

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

III Semester: ME AE CE								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
AEE018	Foundation	L	T	P	C	CIA	SEE	Total
		3	1	-	4	30	70	100
Contact Classes: 45		Tutorial Classes: 15		Practical Classes: Nil			Total Classes: 60	
<p>OBJECTIVES:</p> <p>The course should enable the students to:</p> <ol style="list-style-type: none"> I. Understand Kirchhoff laws and their application in series and parallel electric circuits. II. Discuss principle and operation of measuring instruments. III. Analyze the characteristics of alternating quantities, DC machines and AC machines. IV. Illustrate the V-I characteristics of various diodes and bi-polar junction transistor. <p>COURSE LEARNING OUTCOMES(CLO'S):</p> <ol style="list-style-type: none"> 1. Analyze the circuits using Kirchhoff's current law and Kirchhoff's voltage law. 2. Use star delta transformation for simplifying complex circuits. 3. Generalize operation and principle of measuring instruments. 4. Demonstrate the working principle of DC motor, DC generator and transformer. 5. Describe the construction of DC motor, DC generator and transformer. 6. Classify the types of DC Generator and DC Motor. 7. Derive the emf equation of DC generator, transformer and Torque equation of DC motor. 8. Discuss the principle of operation of induction motor. 9. Explain the construction and characteristics of alternator. 10. Illustrate the generation of power in DC machines and AC machines. 11. Compare the operation of half wave, full wave and bridge rectifiers. 12. Differentiate the operation and biasing of semiconductor devices like diodes and transistor. 13. Apply the concept of diodes in converting AC to DC. 14. Distinguish the different configurations of transistor. 15. Examine the voltage, current and frequency of electric network using CRO. 16. Apply the knowledge of electromagnetic laws and basic concepts of electronics. 17. Process the knowledge and skills for employability and to succeed national and international level competitive examinations 								
UNIT -I	ELECTRIC CIRCUITS, ELECTROMAGNETISM AND INSTRUMENTS						Classes: 10	
<p>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.</p>								
UNIT -II	DC MACHINES						Classes: 10	
<p>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.</p>								

UNIT -III	ALTERNATING QUANTITIES AND AC MACHINES	Classes: 08
<p>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.</p>		
UNIT-IV	SEMICONDUCTOR DIODE AND APPLICATIONS	Classes: 09
<p>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.</p>		
UNIT-V	BIPOLAR JUNCTION TRANSISTOR AND APPLICATIONS	Classes: 08
<p>Bipolar junction: DC characteristics, CE, CB, CC configurations, biasing, load line, transistor as an amplifier.</p>		
Text Books:		
<ol style="list-style-type: none"> 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. Williamm 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. 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:		
<ol style="list-style-type: none"> 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:		
<ol style="list-style-type: none"> 1. https://www.kuet.ac.bd/webportal/ppmv2/uploads/1364120248DC%20Machines2.pdftextofvideo.npt el.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:		
<ol style="list-style-type: none"> 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. 		