Course Description

TITLE **:** Electrical Science- I
Course Code : IEC102
CREDITS : 3-1-0-2
TYPE-WHEN : Monsoon-2018
FACULTY NAME : Rambabu Kalla
PRE-REQUISITE : None
OBJECTIVE : To get familiar with analysis of linear electric circuits.

COURSE TOPICS :

INTRODUCTION

Introduction to Systems, Linear Systems, Electrical Systems/Circuits, Charge, Current, Voltage, Power, Voltage and Current Sources, Ohm's law, KCL, KVL, Loops and Nodes, Series and Parallel Connections, Voltage and Current Division.

CIRCUIT ANALYSIS AND THEOREMS

Nodal Analysis, Mesh Analysis, Super Mesh and Super Node, Principles of Linearity, Superposition, Superposition Theorem, Thevenin and Norton Theorems and their Equivalent Circuits, Maximum Power Transfer Theorem, Source Transformations, Delta-Wye Conversion.

TIME DOMAIN ANALYSIS

Capacitor, Inductor and their Combinations, Principle of Duality, RL and RC Circuits - Transient Response (Source Free Response), Introducing Forcing Functions - Step and Rectangular Pulse, Complete Response - Natural and Forced Response, Natural Response of an RLC circuit, Cases of Damping, Complete Response - Forced and Natural Response.

SINUSOIDAL STEADY-STATE ANALYSIS

Sinusoidal and Complex Forcing Functions and their Characteristics, Forced Response to Sinusoidal Functions, Phasors, Impedance, Admittance, Phasor Diagrams.

TWO PORT NETWORKS

Characterization of a Four-terminal Network based on its Terminal Voltages and Currents, Two-port Parameters – Impedance, Admittance, Hybrid and Transmission Parameters.

PREFERRED TEXT BOOKS: Fundamentals of Electric Circuits by Alexander & Sadiku

***REFERENCE BOOKS:** Engineering Circuit Analysis by Hayt, Kemmerly, & Durbin
Engineering Circuit Analysis by Irwin & Nelms
Circuits, Devices and Systems by Smith & Dorf

GRADING PLAN:

Type of Evaluation	Weightage (in %)
Assignments/Quizzes	**15**
Mid Exam	**35**
End Semester or Final Exam	**50**

OUTCOME: Systematically analyze a given linear electric circuit by writing down the equations characterizing them and solving them.