INSTITUTE	**FACULTY OF TECHNOLOGY**
PROGRAM	**BACHELOR OF TECHNOLOGY (CIVIL ENGINEERING)**
SEMESTER	**1**
COURSE TITLE	**BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING**
COURSE CODE	**01EE2101**
COURSE CREDITS	**4**

Objective:

1 To provide foundational knowledge of electric circuits, electrical machines, and electronic devices. It aims to equip students with essential concepts and practical skills for understanding and working with electrical and electronic systems.

Course Outcomes: After completion of this course, student will be able to:

1 Apply various laws to solve DC circuits.

2 Analyze the behaviour of AC circuits.

3 Explain the construction and the principle of operation for various electrical machines and batteries

4 Interpret the characteristics of semiconductor devices and apply them in electronic circuits.

Pre-requisite of course:NA

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
3	0	2	50	30	20	25	25

Contents : Unit	Topics	Contact Hours
1	**Fundamental of DC Circuits** Definition of Current, Voltage, e.m.f., Power Energy, Resistance, Open circuit and short circuit, Kirchoff's Laws, Nodal Analysis, Mesh Analysis of Electrical Networks	6
2	**Electromechanical Energy Conversion** Principle, Construction and operation of DC machine, Induction motor, transformer	5
3	**AC Circuits** Introduction to AC quantities, Phasor representation of alternating quantities, Analysis of series RL circuit, RC circuit, RLC series-parallel circuit, Polyphase system Introduction, terminology, phase sequence, voltage and current relationship in star connection, voltage and current relationship in delta connection	11

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Contents : Unit	Topics	Contact Hours
4	**Semiconductor Diodes** Energy Band Diagram of conductor, semiconductor and insulator; Crystal Structure of Semiconductor Materials, Intrinsic and Extrinsic Semiconductor Materials, Symbol and Construction, Operating Characteristics in Forward and Reverse Bias, Applications of Diode as Switch, Rectifier, Clipper, Clamper, Light Emitting Diode (LED) and Seven segment display	9
5	**Transistors** Bipolar Junction Transistor (BJT) - Types, Symbol, and Construction of BJT, Basic Operation of BJT, BJT Configurations: Common Base, Common Emitter, Common Collector with Operation, Input/output Characteristics, Applications of Transistors as Switch and Amplifier, Introduction to JFET, Introduction to MOSFET	8
6	**Batteries** Electric cell, types of cells, Equivalent circuits, grouping of cells, batteries, Important terminologies of battery, charging method, Application of battery	3
Total Hours		**42**

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	**Experiment No. 01** Measurement of power in a single-phase RL circuit using wattmeter.	2
2	**Experiment No. 02** Determination of parameters in series RLC circuit.	2
3	**Experiment No. 03** Relate line quantity and phase quantity in 3-phase circuit.	2
4	**Experiment No. 04** Verify the operation of Clipper circuits using silicon diode.	2
5	**Experiment No. 05** Verify the operation of Clamper circuits using silicon diode.	2
6	**Experiment No. 06** Obtain the output of half wave rectifier circuit using silicon diode.	2
7	**Experiment No. 07** Obtain the output of full wave rectifier circuit using silicon diode.	2
8	**Experiment No. 08** Analyze the performance of BJT as an amplifier.	2
9	**Experiment No. 09** To familiarize with different safety and protective devices used in household application.	2

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Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
10	**Experiment No. 10** Calculation of energy bill of appliances used in household application.	2
11	**Experiment No. 11** Demonstration of cut view of electrical machines.	2
Total Hours		**22**

Textbook :

1 Electrical and Electronic Technology, E. Hughes, Prentice Hall India, 10th edition, 2008

2 Basic Electrical Engineering, V.N. Mittal, Tata Mcgraw-Hill, 2nd edition, 2006

3 Electrical Engineering Fundamentals, V. Del Toro, Prentice - Hall India, 2nd edition, 2006

4 Theory and Problems in Basic Electrical Engineering, D. P. Kothari and I. J. Nagrath, Prentice Hall India, -

5 Electrical Technology, B. L. Theraja, S. Chand Publication, 2012

6 Elements of Electrical Engineering, U. A. Patel, Atul Prakashan, 8th edition, 2009

7 Electronics Principles, Albert Malvino and David Bates, Tata McGraw-Hill, 7th Edition, 2006

8 Electronic Devices and Circuit Theory, Robert Boylestad and Louis Nashelsky, Pearson Education, 10th Edition, 2009

9 Electronics Device and Circuits, S Salivahanan and N Suresh Kumar, Tata McGraw-Hill Education Private Limited, 2nd Edition, 2008

10 Electronics Device and Circuits, Jacob Milman and Christos C. Halkias, Tata McGraw-Hill, 3rd Edition, 2008

References:

1 Basic Electrical Engineering, Basic Electrical Engineering, A. Chakrabarti, S. Nath, C. Chanda, Tata McGrawHill Education India Pvt. Ltd, 2013

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember / Knowledge	**Understand**	**Apply**	**Analyze**	**Evaluate**	**Higher order Thinking / Creative**
20.00	25.00	30.00	25.00	0.00	0.00

Instructional Method:

1 The course delivery method will depend upon the requirement of content and need of students.

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Instructional Method:

2 The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

3 Students may use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory.

Supplementary Resources:

1 http://nptel.ac.in/courses/108108076/

2 http://nptel.ac.in/downloads/108105053/

3 http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6- 002-circuits-and- electronics-spring-2007/video-lectures/

4 http://www.electrical4u.com/nature-of-electricity/

5 http://vlab.amrita.edu/index.php

6 http://textofvideo.nptel.iitm.ac.in/video.php?courseId=117103063

7 https://www.edx.org/course/circuits-electronics-1-basic-circuit-mitx-6-002-1x

8 http://www.learnabout-electronics.org

9 http://www.electronics-tutorials.ws

10 http://101science.com/Radio.htm

11 http://www.electronicsandyou.com