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Department of Electrical Engineering	
Electrical and Electronic Circuits (63291)	
Total Credits	**3**
major compulsory	
Prerequisites	P1 : General Physics II (22102)

Course Contents

A brief introduction about electric circuits &physics theories.Ohms Law, series resistors, parallel resistors &passive sign convention

	Intended Learning Outcomes (ILO's)	Student Outcomes (SO's)	Contribution
1	To understand the DC analysis of electrical circuits,to do mathematical calulations and solving different circuits using different techniques such as Nodal analysis, Mesh-Analysis technique, Superposition, Transformation, Thevenins and Norton's theorems, and the Power Analysis.	A	35 %
2	To understand the AC (Sinusoidal Steady State) analysis and design of electrical circuits, and the Instantaneous &average power, maximum average power transfer Analysis, and the three phase systems.	C	30 %
3	An ability to analyze important electronic circuits, to understand and solve electronic problems of Semiconductor devices and diode circuits,Transistors with characteristics, applications. Applications of Basic BJT amplifiers: analysis and design.	A	35 %

Textbook and/ or Refrences

Fundamentals of Electric Circuits, 3rd Edition, Alexander &Sadiku McGraw Hill, 2007.Principles of Electronics ,11TH Edition V.K Mehta S.Chand 2008 Electronic Devices &Circuit Theory, 7th Edition Louis Nashelsky, Printice Hall

Assessment Criteria	Percent (%)
First Exam	20 %
Second Exam	20 %
Homeworks	10 %
Final Exam	50 %

Course Plan

Week	Topic
1	Basic Concepts 1.1 Revision of simple physics theories 1.2 Fundamentals of atom theory 1.3 Charge carriers and free electrons 1.4 Classification of elements 1.5 Definition of current, voltage, power &energy 1.6 Transmission of a Random process Through a linear time invariant filter 1.7 Solving problems
2	Basic Laws 2.1 Ohms law &resistivity 2.2 Open &short circuit models 2.3 Resistance &conductance 2.4 Circuit terms (Nodes, Branches &Loops) 2.5 Kirchhoffs Laws (Kirchhoffs voltage law, Kirchhoffs current law) 2.6 Series &Parallel Resistors
3	Methods of Analysis 3.1 Series resistors &voltage division 3.2 Parallel resistors &current division 3.3 Wye-Delta Transformation 3.4 Solving intermediate &advanced problems
4	First Exam
5	3.5 Nodal analysis 3.6 Super-node technique 3.7 Solving equations with 2 &3-unknowns using substitution and matrix techniques

6	Circuit Theorems 4.1 Mesh-Analysis technique 4.2 Super-Mesh 4.3 Thevenins Theorem 4.4 Norton Theorem 4.5 Solving Problems
7	Capacitor &Inductor 6.1 Capacitors 6.2 Series &Parallel Capacitors 6.3 Inductors 6.4 Series &Parallel Inductor
8	Sinusoids &Phasors 9.1 Sinusoids 9.2 Phasors 9.3 Phasor relationships for Resistor, Inductor &Capacitor 9.4 Impedance &Admittance 9.5 Kirchhoffs Laws in Frequency domain
9	Sinusoidal Steady State Analysis 10.1 Current division &voltage division in phasor-domain 10.2 Nodal analysis in phasor domain 10.3 Mesh analysis in phasor domain 10.4 Thevenin &Norton Equivalent circuits in phsor domain Second Exam
10	AC Power Analysis 11.1 Instantaneous &average power 11.2 Maximum average power transfer 11.3 Effective or RMS value 11.4 Apparent power and power factor 11.5 Complex Power
11	Analysis of balanced three phase circuits
12	Electronics 12.1 Semiconductor theory, p-n junction 12.2 Semiconductor devices and diodes 12.3 Diodes applications including rectification, clamped, clipping and voltage multiplication
13	12.4 Special purpose diodes, properties, analysis and application
14	12.5 Transistor BJT and MOSFET: characteristics, application, mathematical equation And applications
15	12.6 Basic BJT amplifiers: analysis and design