



C.U.SHAH UNIVERSITY – WADHWAN CITY

FACULTY OF: -Technology and Engineering (Diploma Engineering)

DEPARTMENT OF: -Electrical Engineering

SEMESTER: - V **CODE:** -2TE05INE1

NAME – Industrial Electronics (INE)

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	TW	
2TE05INE1	Industrial Electronics	04	00	02	06	05	30	1.5	70	03	--	20	30	--	150

Objectives:-

- To Develop The Basic Knowledge of Principles and Concept of Electronics Parameters Related To Industry.
- Understanding of Working Principle, Construction and Application of Electronic Devices Used In Industry.

Prerequisites: - • Knowledge of Basic Electronic Devices.

Course Outlines:-

Sr. No.	Course Contents	No of Hours
1	Thyristors Construction, Working and Applications of SCR, DIAC, TRIAC and IGBT, Working of SCR Using Transistor Analogy, Triggering Methods of SCR, Commutation Techniques of SCR, Construction, SCR as a Static Switch, AC Power Control Using DIAC-TRIAC, UJT Triggered SCR Power Control.	8
2	Power Converters Single Phase Half and Full Wave Controlled Bridge Rectifiers Using SCR, Three-Phase Half Wave and Three-Phase Full Wave Rectifiers, Comparisons and Applications of Single Phase Rectifiers and Poly Phase Rectifiers Principle, Working and Applications of Series, Parallel and Bridge Inverters, Principle, Working Applications and application of Single Phase Cyclo-Converters and Chopper.	9
3	Voltage Regulator Need of AC Voltage Regulator, Operating Principle, Circuit Diagram and Applications of different types of Voltage Regulators, Operating Principle and Applications of Switching Regulator, Explanation of Isolation Transformer, Requirement of Power Supply, Review of Linear Regulator, It's Requirements.	9
4	Uninterrupted Power Supply Need of UPS, Basic Block Diagram of UPS and Operating Principle, Types of UPS: Off Line UPS, On Line UPS, Line Interactive UPS and Their Comparison, UPS Specifications.	8

5	Solid State Control of A.C. And D.C. Motors Definition, Block Diagram, Working and Comparison of Open Loop and Close Loop Control System, Single Phase DC Shunt Motor and its Speed Control Using Thyristors, Single Phase Induction Motor (AC Motor) and its Speed Control Using Thyristors, Universal Motor and its Speed Control, Stepper Motor and its speed Control.	6
6	Industrial Applications High Frequency Application Principle, Working , Merits-Demerits and Applications of Induction Heating, Principle, Working, Merits-Demerits and Applications of Die-Electric Heating, Properties and Applications of X-Ray Tubes, Properties and Applications of Ultrasonic Waves, Properties and Applications of Microwave. Applications of Photo Electric Devices Photo Electricity and Photo Devices, Photo Relays, Smoke Detector, Level Indicator, Flame Failure Relays, Temperature Control of Furnace.	12

List of Experiments:-

- To Study and Perform V-I Characteristic of SCR.
- To Study and Perform V-I Characteristic of TRIAC.
- To Study and Perform V-I Characteristic of DIAC.
- To Study and Perform The UJT Trigger Circuit for AC Phase Control of TRIAC.
- To Study the Operation of Different Methods of Forced Commutation of SCR.
- To Study and Perform The DIAC Trigger Circuit for AC Phase Control of TRIAC.
- To Study and Perform The R Trigger Circuit For AC Phase Control of TRIAC.
- To Study and Perform Three Phase Half Controlled Bridge Rectifier.
- To Study and Perform Three Phase Full Controlled Bridge Rectifier.
- To Study and Perform Single Phase SCR Series Inverter.
- To Study and Perform Single Phase SCR Parallel Inverter.
- To Study about SMPS and UPS.
- To Study about Photo Electric Devices.
- To Study about Electric Heating.
- To Demonstrate The Operation of Photo Electric Relay.

Learning Outcomes:-

- Understanding of Operation of Various Electronic Devices like Converters, Invertors, Regulator.
- Selection of a Specific Device for a Specific Industrial Application.

Books Recommended:-

- Industrial Electronics and Control by **S.K. Bhattacharya** , Tata McGraw-Hill
- Industrial Electronics by **G.K. Mithal**, Khanna Publication
- Power Electronics by **M. D. Singh And K. B. Khanchandani**, McGraw-Hill
- Electronics In Industry by **George M. Chute and Robert D. Chute**, McGraw-Hill
- Power Electronics by **M.H. Rashid**, PHI
- Industrial Electronics by **Petruszella**, McGraw-Hill International