



C.U. SHAH UNIVERSITY – Wadhwan City

FACULTY OF: -Technology and Engineering (Diploma Engineering)

DEPARTMENT OF: -Electrical Engineering

SEMESTER: - III

CODE: -2TE03BEE1

NAME – Basic Electronics (BEE)

Teaching & Evaluation Scheme:-

Subject Code	Subject Name	Teaching Scheme (Hours)				Credits	Evaluation Scheme							
		Th	Tu	Pr	Total		Theory				Practical (Marks)		Total Marks	
							Sessional Exam		University Exam		Internal			University
							Marks	Hours	Marks	Hours	Pr	TW		Pr
2TE03BEE1	Basic Electronics (BEE)	4	0	2	6	5	30	1.5	70	3	30	20	----	150

Objectives:-

- To Developed the Basic Knowledge of Principles & Concept of Electronics Parameters.
- Understanding of Principle, Construction & Application of Electronics Devices.
- To Developed the Basic Knowledge of Rectifier & Amplifiers.

Prerequisites: - • Basic Knowledge of different types of materials and its use.

Course Outlines:-

Sr. No.	Course Contents	No Of Hours
1	Physics Structure of Semiconductor History, Atomic and Crystal Structure of Germanium and Silicon, Covalent Bonds, Generation and Recombination, Effect of Temperature on Conductivity of Intrinsic Semiconductors, Energy Levels Diagram of Conductor, Insulators and Semi-Conductors, Intrinsic Semiconductors, Extrinsic Semiconductor Materials Doping of Impurity, P and N Type Semiconductors and Their Conductivity, Minority and Majority Carriers, Drift And Diffusion.	5
2	Semiconductor Diode Circuits PN Junction Diode, Depletion Layer, Behaviour of PN Junction Characteristics, Zener and Avalanche Breakdown, Concept of Junction Capacitance in Forward and Reverse Bias Conditions, Semiconductor Diode & Zener Diode Characteristics, Zener Diode as a Voltage Regulator – Applications, Diode (PN Junction) as Rectifier, Half Wave Rectifier, Full Wave Rectifier, Including Centre Tap and Bridge Rectifier, Relationship Between D.C. Output Voltage and A.C. Input Voltage, Rectification Efficiency and Ripple Factor For Rectifier Circuits, Filler Circuits: Shunt Capacitor, Series Inductor, Capacitor Input, Different Types of Diodes and its Applications (Power Diodes, Varactor Diodes and Tunnel Diodes and Point Contact Diodes.)	8
3	Bipolar Transistor and Circuits Concept of Bipolar Transistor as Two Junction Three Terminal Device Having Two Kinds of Current Carriers ; PNP and NPN Transistors, Symbols and Mechanisms of Current Flow, Concept of Leakage Current ICBO, Effect of Temperature on Leakage Current; CB, CE And CC Configurations. Common Base Configuration (CB), Common Emitter Configuration (CE), Leakage Current (ICBO), Current Gain α and β , Emitter Efficiency γ , Common Collector (CC) Configuration. Comparison Of CB, CC and CE Configuration	15

	<p>With Regard to Dynamic Input and Output Resistance, Current Gain and Leakage Current, Preference of CE Configuration Over CB Configuration, Transistor as an Amplifier in CE Configuration, DC Load Line and Operating Point in CE Configuration, Analysis of Amplifier Based on D.C. Load Line and A.C. Load Line, Concept of Power Gain as Product of Voltage Gain and Current Gain, Need For Stabilization of Operating Point, Effect of Fixing Operating Point in Cut Off and Saturation Region on Performance of Amplifier, Calculation of Operating Point for Different Biasing Circuits.</p> <p>Field Effect Transistor, Construction, Working Principle of FET, Difference Between FET and BJT – Characteristics of FET.</p> <p>UJT, Construction, Equivalent Circuit, Operation, Characteristics. UJT as a Relaxation Oscillator</p> <p>MOSFET, Construction, Characteristics, MOSFET as a Switch, CMOS Basic Concept (PMOS & CMOS).</p>	
4	<p>Power Amplifier</p> <p>Concept of Power Amplifier, Large Signal Amplifier, Difference Between Voltage Amplifier & Power Amplifier, Classification of Power Amplifiers on The Basis of Selection of Operating Point, Class A, Class B, Class AB, Class C Amplifier, Comparison of All Power Amplifiers, Push Pull Amplifier-Circuit Diagram, Working, Advantages of Push Pull Amplifier, Complimentary Push Pull Amplifier, Phenomena of Thermal Runaway of Transistor, Meaning of Thermal Runaway, How Heat Sink Prevents Thermal Runaway of Transistor, Power De Rating Curve of Power Amplifier.</p>	14
5	<p>Oscillators</p> <p>Transistor Oscillator, Classifications, Condition for Oscillation, General Form of LC Oscillator, Hartley Oscillator, Colpitts Oscillator, RC Phase Shift Oscillator, Crystal Oscillator.</p>	4
6	<p>Special Semiconductor Devices</p> <p>SCR, Introduction, Working, Two Transistor Analogy of SCR, VI Characteristics, SCR as a Switch, Controlled Rectifier, Specifications.</p> <p>DIAC, Construction, Working, Characteristics, Diac as Bi-Directional Switch.</p> <p>TRIAC, Basic Working Principle, Characteristics, Speed Control of Fan Using Diac and Triac.</p> <p>IGBT, Basic Principle, IGBT as a Switch</p>	8

List of Experiments:-

- Study and Test PN Junction Diode & Its Characteristics.
- Test Half Wave Rectifier Using CRO
- Test Full Wave Centre Tapped & Bridge Rectifier Using CRO
- Compare Output Waveform of Different Filters Using CRO
- To Study Different Biasing Methods of Transistor
- Study and Test the Performance of CB Transistor Amplifier
- Study and Test The Performance of CE Transistor Amplifier
- Testing of Transistor Using Multi Meter
- Study and Test the Performance Class – B Push Pull Amplifier
- Study and Test Hartley Oscillator Using CRO
- Study and Test Colpitts Oscillator Using CRO
- Study and Test RC Phase Shift Oscillator Using CRO
- Study Characteristics of SCR And UJT
- Study and Test Zener Diode As Voltage Regulator

Learning Outcomes:-

- Application & importance of electronic devices.
- Definition & identification of various electronics parameters.
- Knowledge of Oscillator, SCR, UJT.
- Knowledge of different electronic circuits.
- Knowledge of voltage Regulation.

Books Recommended:-

- Principle of Electronics - **V.K. Mehta**
- Electronics principles - **Malvino** -Tata McGraw Publication
- Electronics Devices and Circuits – **J.B.Gupta**
- Electronics Devices and Circuits - **Jacob Millman and Halkies** -Tata McGraw – Publication