

4202 – INDUSTRIAL ELECTRONICS AND CONTROL CIRCUITS										
Teaching Schedule Per Week			Progressive Assessment		Examination Schedule (Marks)					
Lectures	Practical	Credits			Theory		Practical Ex.		Total	
3	4	7	25	25	3Hrs	100	50		200	
Pre-requisite		Source	Semester		Theory	Test	Total	TW	PR	Gr Total
4213		INC			75	25	100	25	50	175

Rationale: Due to merits like speed, precise control, compactness, portability, electronic circuits find wide applications in industry. This subject deals with such control circuits in different fields. The subject also deals with different types of power supplies, which are an integral part of any electronic equipment as well as those used in controllers such as motor speed control and temperature control.

COURSE CONTENTS	Hrs.	Mks.
1. IC REGULATORS IC 723, 78XXX, 79XX. Block diagram, working and application circuits	6	12
2. CONTROLLED RECTIFIERS, INVERTERS AND CYCLOCONVERTERS Construction, characteristics & operation of SCR: Diac, Triac, UJT; Turn-on and Turn-off methods of SCR, Triac; Phase control of SCR firing by UJT, IGBT; SCR phase control by pdstral and ramp; SCR phase control by temperature or light; SCRs with inductive load; Triac as static switch, light dimmer; Concept of inverter; Working of series & parallel inverters; Types of cycloconverters, their working & applications.	14	28
3. SPECIAL POWER SUPPLIES A C Voltage stabilisers; Switch mode power supply ( Block diagram and working ); UPS (Block diagram and working); Batteries: Construction, working, rating and charging of lead acid and nickel cadmium batteries.	8	16
4. MOTOR SPEED CONTROL Armature control and field control of dc shunt motor using SCR; DC Motor speed regulation using SCR; Speed control of Single phase induction Motor, three phase induction motor, using SCR.	4	10
5. TIMER IC 555 Block diagram and working; Application of IC 555, Monostable, asatable, sequential timer, long duration timer.	6	12
6. OPTICAL SENSORS AND CIRCUITS Fundamentals of EM Radiation: Nature of EM Radiation, Characteristics of light; Construction, characteristics and working of photo transistor, LASCR, Photodiode, LDR, photovoltaic cell and optocouplers; Opto-electronic control circuits: burglar alarm, smoke detectors, flame indicators, batch counter, automatic exposure timer	6	12
7. ULTRASONICS Generation and detection of ultrasonic; Applications: Flaw detection, distance measurement and proximity detector.	4	10
<b>Total</b>	<b>48</b>	<b>100</b>

#### LIST OF PRACTICALS:

(Minimum 15 practicals)

1. V-I Characteristics of SCR, Diac, Triac, UJT. (4 turns)
2. Characteristics of Phototransistor, Photodiode (2 turns)
3. Build and test regulated power supply using 723 (2 turns)
4. Build and test dual supply using 78XX and 79XX
5. Study of different triggering circuits for SCR: R – Triggering, RC triggering, UJT – Triggering.
6. Build and test half wave controlled rectifier.
7. Build and test full wave controlled rectifier with a different load.
8. Build and test ac regulator using triac
9. Build and test ac regulator using anti parallel SCRS.
10. Build and test light dimmer using tiac, diac and RC triggering.
11. Build and test Monostable, Astable, Sequential timer using IC 555 (3 turns)
12. Build and test light activated switch, burglar alarm, object counter. (3 turns)
13. Build and test frequency to voltage converter using monostable.
14. Study of ultra sonic transmitter and receiver.
15. Build variable current source using three terminal power supply regulators: such as 78XX and find out saturation and limitation.

#### TEXT BOOKS:

1. Industrial Electronics and Control by SK Bhattachary, S Chatterjee, TTTI, Chandigarh.
2. Industrial Electronics by G.K. Mittal.
3. Thyristors and their applications by M. Ramamoorthy.

#### REFERENCE BOOKS:

1. Integrated Circuits by Botkar.
2. Industrial Electronics by Chute and Chute.
3. Industrial Electronics (Text LAB Manual) by Paul Zbar.

