

II YEAR I SEM

**15ABEE01-BASIC ELECTRICAL & ELECTRONICS ENGINEERING**

(Common for ME and CSE)

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**PART-A: BASIC ELECTRICAL ENGINEERING**

**Objectives:** This course aims at providing fundamental concepts of electrical circuits, DC, AC Machines and Electrical instruments, which help to increase knowledge and to apply principles in their applications

**UNIT I: Fundamentals of Electrical Circuits & Instruments**

Basic definitions, Types of elements, Ohm's Law, Resistive networks, Kirchhoff's Laws, Inductive networks, Series, Parallel circuits and Star-Delta and Delta-Star transformations. Basic Principle of indicating instruments – permanent magnet moving coil and moving iron instruments.

**UNIT II: DC Machines**

Principle of operation of DC Generator – EMF equation – types - DC motor types torque equation applications – Three point starter

**UNIT III: AC Machines**

Principle of Operation of alternators – regulation by synchronous impedance method principle of operation of induction motor – slip – torque characteristics – applications Principle of Operation of single phase transformers –EMF equation – losses –efficiency and regulation

**TEXT BOOKS**

1. Network Analysis – A Sudhakar, Shyammoan S.Palli, 3 ed., 2009. TMH Publications.
2. Principles of Electrical and Electronics Engineering by V.K.Mehta, S.Chand &Co.

**REFERENCES**

1. Network analysis and Synthesis – CL Wadhwa, 3 ed., 2007, New Age International Publishers.
2. Introduction to Electrical Engineering – M.S Naidu and S.Kamakshaiah, THM Publications.
3. Basic Electrical Engineering by Kothari and Nagarath, THM Publications, 2<sup>nd</sup> Edition

**COURSE OUTCOME:** Students able to apply fundamental concepts, principle of electrical engineering for their applications

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BOS - chairman

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**PART – B: BASIC ELECTRONICS ENGINEERING**

**Objective:**

- The objective of this Course is to provide the students with an introductory and broad treatment of the field of Electronics Engineering.

**Course Outcomes:**

Upon completion of the course, students will:

- a. Analyze the operating principles of major electronic devices, its characteristics and applications.
- b. Design and analyze the DC bias circuitry of BJT and FET.
- c. Design and analyze basic transistor amplifier circuits using BJT and FET.

**UNIT – IV**

**Semiconductor Devices:** The p-n Junction Diode-Forward Bias, Reverse Bias, Volt-Ampere Characteristics, Applications of Diodes, Diode as a Switch. Diode as a Rectifier-Half-wave Rectifier, Full-Wave Rectifier, Full-Wave Bridge Rectifier, Rectifiers with Filters.

**UNIT – V**

**Transistors:** Bipolar Junction Transistor (BJT) – Types of Transistors, Operation of NPN and PNP Transistors, Input-Output Characteristics of BJT in CB, CE and CC Configurations, Relation between  $I_C$ ,  $I_B$  and  $I_E$ . Transistor Biasing- Fixed Bias, Voltage Divider Bias, Transistor Applications-Transistor as an Amplifier, Transistor as a Switch, Single stage CE Amplifier-Response of CE amplifier.

**UNIT – VI**

**Oscillators and Op-Amps:** Sinusoidal Oscillators, Barkhausen Criteria for Oscillator Operation, Components of an Oscillator, Classification of Oscillators, LC Tuned, RC Phase Shift Oscillator circuits.

Symbol of an Op-Amp, Characteristics of an Ideal Op-Amp, Basic Forms of Op-Amps in open and closed loop-Inverting & Non-Inverting Amplifiers, Applications of Op-Amps, summing, subtractor, Comparator.

**TEXT BOOKS:**

1. Electronics Devices and Circuits, J.Millman and Christos. C. Halkias, 3<sup>rd</sup> edition, Tata McGraw Hill, 2006.
2. Electronics Devices and Circuits Theory, David A. Bell, 5<sup>th</sup> Edition, Oxford University press., 2008.

**REFERENCES:**

1. Electronics Devices and Circuits Theory, R.L.Boylestad,Louis Nashelsky and K.Lal Kishore, 12<sup>th</sup> edition, 2006, Pearson, 2006.
2. Electronic Devices and Circuits, K. Lal Kishore, 3<sup>rd</sup> Edition, BSP, 2008.
3. Electronic Devices and Circuits, N.Salivahanan, and N.Suresh Kumar, 3<sup>rd</sup> Edition, TMH, 2012
4. Microelectronic Circuits, S.Sedra and K.C.Smith, 5<sup>th</sup> Edition, Oxford University Press.



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