

# GUJARAT TECHNOLOGICAL UNIVERSITY

## DIPLOMA IN POWER ELECTRONICS

### SEMESTER: V

Subject Name:     **Applied Power Electronics**

| Sr. No. | Course content  |
|---------|---|
| 1.      | <b>Relays And Timers:</b> <ul style="list-style-type: none"> <li>• <b>Relay:</b> Basic Construction, Time Delay Relay Using Transistor &amp; Relay,</li> <li>• <b>Solid State Relay:</b> Time Delay Relay Using SCR &amp; UJT For AC and DC load, Time Delay Relay Using DIAC &amp; TRIAC</li> </ul>  |
| 2.      | <b>Special Function Integrated Circuits:</b> <ul style="list-style-type: none"> <li>• Analog multiplier and divider, VCO, PLL, V/F and F/V converter, A/D Converters, D/A Converters, PWM, Switched Capacitor Circuits, Instrumentation Amplifier.</li> </ul>   |
| 3.      | <b>Welding:</b> <ul style="list-style-type: none"> <li>• <b>Resistance welding:</b> Block diagram, Purpose of welding control circuit, Types of resistance welding (Spot welding, Projection welding, Seam welding, Butt welding).</li> <li>• <b>Electronics welding methods:</b> AC welder circuits, Single phase and Three phase DC welder circuit, Sequence weld timer circuit, Auxiliary control circuit, Heat control, Slope control, Electronic line contactor using SCR, Synchronous and non synchronous control.</li> <li>• Sequence timer used in welding processes</li> <li>• Energy storage welding</li> <li>• Capacitor type charging storage welding: Circuit, Advantages, Disadvantages</li> <li>• Inductor type energy storage welding: Advantages, Disadvantages</li> </ul> |
| 4.      | <b>Induction and Dielectric Heating:</b> <ul style="list-style-type: none"> <li>• <b>Induction Heating:</b> Working principle, Skin effect, Depth of penetration, Factor affecting depth of penetration, Applications of induction heating, Advantages &amp; Disadvantages.</li> <li>• <b>Dielectric Heating:</b> Working principle &amp; operation, Calculation of dielectric power, Applications of dielectric heating, Advantages, Disadvantages.</li> <li>• Comparison between induction and dielectric heating.</li> </ul>   |
| 5.      | <b>Ultrasonic:</b> <ul style="list-style-type: none"> <li>• <b>Introduction:</b> Properties of ultrasonic wave, Production of ultrasonic waves, Magnetostrictive generator - Circuit and working, Piezo-electric crystal generator-effect, circuit, working, advantages &amp; disadvantages.</li> <li>• <b>Some applications of ultrasonic:</b> Ultrasonic cleaner, Ultrasonic flow detector, Ultrasonic flow measurement, Ultrasonic welding.</li> </ul>   |

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| 6. | <b>Battery:</b> <ul style="list-style-type: none"> <li>Battery Classification, Construction, Working, Characteristics of batteries, Internal impedance, self discharge, Charging methods, Power storage capacity, technological development in battery.</li> </ul>  |
| 7. | <b>Photo Electric Devices:</b> <ul style="list-style-type: none"> <li><b>Introduction of photo electric effect:</b> Photo emissive effect, Photo voltaic effect, Photo conductive effect, Photo junction effect.</li> <li><b>Solar cell (Photo voltaic cell):</b> Construction &amp; Working, List applications of photo voltaic cell, Photo relay using photo cell - Circuit and working.</li> <li>Photo conductive device - LDR - Circuit and working, Photo relay using LDR &amp; Transistor - Circuit &amp; Working, LDR circuit to trigger SCR - Circuit &amp; Working.</li> <li>Photo Diode: Construction and working, Photo Relay using photo diode - circuit &amp; working.</li> <li><b>Photo Transistor:</b> Photo Relay using photo diode - circuit &amp; working, Photo Darlington Amplifier - Construction &amp; Working.</li> <li><b>LASCR:</b> Construction &amp; Working, Applications of LASCR, Photo relay using LASCR - Circuit &amp; working.</li> </ul> |

### Reference Books:

1. Industrial Electronics by S.N.Biswas.
2. Industrial Electronics by G.K.Mithal.
3. Industrial and Power Electronics by H.C.Rai.
4. Integrated Circuit by K.R.Bottker.