



Course: BTech

Semester: 2

Prerequisite: Knowledge of Physics and Mathematics up to 12th science level

Rationale: The course provides introductory treatment of the field of Basic of Electronics to the students of various branches of engineering

Teaching and Examination Scheme

| Teaching Scheme | | | | | Examination Scheme | | | | | Total |
|------------------|-------------------|--------------|----------|--------|--------------------|----|----|----------------|----|-------|
| Lecture Hrs/Week | Tutorial Hrs/Week | Lab Hrs/Week | Hrs/Week | Credit | Internal Marks | | | External Marks | | |
| | | | | | T | CE | P | T | P | |
| 3 | 0 | 2 | 0 | 4 | 60 | 20 | 30 | 20 | 20 | 150 |

SEE - Semester End Examination, CIA - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)

Course Content

W - Weightage (%) , T - Teaching hours

| Sr. | Topics | W | T |
|-----|---|----|----|
| 1 | Diode Theory and Its Applications Introduction to Ideal Diode, Effect of temperature Ideal diodes, unbiased diode and Forward and reverse bias of Diode. PIV, surge current, Diode as Uncontrolled switch. Rectifiers: Half wave, Full wave and bridge wave. IDC, VDC and Irms Measurements. Ripple factor, PIV rating. Choke and Capacitor input filter rectifiers, Clipper and Clamper circuits, Voltage multiplier: Half wave voltage doubler and full wave voltage doubler | 15 | 10 |
| 2 | Special Purpose Diodes Construction of Zener diode, Characteristics of Zener diode, Application of Zener Diode as Voltage Regulator, load line, Optoelectronic devices (LED and Photo Diode), Seven Segment Display, Schottky diode and its Application, Varactor Diode and its Application, Understanding Datasheets. | 15 | 6 |
| 3 | Transistor Fundamentals and its Biasing techniques Construction of BJT, working principle of BJT, Characteristics & specifications of BJT (PNP & NPN transistors), Biased and unbiased BJT, Configuration of transistor, concept of gain & BW, Operation of BJT in cut-off, saturation & active regions (DC analysis), BJT as switch, Transistor as an amplifier, Voltage divider bias and analysis, VDB load line and Q point. | 30 | 15 |
| 4 | DC Regulated Power Supply Voltage Regulator-Basic series and shunt regulator, Types of voltage regulator IC: Fixed and adjustable positive and negative linear voltage regulator, IC linear fixed voltage regulator (78XX, 79XX, LM340 Series), Linear Adjustable Regulator (IC LM317, LM337, and IC 723 IC regulator), DC Regulated Power supply, Switched mode power supply (SMPS). | 20 | 6 |
| 5 | Introduction to Sensors and Transducers Introduction to sensors and Transducers, Comparison between sensors and Transducers, Applications of Sensors and Transducers, Types of Electronic sensors, Types of Transducers. | 20 | 6 |

Reference Books

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| 1. | Electronic Principles By A. P. Malvino Tata McGraw Hill Publication New Delhi |
| 2. | Electronic Devices and Circuits By Jacob Millman and Halkias Tata McGraw Hill Publication New Delhi. |
| 3. | Electronic Devices and Circuits By Robert L. Boylestad and Louis Nashelsky Pearson, Prentice Hall. |
| 4. | Electronic Devices By Thomas L. Floyd Pearson, Prentice Hall |
| 5. | Linear Electronic Circuits and Devices By James Cox, Delmar Publication. |
| 6. | Electronic Devices and Circuits By David A. Bell Oxford Publication |

Course Outcome

After Learning the Course the students shall be able to:

- CO1: Ability to analyze PN junctions diode under various conditions.
CO2: Ability to describe the behavior of special purpose diodes.
CO3: Ability to design and analyze BJT under various conditions.
CO4: Ability to design voltage regulators for various applications.
CO5: To understand fundamentals of sensors and transducers

List of Practical

| | |
|-----|---|
| 1. | To Plot V-I characteristics Diodes. (a) PN junction diode Characteristic, (b) Zener Diode characteristics. |
| 2. | To Observe Rectifier Circuit (a) Half wave Rectifier without filter, (b) Full wave rectifier without filter, (c) Half wave Rectifier with (L,C) filter, and (d) Full wave Rectifier with (L,C) filter and measure DC voltage regulation and ripple factor for various load currents in case of filtered output. |
| 3. | Designing of power supply using IC regulator circuit. (a) Designing of +5 Volt DC Power Supply using 7805, (b) Designing of -5 Volt DC Power Supply using 7905, (c) Designing of +12 Volt DC Power Supply using 7812, and (d) Designing of -12 Volt DC Power Supply using 7912. |
| 4. | To Observe Response of Clipping and Clamping circuits using diodes (a) Diode Positive Clipper without and with Biased clipper, (b) Diode Negative Clipper without and with Biased clipper, (c) Biased Positive Negative Clipper (Combinational Clipper), and (d) Positive Clamper, and Negative Clamper. |
| 5. | (a) To Plot and Study input-output characteristics of common Base (CB) configuration of Transistor, and (b) To Plot and Study input-output characteristics of common Emitter (CE) configuration of Transistor. |
| 6. | To study Voltage divider bias circuit: (a) To observe the effect of change in base current on Q-operating point, and (b) To set Q point for operation of transistor amplifier in linear region. |
| 7. | Optoelectronic devices: (a) To plot characteristics of LED, (b) To plot Characteristic of Photo Diode, and (c) To observe isolated control of optocoupler. |
| 8. | To plot characteristics of Schottky and Varactor diode. |
| 9. | Designing of Linear Adjustable Regulator using IC LM317. |
| 10. | Introduction to Sensors and Transducers |

Miscellaneous

Open Ended Problems

- 1) To design and implementation of Dual power supply
- 2) To design and implementation of Adjustable positive voltage regulator
- 3) To design and implementation of Adjustable negative voltage regulator
- 4) Transistor as a switch
- 5) Transistor as an amplifier