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COURSE PLAN

Subject code: BE8452

Branch/Year/Sem/Section: B.E BME/II/IV

Subject Name: BASICS OF ELECTRICAL ENGINEERING Batch: 2018-2022

Staff Name: L.GLARIDA AMALA

Academic year: 2018-2019

COURSE OBJECTIVE

1. To introduce the fundamental concepts of electrical circuits connections with load.
2. To understand the basic theory, operational characteristics of AC and DC machines
3. To study the operating principles of measuring instrument for V, I, energy, power.
4. To create awareness on the methods for electrical safety, load protection.
5. To observe the electricity supply sources based on classical and standalone systems.

TEXT BOOK:

T1. Dr. D P Kothari, Prof I J Nagrath, —Basic Electrical Engineering, 3rd Edition, Tata McGraw-Hill, 2009.

T2. P.C. Sen, Principles of Electrical Machines and Power Electronics, Wiley, 2016 (Reprint)

REFERENCES:

R1. Joseph Edminister, Mahmood Nahvi, —Schaum's Outline of Electromagnetics, 4th Edition, Tata McGraw-Hill, 2013

R2. Vijay kumar Garg, Basic Electrical Engineering (A complete Solution), Wiley Reprint 2015

WEB RESOURCES

W1: https://www.webopedia.com/DidYouKnow/Hardware_Software/mobile-operating-systems-mobile-os-explained.html (TOPIC NO: 43)

W2: https://www.techotopia.com/index.php/IOS_6_Architecture_and_SDK_Frameworks
(TOPIC NO: 44)

W3: https://developer.apple.com/library/archive/documentation/MacOSX/Conceptual/OSX_Technology_Overview/CoreOSLayer/CoreOSLayer.html (TOPIC NO: 45)

TEACHING METHODOLOGIES:

- BB - BLACK BOARD
- VIDEO - VIDEO TUTORIAL
- PPT - POWER POINT PRESENTATION



DEPARTMENT OF BIOMEDICAL ENGINEERING

EE8452 BASICS OF ELECTRICAL ENGINEERING L T P C

3 0 0 3

UNIT I ELECTRICAL CIRCUITS AND ANALYSIS

9

Ohm's law, DC and AC circuits fundamentals, Energy sources, Kirchhoff's laws, Mesh and Nodal analysis, Star -delta and Delta -star transformation; theorems and simple problems : Superposition, Thevenin's, Maximum power transfer theorem.

UNIT II ELECTRICAL MACHINES

9

DC Machines: D.C generators & D.C motors: Principle of operation, constructions, types, Applications - A.C Machines: Types - Introduction to Alternators - Single Phase and Three phase induction motors: principle of operation, Types and Applications - Transformers : Principles of operation, Constructional Details, Types and Applications.

UNIT III BASIC ELECTRICAL INSTRUMENTATION

9

Introduction, classification of instruments, operating principles, essential features of measuring instruments (elementary Treatment only) - Moving coil, permanent magnet (PMMC) instruments, Moving Iron of Ammeters and Voltmeters Energy meter, Current Transformer, Potential Transformer.

UNIT IV ELECTRICAL WIRING AND SAFETY

9

Cable and wire types and applications, Service mains, meter board and distribution board. Brief discussion on concealed conduit wiring. Two-way and three-way control. Elementary discussion on Circuit protective devices: fuse and Miniature Circuit Breaker (MCB's). Electric shock, precautions against shock, Objectives for Neutral and Earthing, types of earthing; pipe and plate earthing, Residual current circuit breaker.

UNIT V ELECTRICAL POWER SYSTEM AND ITS APPLICATION

9

Introduction to Power generation, distribution and Transmission. Power supply circuits with SMPS, UPS, Batteries : Types, Principle of operation. Smart Grid based on solar and wind energy systems - Electrical vehicle charging, Application of Computer in Electrical Grid, Power Tariffs.

TOTAL: 45 PERIODS

Topic No	Topic Name	Books For reference	Page No	Teaching Methodology	No of periods required	Cumulative periods
UNIT I ELECTRICAL CIRCUITS AND ANALYSIS (9)						
1.	Ohm's law, DC and AC circuits fundamentals,	T1	2.2	BB	1	1
2.	Energy sources, Kirchhoff's laws	T1	2.2-2.4	BB	1	2
3.	Mesh analysis,	T1	2.18	BB	1	3
4.	Nodal analysis,	T1	2.11	BB	1	4
5.	Star -delta transformation	T1	2.7	BB	1	5
6.	Delta -star transformation	T1	2.7	BB	1	6
7.	theorems and simple problems : Superposition,	T1	2.25	BB	1	7
8.	Thevenin's,	T1	2.26	BB	1	8
9.	Maximum power transfer theorem	T1	2.31	BB	1	9
LEARNING OUTCOME: At the end of unit , the students will be able to						
<ul style="list-style-type: none"> • Know the fundamentals of Electrical circuits. • Understand the concept of circuit theory. • Understand the concept of Theorems. 						
UNIT II ELECTRICAL MACHINES (9)						
10.	DC Machines: D.C generators & D.C motors –	T1	7.1	BB	1	10
11.	Principle of operation,	T1	7.2	BB	1	11
12.	constructions, types, Applications	T1	7.2	BB	1	12
13.	A.C Machines: Types-Introduction to Alternators	T1	8.2	BB	1	13
14.	Single Phase and Three phase induction motors	T1	10.2	BB	1	14
15.	principle of operation, Types and Applications.	T1	10.8	BB	1	15
16.	Transformers : Principles of operation,	T1	6.2	BB & VIDEO	1	16
17.	Constructional Details,	T1	6.5	BB	1	17
18.	Types and Applications.	T1	6.6	BB	1	18
LEARNING OUTCOME:						

