computer-aided tools.

Learning Outcomes

On successful completion of the course, students will be able to:

- Analyse electrical circuits of medium complexity.
- Explain working of simple electrical and electronic circuits/components.
- Design and test simple electrical and electronic circuits.
- Comfortably and safely use basic electrical components and measuring devices.

COURSE CONTENT

Basics of Electrical and Electronic Circuits

Basic Components of Electrical Circuits: Fundamental electrical variables – charge, current, voltage & power; Independent Voltage & Current sources; Ideal circuit elements - Resistor, Capacitor & Inductor; Controlled Source models – VCVS, VCCS, CCVS & CCCS - definitions & circuit models; Concepts of Linearity, Time-invariance & Passivity.

Linear D-C Circuits: Kirchhoff's laws, Series & Parallel combinations of resistances, Voltage & Current divisions, Analysis of resistive circuits using Loop & Node equations – with independent sources only, and with both independent and controlled sources.

Time-domain Analysis of LTI Circuits: Natural & forced responses of basic RC & RL circuits, Natural & forced responses of Series & Parallel RLC circuits.

Sinusoidal Steady State Analysis of A-C Circuits: Notions of phasors, impedance, admittance & transfer function; Frequency response vs transient response; Responses of RC, RL & RLC circuits – series & parallel Resonance; Simple passive Filters & their Bode plots; Loop & Node Analysis of a-c circuits with independent & controlled sources.

Useful Circuit Analysis Techniques: Superposition, Source transformations, Thevenin's equivalent, Norton's equivalent, Maximum Power transfer, Delta-wye conversions.

Basic Amplifiers: Amplifier parameters & controlled source models; VCVS model of an Opamp; Amplifiers using ideal OPAMP; Frequency response of basic OPAMP-based amplifiers.

Waveform Generators: Condition of harmonic oscillation; RC and LC oscillator circuits; Square wave generator using 555 Timer and Digital inverters (TTL/CMOS).

Lab. Mode: Hardware Circuit based Experiments and Hands on Projects

Lab. Name: Electronics Lab-1 (Room No. C201)

Any Standard Scientific Calculator (non-programmable) is compulsory in this course and It is also allowed during the exams. Eg. Casio fx-991MS / or equivalent.

RECOMMENDED BOOK(S)

1. Engineering Circuit Analysis, W. H. Hayt, Jack Kemmerly, Steven M. Durbin, Tata McGraw Hill.
2. Circuit theory and analysis by Robert L. Boylestad, Pearson publication.
3. Electronic Devices and Circuit Theory by Robert L. Boylestad, Louis Nashelsky, Pearson

ASSESSMENT PLAN

Quizzes: 15% (During class hrs, best 2 out of 3will be considered for grading)

Mid-Term: 20%

End-Term: 35%

Lab: 30%
- **Day–to–Day performance** (Lab. Report +lab. participation)= **10%** (5%+5%)
- **Project: 8%**
- **Viva/ Lab Quiz: 4%**
- **End sem lab exam: 8%**

Note: Passing Marks Cut-off : 35%

'A' Grade Cut-off Marks: 80%,

Minimum Attendance: 75%(As per SNU attendance Policy)

Thanks