



## **C.U.SHAH UNIVERSITY – Wadhwan City**

**FACULTY OF:** - Technology and Engineering (Diploma Engineering)

**DEPARTMENT OF:** - Electrical Engineering

**SEMESTER:** - IV

**CODE:** - 2TE04AEE1

**NAME –** Applied Electronics (AEE)

### **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		
2TE04AEE1	Applied Electronics (AEE)	3	0	2	5	4	30	1.5	70	3	30	20	-----	150	

### **Objectives:-**

- To Developed the Basic Knowledge of Principles & Concept of Electronics Parameters
- Understanding of Working Principle, Construction & Application of Electronics Devices
- To Developed the Basic of Rectifier, Power Supply.
- To Understand Basic of PLC for Industrial Awareness.
- To Developed the Basic Needs of Linear Integrated Circuits in Industrial Application.

**Prerequisites:** - • Knowledge of Basic Electronics.

### **Course Outlines:-**

Sr. No.	Course Contents	No Of Hours
1	<b>Power Electronic Devices</b> Characteristics and Applications of General Purpose Diode, Fast Recovery Diode and Schottky Diode. <b>SCR</b> , Introduction, Working, Two Transistor Analogy of SCR, VI Characteristics, SCR as a Switch, Controlled Rectifier, Specifications. <b>DIAC</b> , Construction, Working, Characteristics, Diac as Bi-Directional Switch. <b>TRIAC</b> , Basic Working Principle, Characteristics, Speed Control of Fan Using Diac and Triac. <b>MOSFET</b> , Construction, Characteristics, MOSFET as a Switch, CMOS Basic Concept (PMOS & CMOS). <b>IGBT</b> , Basic Principle ,IGBT as a Switch	14
2	<b>Power Supplies:</b> D. C. And A. C. Power Supplies, Switched Mode Power Supplies, Resonant Power Supply And Bi-Directional Power Supply. Switching Mode Regulators, Principle Of Switching Mode Regulator; Bulk, Boost, Bulk-Boost Regulators. SMPS: Types, Circuit Description, Working Principles, Control Circuits For SMPS, Application UPS: Circuit Description Of On Line & Off Line UPS, Working Principles, Methods Of Voltage Control, Various Techniques Of Pulse Width Modulation.	10

3	<b>A.C. Controlled Rectifiers :</b> Control Techniques, Single Phase Half Wave Controlled Rectifiers, Effect of Freewheeling Diode. Single Phase Full Wave Controlled Rectifier (Two Quadrant Converter), Single Phase Half Controlled Bridge Rectifier, Three Phase Half Wave Controlled Rectifier, Three Phase Full Wave Controlled Rectifier, Six Pulse Converters, Effect of Transformer Reactance.	10
4	<b>Inverters &amp; Cyclo Converter:</b> Working Principal of Inverters, Types of Inverter, Single Phase Inverters Using Thyristor With R & RL Loads, Single Phase Series and Parallel Inverters, Pulse Width Modulation Technique, Cyclo Converter, Working Principle, Types of Cyclo Converter.	10
5	<b>Chopper :</b> Principle of operation and Control Techniques of Chopper, Types of Chopper Circuit (A-Type to E-Type) Jhones's Chopper, Morgans Chopper, Application of Chopper.	10
6	<b>Simple Circuits Using IC</b> Linear ICs, -Classification of Linear ICs, Important Features Of Linear ICs, Block Diagram of Op-Amp IC 741, Specifications of IC 741. Applications of IC 741, Connection Diagram, Explain Working of Unity Gain Amplifier, Integrator, Differentiator, Voltage Comparator, Clipping Amplifier, Voltage Regulator ICs, Block Diagram Three Terminal Fixed Voltage Regulator IC(78-- & 79—Series) and Variable Voltage Regulator IC (IC 723 & LM—Series), Timer ICs -Block Diagram & Pin Diagram Of IC 555 ,IC 555 as Mono-Stable Mode, A-Stable Mode & Bi-Stable Mode .	10

#### List of Experiments:-

- Determine efficiency, voltage ratio and ripple factor of three phase half wave rectifier
- Determine efficiency, voltage ratio and ripple factor of three phase full wave rectifier or bridge rectifier.
- Determine efficiency, voltage ratio and ripple factor of three phase six phase half wave rectifier.
- Simulate poly phase rectifier circuit, observe and print the various wave forms.
- Identify the terminals of IGBT, perform test on IGBT & plot static characteristics
- Test any one or two chopper circuits with load.
- Perform speed control of DC motor using chopper circuit. Or any other chopper application
- Test 1- $\phi$  Cycloconverter for different output frequencies.
- To Study about OP-AMP
- To Study about 555 IC (a-stable , mono-stable , bi-stable)
- TO study and develop Regulated Power Supply for Different Voltages.
- Control the speed of fan using DIAC and TRIAC.

#### 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:-

- Power Electronics By **M D Singh And K B Khanchandani**, Tata Mc Gram-Hill Publishing Company Limited,
- Principle Of Electronics - **V.K. Mehta**
- Power Electronics - **Rasid Mumammad** - Pearson Publication
- Op-Amps And Linear Intergrated Circuits – **R.Gaykwad**- Pearson Publication