COURSE HANDOUT

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING (EE-201)

BE-2ND SEMESTER

ACADEMIC YEAR (2024-25)

Dr. Suhaib Ahmed Batt

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SYLLABUS

Course Code	Course Name	Course Type	Cd	L	T	P	Marks		
							Sessional	Final Exam	Total
EE-201	Basic Electrical and Electronics Engineering	PCC	4	3	1	0	50	100	150

COURSE OUTCOMES

At the end of the course the student will be able to:	
CO1	Learn about application of network laws and theorems to design electric circuits.
CO2	Examine sinusoidal waveforms and classify measuring instruments.
CO3	Explain the construction and principle of operation of single-phase transformers and DC machines
CO4	Understand the characteristics of semiconductor devices and rectifier circuits.
CO5	Interpret the principle of various transistor configuration and characteristics.

Unit-I

Elementary Concepts of DC and AC Circuits: Recent advancements in Electrical Engineering, DC Circuit elements (R, L and C), Voltage and Current sources, Kirchhoff's Current and Voltage laws, mesh, and nodal analysis. Superposition, Maximum power transfer, Thevenin and Norton theorems.

(8 Hours)

Unit-II

Representation of Sinusoidal Waveforms: Peak and RMS values, Phasor representation, Real power, Reactive power, apparent power, power factor. Analysis of single-phase AC circuits. Classification of Instruments: Operating principle of Measuring Instruments.

(8 Hours)

Unit-III

Single phase Transformers and Machines: Principle of operation, ideal and practical transformer, equivalent circuit, losses in transformers, transformer testing, regulation and efficiency, Principle of operation of DC and AC machines.

(6 Hours)

Unit- IV

Semiconductor Devices and Applications: Evolution in Electronics (vacuum tubes to nano-electronics), Types and specifications of Resistor, Inductor, Capacitor and Color coding, PN junction and Zener diode characteristics, Types of diodes (Tunnel diode, Schottky diode, LED, photodiode, Varactor diode), Voltage Regulators, Wave Shaping Circuits (rectifiers, filters, clippers, and clampers).

(8 Hours)

Unit-V

Transistors and Biasing Circuits: BJT: Principle and operation of NPN transistor, configuration and characteristics (CB, CE, and CC), types of biasing circuit. Hybrid Parameters Introduction. Two port networks, hybrid model for CE, CC, CB configuration and their analysis using h-parameters, Miller theorem. FET: Principle of Operation and characteristics of JFET, biasing of FET, MOSFET and CMOS.

(10 Hours)

Textbooks

S.No	Name of the Books	Name of the Author	Publisher Name	Edition (Pub.Yr.)
1	Basic Electrical Engineering	D. P. Kothari and I. J. Nagrath	Tata McGraw Hill	4th (2019)
2.	Integrated Electronics	Millman and Halkias	Tata McGraw Hill	4th (2015)

Reference Books

S.No	Name of the Books	Name of the Author	Publisher Name	Edition (Pub.Yr.)
1	Basic Electrical Engineering	A. E. Fitzgerald, David E Higginbotham and Arvin Grabel	Tata McGraw Hill	5th (2009)
2	Electronics Devices and Circuit Theory	Boylstead	Pearson Education	11th (2015)
3	Electronic Principles	Melvino Leach	Tata McGraw Hill	7th (2017)

COURSE PLAN		
Unit-I Elementary Concepts of DC and AC Circuits		
S.No	**Topics**	**Recommended Books**
1	Elementary Concepts of DC and AC Circuits	Book 1, Ch.1
2	Recent advancements in Electrical Engineering	Book 1, Ch.1
3	DC Circuit Elements (R, L, C)	Book 1, Ch.1
4	Voltage and Current sources, Kirchhoff's current and Voltage Laws	Book 1, Ch.1
5	Mesh and Nodal analysis	Book 1, Ch.1
6	Superposition Theorem	Book 1, Ch.2
7	Maximum Power transfer Theorem	Book 1, Ch.2
8	Thevenin & Norton Theorems	Book 1, Ch.2
Unit-II Representation of Sinusoidal Waveforms		
9	Representation of Sinusoidal Waveforms	Book 1, Ch.4
10	Peak and RMS values	Book 1, Ch.4
11	Phasor representation	Book 1, Ch.4
12	Real power	Book 1, Ch.4
13	Reactive power, apparent power	Book 1, Ch.4
14	Power factor	Book 1, Ch.4
15	Analysis of single-phase AC circuits.	Book 1, Ch.4
16	Classification of Instruments: Operating principle of Measuring Instruments	Book 1, Ch.4
Unit-III Single Phase Transformer and Machines		
17	Single phase Transformers and Machines	Book 1, Ch.8
18	Principle of operation, ideal and practical transformer	Book 1, Ch.8
19	Equivalent circuit	Book 1, Ch.8
20	Losses in transformers	Book 1, Ch.8
21	Transformer testing, regulation, and efficiency	Book 1, Ch.8
22	Principle of operation of DC and AC machines	Book 1, Ch.8
Unit-IV Semiconductor Devices and Application		
23	Evolution in Electronics (vacuum tubes to nano-electronics)	Book 2, Ch.1
24	Types and specifications of Resistor, Inductor, Capacitor and Color coding	Book 2, Ch.1
25	PN junction	Book 2, Ch.3
26	Zener diode and its characteristics	Book 2, Ch.3

27	Types of diodes (Tunnel diode, Schottky diode)	Book 2, Ch.3
28	Types of diodes (LED, photodiode, Varactor diode)	Book 2, Ch.3
29	Voltage Regulators	Book 2, Ch.3
30	Wave Shaping Circuits (rectifiers, filters, clippers and clampers).	Book 2, Ch.4
Unit-V Transistors and Biasing Circuits		
31	Transistors and Biasing Circuits: BJT: Principle and operation of NPN transistor	Book 2, Ch.5
32	Configuration and characteristics (CB)	Book 2, Ch.5
33	Configuration and characteristics (CE, and CC)	Book 2, Ch.5
34	Types of biasing circuit.	Book 2, Ch.9
35	Hybrid Parameters Introduction	Book 2, Ch.8
36	Two port networks, hybrid model for CE, CC, CB configuration and their analysis using h-parameters	Book 2, Ch.8
37	Miller theorem	Book 2, Ch.8
38	FET: Principle of Operation and Characteristics	Book2, Ch. 10
39	Biasing of JFET	Book2, Ch. 10
40	MOSFET and CMOS	Book2, Ch. 9 & 10

ADDITIONAL WEB RESOURCES

1.	**MOOC:** Linear Circuits 1: DC Analysis https://www.coursera.org/learn/linear-circuits-dcanalysis
2.	**NPTEL:** Video lectures on Fundamentals of Electronic Engineering https://onlinecourses.swayam2.ac.in/nou24_ec04/preview

GRADING AND ASSESSMENT

- **Sessional Test**: 20 marks
- **Assignment**: 20 marks
- **Attendance**: 10 marks
- **Final Examination**: 100 marks

COURSE POLICIES

- **Attendance**: Minimum 75% attendance is mandatory to appear in the final examination of the course.
- **Academic Integrity**: MIET's academic integrity policies apply. Plagiarism will not be tolerated.
- **Late Submissions**: Assignments and projects must be submitted by the specified timelines.

FACULTY INFORMATION

- **Office Hours**

  Tuesday (12:55 PM - 1:45 PM)
  Friday (12:55 PM - 1:45 PM)

- **Contact Information**
  suhaib.ece@mietjammu.in