BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

I Semester: CE | II Semester: ME | III Semester: AE

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
AEEB04	Core	3	1	-	4	30	70	100

Contact Classes: 45	Tutorial Classes: 15	Practical Classes: Nil	Total Classes: 60

I. COURSE OVERVIEW:

Basic Electrical and Electronics Engineering course deals with the concepts of electrical circuits, basic law's of electricity, different methods to solve the electrical networks and the instruments to measurethe electrical quantities. This course focuses on the construction, operational features of energy conversion devices such as DC and AC machines, Transformers. It also emphasis on basic electronics semiconductor devices and their characteristics and operational features.

II. OBJECTIVES:

The course should enable the students to:

I   Understanding of the basic elements encountered in electric networks, andoperation of measuring instruments.

II   The construction and working principle of DC generator, DC motor, andtypes of DC machines based on field excitation method.

III   Analyze the characteristics of alternating quantities and AC machines.

IV   Illustrate the V-I characteristics of various diodes and bi-polar junction transistor.

III. COURSE OUTCOMES:

After successful completion of the course, students should be able to:

CO 1	**Solve** complex electrical circuits by applying network reduction techniques for reducing into a simplified circuit.	Apply
CO 2	**Differentiate** the working of moving iron and moving coil type instruments for computing electrical quantities using suitable instrument.	Understand
CO 3	**Demonstrate** the construction, principle and working of DC machines for their performance analysis.	Understand
CO 4	**Illustrate** alternating quantities of sinusoidal waveform and working,construction of single phase transformers, induction motors, alternators for analysis of AC waveforms and AC machines.	Understand
CO 5	**Apply** the PN junction characteristics for the doide applications such as switch and rectifier.	Apply
CO 6	**Extend** the biasing techniques for bipolar and uni-polar transistoramplifier circuits considering stability condition for establishing a proper operating point.	Understand

IV. SYLLABUS:

MODULE - I	ELECTRIC CIRCUITS, ELECTROMAGNETISM AND INSTRUMENTS	Classes: 09

Electrical Circuits: Basic definitions, types of elements, Ohm's Law, resistive networks, inductive networks, capacitive networks, Kirchhoff's Laws, series, parallel circuits and star delta transformations, simple problems, Faradays law of electromagnetic induction; **Instruments:** Basic principles of indicating instruments, permanent magnet moving coil and moving iron instruments.

MODULE - II	DC MACHINES	Classes: 08

DC Machines: Principle of operation of DC generator, EMF equation, principle of operation of DC motors, torque equation, types of DC machines, applications, three point starter.

MODULE-III	ALTERNATING QUANTITIES AND AC MACHINES	Classes: 10

Alternating quantities: Sinusoidal AC voltage, average and RMS values, form and peak factor, concept of three phase alternating quantity; Transformer: Principle of operation, EMF equation, losses, efficiency and regulation.

Three phase induction motor: Principle of operation, slip, slip torque characteristics, efficiency, applications; Alternator: Principle of operation, EMF Equation, efficiency, regulation by synchronous impedance method.

MODULE -IV	SEMICONDUCTOR DIODE AND APPLICATIONS	Classes: 09

Semiconductor diode: P-N Junction diode, symbol, V-I characteristics, half wave rectifier, full wave rectifier, bridge rectifier and filters, diode as a switch, Zener diode as a voltage regulator.

MODULE - V	BIPOLAR JUNCTION TRANSISTOR AND APPLICATIONS	Classes: 09

Bipolar junction transistor: Working principle of transistors, DC characteristics, CE, CB, CC configurations, biasing, load line, applications.

Text Books:

1. A Chakrabarti, "Circuit Theory", Dhanpat Rai Publications, 6th Edition, 2004.
2. K S Suresh Kumar, "Electric Circuit Analysis", Pearson Education, 1st Edition, 2013.
3. Willianm Hayt, Jack E Kemmerly S.M.Durbin, "Engineering Circuit Analysis", Tata McGraw Hill, 7th Edition, 2010.
4. J P J Millman, C C Halkias, Satyabrata Jit, "Millman"s Electronic Devices and Circuits", Tata McGraw Hill, 2nd Edition, 1998.
5. R L Boylestad, Louis Nashelsky, "Electronic Devices and Circuits", PEI/PHI, 9th Edition, 2006.
6. V K Mehta, Rohit Mehta, "Principles of electrical engineering", S CHAND, 1st Edition, 2003.

Reference Books:

1. David A Bell, "Electric Circuits", Oxford University Press, 9th Edition, 2016.
2. M Arshad, "Network Analysis and Circuits", Infinity Science Press, 9th Edition, 2016.
3. A Bruce Carlson, "Circuits", Cengage Learning, 1st Edition, 2008.
4. M Arshad, "Network Analysis and Circuits", Infinity Science Press, 9th Edition, 2016.
5. A Bruce Carlson, "Circuits", Cengage Learning, 1st Edition, 2008

Web References:

1. https://www.kuet.ac.bd/webportal/ppmv2/uploads/1364120248DC%20Machines2.pdftextofvideo.nptel.iitm.ac.in
2. https://www.eleccompengineering.files.wordpress.com/2014/08/a-textbook-of-electrical-technology-volume-ii-ac-and-dc-machines-b-l-thferaja.pdf
3. https://www.geosci.uchicago.edu/~moyer/GEOS24705/Readings/Klempner_Ch1.pdf
4. https://www.ibiblio.org/kuphaldt/electricCircuits/DC/DC.pdf

5. https://www.users.ece.cmu.edu/~dwg/personal/sample.pdf. 6. https://www.djm.cc/library/Principles_of_Alternating_Current_Machinery_Lawrence_edited.pdf
E-Text Books:
1. https://www.kisi.deu.edu.tr/aytac.goren/ELK2015/w10.pdfwww.bookboon.com. 2. https://www.ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-071j-introduction-to-electronics-signals-and-measurement-spring-2006/lecture-notes/19_bjt_1.pdf. 3. https://www.google.co.in/webhp?sourceid=chrome-instant&ion=1&espv=2&ie=UTF-8#q=half+and+full+wave+rectifier+pdf. 4. https://www.leka.lt/sites/default/files/vaizdai/concepts-in-electric-circuits.pdf. 5. https://www.ktustudents.in
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