SCHEME OF COURSE WORK Course

Details:

Course Title	: BASIC ELECTRICAL AND ELECTRONICS ENGINEERING		
Course Code	: 22EE11D3	L T 1) C	: 3 0 0 3
Program:	: B. Tech		
Specialization:	: MECHANICAL ENGINEERING		
Semester	: 11 SEM		
Prerequisites	: PHYSICS, MATHS.		
Courses to which it is a prerequisite			

Course Outcomes (COs): At the end of the course students will be able to:

I	Analyze the behavior of an electrical circuit
2	Measure the performance quantities such as losses, efficiency ofDC machines
3	Measure the performance quantities such as losses, efficiency ofAC machines
4	Understand the importance and application ofp-n junction diode
5	Evaluate the configurations and applications of Op-Amps.

Program Outcomes (POs): The graduate of Mechanical Engineering will be able to:

	Ability to apply knowledge of mathematics, science, and mechanical engineering.
2	Ability to identify, formulate, analyzing and solve mechanical engineering problems.
3	Ability to design a system, component, or process to meet desired needs including both thermal and mechanical systems.
4	Ability to apply innovative thinking capabilities to carry out the research, conduct experiments, interpret and analyze data, and report results.
5	Ability to apply current software tools and equipment to analyze mechanical engineering roblems.
6	Ability to contribute to society through innovation, enterprise and leadership.
7	The broad education necessary to understand the impact of mechanical engineering solutions in a global and societal context.
8	Ability to understanding of ethical and social responsibility.
9	Ability to carry out tasks by working independently and also in a group of engineers.
10	Abilit to communicate effectivel in both verbal and written forms.
	Ability to exhibit project and finance management skills to manage projects.
12	Awareness of the need for and ability to engage in lifelong learning.

Course Outcome versus Program Outcomes:

Assessment		Assignment / Quiz / Seminar / Case Stud / Mid-Test / End										
COS	POI	P02	P03	P04	P05	P06	P07	P08	P09	POIO	POI 1	P012

co-I												
co-2												
co-3												
CO-4												
co-5												

S - Strongly correlated, M - Moderately correlated, Blank - No correlation

Teachinq-Learninq and Evaluation

	TOPIC / CONTENTS	Course Outcomes	Sample questions	TEACHIN LEARNIN STRATEG	Assessment Method & Schedule
1	UNIT-I BASIC LAWS AND THEOREMS: Ohm's law, Kirchoffs Laws, series and parallel circuits	COI	1. State KCL and KVL 2. Problems on Kirchoffs laws and series, parallel circuits	[a] Lecture [a] Problem Solving	Assignment (Week 5) Mid-Test 1 (Week 8) Quiz (Week 6)
2	Source transformations, delta-wye conversion. Mesh analysis, nodal analysis	COI	l. Problems on source transformation concept. 2. Derivation on star to Delta conversion 3. Problems on star to delta conversion. 4. Problems on mesh and nodal anal sis	[a] Lecture Problem solving	Assignment (Week 5) Mid-Test 1 (Week 8) Quiz (Week 6)
3	Network Theorems superposition theorem, Thevenin's theorem, Norton's theorem, maximum power transfer theorem	COI	1. Applying theorems and calculate the response (voltage/ current) for a given network	[a] Lecture [a] Problem solving	Assignment (Week 5) Mid-Test 1 (Week 8) Quiz Week 6
4	UNIT-II DC MACHINES Constructional features Induced EMF and torque expression	C02	l. Explain the construction details of the D.C Machine. 2. Explain the principal of operation of the D.C.Generator. 3. Derive the torque expression of D.C.M0tor	Lecture Problem Solving	Assignment (Week 5) Mid-Test 1 (Week 8) Quiz (Week 6)
5	Different types of excitation, performance characteristics of different types of dc machines	C02	l. Explain about the classification of D.C.M0tor. 2. Dram and explain the OCC of Shunt generator	Lecture Problem Solving	Assignment (Week 5) Mid-Test 1 (Week 8) Quiz (Week 6)
6	3-point starter	C02	l. Draw the diagram of 3 -point starter and explain the importance of starter.	Lecture Problem Solving	Assignment (Week 5) Mid-Test 1 (Week 8) Quiz (Week 6)

