BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

III Semester: AE

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

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

OBJECTIVES:

The students will try to learn:

I	Understanding of the basic elements encountered in electric networks, and operation of measuring instruments.
II	Explore the basic principles of dc machines and working of three point starter.
III	Analyze the characteristics of alternating quantities and AC machines.
IV	Illustrate the V-I characteristics of various diodes and bi-polar junction transistor

COURSE OUTCOMES:

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

CO 1	Know the fundamental concepts of electric circuits to find voltage and current relationship of passive elements.
CO 2	Solve complex electrical circuits by applying Ohms law, Kirchhoff's laws, star-delta transformation and source transformation technique to reduce into a simplified circuit.
CO 3	Differentiate the working of moving iron and moving coil type instruments to measure electrical quantities using suitable instrument.
CO 4	Apply Faraday's law of electromagnetic induction for demonstrating working of DC generator and DC motor.
CO 5	Explain the necessity of three point starter for safe starting of DC machines.
CO 6	Summarize alternating quantities of sinusoidal waveform using analytical method or mid-ordinate method for analysis of AC waveforms.
CO 7	Demonstrate working principle, construction, and types to develop equivalent circuit of single phase transformers.
CO 8	Explore the concept of rotating magnetic field for understanding the working principle and construction of induction motors.
CO 9	Calculate regulation of alternator using synchronous impedance method to find the performance of the machine.
CO 10	Acquire basic knowledge on the working of PN-Junction diode, Zener diode to plot their V-I characteristics.
CO 11	Identify transistor configuration and explain their working to deduce its working as switch and amplifier.

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: 09

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: 09

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: DC characteristics, CE, CB, CC configurations, biasing, load line, transistor as an amplifier.

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.
5. RL Boylestad,Louis Nashelsky, "ElectronicDevices and Circuits", PEI/PHI,9thEdition,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.

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