



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
COLLEGE OF ENGINEERING (AUTONOMOUS), PULIVENDULA
YSR (KADAPA) Dist 516 390, (A.P) INDIA

B.Tech – II Sem

LTPC

3 0 0 3

Basic Electrical & Electronics Engineering

Part A: Basic Electrical Engineering (Civil, Mechanical, CSE), ECE

Course Objectives:

1. To introduce basics of electric circuits.
2. To teach DC and AC electrical circuit analysis.
3. To explain working principles of transformers and electrical machines.
4. To impart knowledge on low voltage electrical installations

Unit 1 DC & AC Circuits:

Electrical circuit elements (R - L and C) - Kirchoff laws - Series and parallel connection of resistances with DC excitation. Superposition Theorem - Representation of sinusoidal waveforms - peak and rms values - phasor representation - real power - reactive power - apparent power - power factor - Analysis of single-phase ac circuits consisting of RL - RC - RLC series circuits.

Unit Outcomes: Able to

- Recall Kirchoff laws (L1)
- Analyze simple electric circuits with DC excitation (L4)
- Apply network theorems to simple circuits (L3)
- Analyze single phase AC circuits consisting of series RL - RC - RLC combinations (L4)

Unit 2 DC & AC Machines:

Principle and operation of DC Generator - EMF equations - OCC characteristics of DC generator - principle and operation of DC Motor - Performance Characteristics of DC Motor - Speed control of DC Motor - Principle and operation of Single Phase Transformer - OC and SC test on transformer - principle and operation of Induction Motor [Elementary treatment only]

Unit Outcomes: Able to

- Explain principle and operation of DC Generator & Motor.
- Perform speed control of DC Motor (L2)
- Explain operation of transformer and induction motor. (L2)
- Explain construction & working of induction motor - DC motor

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Unit 3 Electrical Installations:

Components of LT. Switchgear: Switch fuse unit (SFU), MCB, ELCB, MCCB, Types of wires and cables, Earthing. Types of batteries, important Characteristics for Batteries. Elementary Calculations for energy consumption, power factor improvement and battery backup

Unit Outcomes: Able to

- Explain principle and operation of protecting equipments.
- Come to know different types of batteries and their usage.

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6. V. Jagan
7. Pradeep
8. C. Srinivas
9. Pradeep
10. Pradeep

I B.Tech II Sem

COURSE NO. - Basic Electrical & Electronics Engineering**(Common to Civil, Mechanical, CSE)****L T P C**
3 1 0 4**Part B: Basic Electronics Engineering****Course Objectives:**

- To provide comprehensive idea about working principle, operation and applications of PN junction & zener diodes, BJT, FET, MOSFET and operational amplifier
- To introduce fundamentals of digital electronics
- To educate on principles of various communication systems
- To teach efficacy of electronic principles which are pervasive in engineering applications

UNIT I ANALOG ELECTRONICS

Overview of Semiconductors, PN junction diode, Zener diode, Applications of diode as switch and rectifier, Zener diode as regulator, special purpose diodes: schottky diode, tunnel diode, varactor diode, photodiode, phototransistor and LED.

BJT construction, operation, configuration and characteristics, JFET and MOSFET construction, operation, characteristics (CS configuration), applications.

Operational Amplifiers: Introduction, block diagram, basic op-amp circuits: Inverting, Non Inverting, summer, subtractor, voltage follower.

Unit Outcomes:

- Describe operation and characteristics of diodes and transistors
- Make use of diodes and transistors in simple, typical circuit applications
- Understand operation of basic op-amp circuits

UNIT II DIGITAL ELECTRONICS

Introduction, Switching and Logic Levels, Digital Waveform, characteristics of digital ICs, logic gates, number systems, combinational circuits - adders, multiplexers, decoders; introduction to sequential circuits, flip flops, shift register, binary counter.

Unit Outcomes:

- Explain different logic gates using truth table
- Distinguish combinational and sequential circuits
- Analyze various combinational circuits such as adders, multiplexers and decoders
- Understand functionality of flip-flops, shift registers and counters

UNIT III COMMUNICATION SYSTEMS

Introduction, Elements of Communication Systems, EM spectrum, basics of electronic communication, Amplitude and Frequency modulation, Pulse modulation, Communication receivers, Examples of communication systems: Microwave & Satellite, Fibre optic, Television, mobile communication (block diagram approach).

Unit Outcomes:

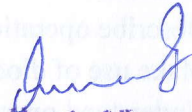
- Describe basic elements of a communication system
- Explain need for modulation and different modulation techniques
- Understand functioning of various communication systems

TEXT BOOKS:

- 1.D.P. Kothari, I.J.Nagrath, Basic Electronics, 2nd edition, McGraw Hill Education(India)Private Limited
- 2.S.K. Bhattacharya, Basic Electrical and Electronics Engineering, 2nd edition, Pearson India Private Limited.

REFERENCES:

- 1.R. Muthusubramanian, S. Salivahanan, "Basic Electrical and Electronics Engineering", Tata McGraw-Hill Education, Reprint 2012.
- 2.David Bell, Electronic Devices and Circuits: Oxford University Press, 5th EDn., 2008.


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