7	losses and efficiency, efficiency by direct loading	C02	1. Explain about various losses in DC Machine. 2. Describe in detail about brake test on D.C.Motor	[a] Lecture [a] Problem Solving	Assignment (Week 5) Mid-Test 1 (Week 8) Quiz (Week 6)
8	Mid-Test 1		UNIT 1, 11		
9	UNIT 111- A.C Machines Transformers: Constructional details, EMF equation	C03	l . Explain working principle of transformer? 2. Derive EMF equation of transformer	[a] Lecture Problem solving	Assignment (Week 17) Mid-Test 2 (Week 21) Quiz Week 19
10	voltage regulation, losses and efficiency	C03	l . Define voltage regulation. 2. Explain about various losses in single phase transformer.	[a] Lecture [a] Problem Solving	Assignment (Week 17) Mid-Test 2 (Week 21) Quiz (Week 19)
11	open/short- circuit tests and determination of efficiency	C03	1. Explain about open circuit on a single phase transformer and derive the expression for efficiency 2. Problems on efficiency calculation	[a] Lecture [a] Problem Solving	Assignment (Week 17) Mid-Test 2 (Week 21) Quiz (Week 19)
12	Three Phase Induction Motors: Construction, working principle	C03	1. Explain about the working principle of 3-phase induction motor. 2. Discuss In detail about the construction of 3-phase induction motor	[a] Lecture [a] Problem Solving	Assignment (Week 17) Mid-Test 2 (Week 21) Quiz (Week 19)
13	Torque and Torque-Slip characteristics, efficiency	C03	l . Draw the torque-slip characteristics of 3-phase induction motor. 2. Derive the torque expression for 3phase induction motor	[a] Lecture [a] Problem Solving	Assignment (Week 17) Mid-Test 2 (Week 21) Quiz (Week 19)
14	Synchronous Motor: Construction, EMF Equation, working principle	C03	l . Derive EMF equation of alternator 2. Explain the working principle of synchronous motor	[a] Lecture [a] Problem Solving	Assignment (Week 17) Mid-Test 2 (Week 21) Quiz (Week 19)
15	Unit IV: Semiconductor Devices p-n Junction diode - Basic operating principle, current-voltage characteristics	C04	1. Draw V-I characteristics of Diode 2.Explain about the working of P-N junction diode	[a] Lecture [a] Problem Solving	Assignment (Week 17) Mid-Test 2 (Week 21) Quiz (Week 19)
16	rectifier circuits (half-wave, full-wave, rectifier with filter capacitor), Zener diode as Voltage Regulator	C04	l. Compare half wave and full wave rectifiers. 2. Explain how Zener diode acts as a voltage regulator	[a] Lecture [a] Problem Solving	Assignment (Week 17) Mid-Test 2 (Week 21) Quiz (Week 19)

17	Metal oxide semiconductor field effect transistors (MOSFET): Operation of NMOS and PMOS FETs, MOSFET as an amplifier and switch	C04	1. Draw the switching characteristics of MOSFET. 2. Explain about the operation of MOSFET as an amplifier	[a] Lecture [a] Problem Solving	Assignment (Week 17) Mid-Test 2 (Week 21) Quiz (Week 19)
18	Unit-V : Operational Amplifiers The Ideal Op Amp, The Inverting Configuration, The closed loop gain, Effect of Finite open-loop gain	C05	1. Write any four characteristics of ideal op-amp 2. Draw the equivalent circuit diagram of Op-Amp	[a] Lecture [a] Problem Solving	Assignment (Week 17) Mid-Test 2 (Week 21) Quiz (Week 19)
19	The Non Inverting Configuration, The closed loop gain, Characteristics of Non Inverting Configuration, Effect of finite open loop gain	C05	l . Explain how Op- Amp works in noninverting mode and derive the gain expression. 2. Compare inverting and non-inverting configurations	[a] Lecture [a] Problem Solving	Assignment (Week 17) Mid-Test 2 (Week 21) Quiz (Week 19)
20	the voltage follower, Difference amplifiers, A Single Op-amp difference amplifier.	C05	l. Explain how Op-Amp act as a voltage follower. 2. Derive the gain expression for difference amplifier	Lecture Problem Solving	Assignment (Week 17) Mid-Test 2 (Week 21) Quiz (Week 19)
21	MID TEST-2				
22	SEMESTER END EXAM				