At the end of unit , the students will be able to

- Understand the concept of DC machines.
- Understand the concept of Transformers.
- Understand the concept of AC machines

UNIT – III BASIC ELECTRICAL INSTRUMENTATION (9)

19.	Introduction,-	T1	11.2	BB	1	19
20.	classification of instruments,	T1	11.2	BB	1	20
21.	operating principles	T1	11.3	BB	1	21
22.	essential features of measuring	T1	11.4	BB	1	22
23.	Moving coil	T1	11.18	BB	1	23
24.	permanent magnet (PMMC)	T1		BB	1	24
25.	Moving Iron of Ammeters and Voltmeters Energy meter,	T1	11.23	BB& VIDEO	1	25
26.	Current Transformer	T1	11.8	BB	1	26
27.	Potential Transformer	T1	11.9	BB	1	27

LEARNING OUTCOME:

At the end of unit , the students will be able to

- Understand the concept of Measurements.
- Gain knowledge Instrumentation.
- Known about Application.

UNIT IV ELECTRICAL WIRING AND SAFETY (9)

28.	Cable and wire types and applications,	R1	156	BB	1	28
29.	meter board and distribution board.	R1	158	BB & VIDEO	1	29
30.	Brief discussion on concealed conduit wiring	R1	148	BB	1	30
31.	Two-way and three-way control	R1	140	BB	1	31
32.	Elementary discussion on Circuit protective devices:fuse and MiniatureCircuit Breaker(MCB's).	R1	170	BB	1	32
33.	Objectives for Neutral and Earthing precautions against shock,	R2	130	BB	1	33
34.	Objectives for Neutral and Earthing	R2	132	BB	1	34
35.	types of earthing; pipe and plate earthing,	R2	133	BB	1	35
36.	Residual current circuit breaker.	R2	134	BB	1	36

LEARNING OUTCOME:**At the end of unit , the students will be able to**

- Understand the concept of Wiring.
- Known about Switches control.
- Get the knowledge about Earthing.

UNIT V ELECTRICAL POWER SYSTEM AND ITS APPLICATION (9)

37.	Introduction to Power generation,	R2	115	BB	1	37
38.	distribution and Transmission.	R2	116	BB	1	38
39.	Power supply circuits with SMPS	R2	117	BB	1	39
40.	UPS, Batteries : Types, Principle	R1	175	BB	1	40
41.	Smart Grid based on solar	R1	176	BB	1	41
42.	wind energy systems	R1	178	BB	1	42
43.	Electrical vehicle charging , applications of DC Motor T	W1		PPT	1	43
44.	Application of Computer in Electrical Grid,	W2		PPT	1	44
45.	Power Tariffs.	W3		PPT	1	45

LEARNING OUTCOME:**At the end of unit , the students will be able to**

- Understand the concept of Transmission and Distribution.
- Get the knowledge about Power Tariffs

COURSE OUTCOME**At the end of the course, the student should be able to:**

- Design simple electrical circuits and understand through nodal, mesh analysis about constructing series and parallel configuration of circuits with sources and variable loads.
- Get knowledge on electrical machines and on its efficient operating principle.
- Understand metering principles, safety measures while working with electrical circuits.
- Analyse existing power distribution and hence apply technology in electrical applications

CONTENT BEYOND THE SYLLABUS

WIND ENERGY

CONTINUES INTERNAL ASSESSMENT DETAILS

ASSEMENT NUMBER	I	II	MODEL
TOPIC NO.(UNIT)	1-18 (1 st & 2 nd units)	19-36 (3 rd & 4 th units)	1-45 (units 1-5)

ASSIGNMENT DETAILS

ASSIGNMENT NUMBER	I	II	III
TOPIC NUMBER FOR REFERENCE	1-18 (1 st & 2 nd units)	19-36 (3 rd & 4 th units)	1-45 (units 1-5)
DEAD LINE			

ASSIGNMENT NUMBER	DESCRIPTIVE QUESTIONS/TOPIC (Minimum of 8 Pages)
I	Star -delta and Delta -star transformation; theorems: Superposition, Thevenin's, Maximum power transfer theorem
II	Transformers : Principles of operation, Constructional Details, Types and Applications
III	Moving coil , permanent magnet (PMMC) instruments, Moving Iron of Ammeters and Voltmeters Energy meter,