GUJARAT TECHNOLOGICAL UNIVERSITY

Syllabus for Bachelor of Vocation (B.Voc.), 1st Semester
Branch: Solar & Renewable Energy
Subject Name: Fundamental of Electrical Engineering-1
Subject Code: 1110703

Type of course: Core

Prerequisite: NA

Rationale: The course "Fundamentals of Electrical Engineering-I" is to provide students with a solid foundation in the principles and concepts of electrical engineering.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
				Theory Marks		Practical		
L	T	P	C	ESE (E)	PA(M)	ESE (V)	PA (I)	
3	0	0	3	50	0	0	0	50

L- Lectures; T- Tutorial/Teacher Guided Student Activity; P- Practical; C- Credit; ESE- End Semester Examination; PA- Progressive Assessment

Contents:

Sr. No.	Content	Total Hrs.	Module % Weightage
1	**Introduction:** Charge, Current, Potential, voltage, power, Energy, Electrical Resistance and its Unit, Ohms law: applications and limitations Specific Resistance and its unit. Parameters affecting the resistance, Effect of temperature on resistance and temperature co-efficient, potential difference; EMF, Work, Power, Energy, Joul's Law, Series-Parallel Circuit.	10	20
2	**Electrical Circuits:** Concept of Open circuit, Closed circuit, Short circuits, Definitions of node, branch, loop, mesh, Kirchhoff's Voltage and Current law (KVL and KCL), Mesh Analysis and Nodal Analysis of Networks, Principle of Duality	08	20
3	**Network Theorem:** Linear & Nonlinear circuit, Active and Passive Network, Super Position Theorem, Thevenin's Theorem, Norton's Theorem Maximum Power Transfer Theorem, Reciprocity Theorem, Star delta transformation	10	25
4	**Electrostatic & Capacitors:** Definitions of Electrostatic, types of capacitors, series, parallel combinations & related circuit calculations in brief charging & discharging of capacitor. Energy stored in capacitor.	06	15
5	**Electromagnetic Induction:** Magnetic Circuit , Comparison Between Electric And Magnetic Circuits , Series/Parallel Magnetic Circuit Calculations , Magnetic Hysteresis, Hysteresis And Eddy Current Loss, Magnetic Materials, Electromagnetic induction, Statically And Dynamically Induced E.M.F.S in brief, Fleming's Right hand rule-Left hand rule, Coefficients Of Self And Mutual Inductances, Coefficient Of Coupling, Series/Parallel Combinations Of Inductances, Rise And Decay Of Current In Inductive Circuits , Force Experienced By Current Carrying Conductor Placed In Magnetic Field	08	20
	Total	**42**	**100**

Reference Books:

1. B. L. Theraja, "Electrical Technology – Part I", S. Chand and Co. 2012
2. J. B. Gupta, "Basic Electrical Engineering", S. K. Kataria & Sons. 2019

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
20	10	10	10	--	--

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Createand above Levels (Revised Bloom's Taxonomy)

Course Outcomes:

Sr. No.	CO Statement	Marks % Weightage
CO-1	Understand the basic concepts and principles of electrical engineering.	20%
CO-2	Apply fundamental Electrical theorem to solve Electrical Circuit	45%
CO-3	Understand the fundamental principles of electrostatics, electric fields, and electric potential.	15%
CO-4	Understand the fundamental principles of electromagnetic induction, inductor and its response curve while DC excitation	20%

List of Open Source Software/learning website:

https://nptel.ac.in.