



MARRI LAXMAN REDDY INSTITUTE OF TECHNOLOGY AND MANAGEMENT

(AN AUTONOMOUS INSTITUTION)

(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)

Accredited by NAAC with 'A' Grade & Recognized Under Section 2(f) & 12(B) of the UGC act, 1956

COURSE CONTENT

INTRODUCTION TO ELECTRICAL ENGINEERING								
I Semester: ECE								
Course Code	Category	Hours/Week			Credits	Maximum Marks		
2510203	Foundation	L	T	P	C	CIA	SEE	Total
		2	0	0	2	40	60	100
Contact Classes:45	Tutorial Classes: Nil	Practical Classes: Nil			Total Classes:45			
Prerequisites: Mathematics.								

Course Overview:

This course introduces the fundamentals of electrical engineering, including DC and AC circuit analysis, transformers, electrical machines, and electrical installations. Students learn basic circuit laws, power concepts, operation of machines, and practical aspects such as switchgear, wiring, earthing, batteries, energy calculation, and power factor improvement, providing a strong foundation for electrical engineering applications.

Course Objectives:

1. To understand the basic laws of simple DC networks.
2. To learn the fundamentals of single-phase AC circuits and three-phase systems.
3. To understand the working principles of transformers and performance parameters.
4. To study the operation and characteristics of DC machines, induction motors, and synchronous generators.
5. To understand electrical installation components and perform calculations related to switchgear, earthing, and batteries.

Course Outcomes: After Completion of the Course, Students should be able to

1. Analyze DC circuits using KVL, KCL, and Thevenin's and Norton's theorems.
2. Elucidate single-phase and three-phase AC circuits.
3. Evaluate transformer parameters, equivalent circuit, losses, voltage regulation, and efficiency.
4. Analyze DC shunt machine performance, torque-slip characteristics of induction motors, and operation of synchronous generators.
5. Perform electrical calculations for energy consumption and identify installation components.

UNIT - I: D.C. Circuits: Introduction to R, L and C elements, Independent voltage and current sources, KVL & KCL, analysis of simple circuits with dc excitation. Superposition, Thevenin and Norton Theorems.

UNIT - II: A.C. Circuits: Introduction to sinusoidal waveforms, phasor representation, the concept of power and power factor, Analysis of 1-phase RLC series and parallel circuits, resonance in series R-L-C circuit. Three-phase balanced circuits, voltage and current relations in star and delta connections.

UNIT - III: Transformers: Principle of operation, equivalent circuit, losses, regulation and efficiency. Introduction to Auto-transformer.

UNIT - IV: Electrical Machines: Principle of operation of DC machine, performance characteristics of dc shunt machine. Principle of operation of 3-phase induction motor, torque-slip characteristics. Principle of operation of synchronous generator.

UNIT - V: Electrical Installations: Components of LT Switchgear: SFU, MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, and Characteristics. Elementary calculations for energy consumption, power factor improvement and battery backup.

TEXTBOOKS:

1. D.P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 4th Edition, 2019.
2. MS Naidu and S Kamakshaiah, "Basic Electrical Engineering", Tata McGraw Hill, 2nd Edition, 2008.

REFERENCEBOOKS:

1. P. Ramana, M. Suryakalavathi, G.T. Chandrasheker, "Basic Electrical Engineering", S. Chand, 2nd Edition, 2019.
2. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009
3. M. S. Sukhija, T. K. Nagsarkar, "Basic Electrical and Electronics Engineering", Oxford, 1st Edition, 2012.
4. Abhijit Chakrabarthy, Sudipta Debnath, Chandan Kumar Chanda, "Basic Electrical Engineering", 2nd Edition, McGraw Hill, 2021.
5. L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011.
6. E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
7. V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989

ELECTRONIC RESOURCES:

1. https://www.engineer4free.com/circuits.html?utm_source=chatgpt.com
2. https://wizape.com/English/Electrical-Engineering-Fundamentals?utm_source=chatgpt.com
3. https://archive.nptel.ac.in/courses/108/102/108102146/?utm_source=chatgpt.com
4. https://alison.com/course/electrical-engineering-electrical-transformer-components?utm_source=chatgpt.com

MATERIALS ON LINE:

1. Course template
2. Tutorial question bank
3. Tech talk and Concept Video topics
4. Open-ended experiments
5. Definitions and terminology
6. Assignments
7. Model question paper–I
8. Model question paper–II
9. Lecture notes
10. E-Learning Readiness Videos (ELRV)