C.U.SHAH UNIVERSITY

FACULTY OF: - Technology & Engineering
DEPARTMENT OF: -Instrumentation & Control Engineering
SEMESTER: - V
CODE: - 4TE05CSC1
NAME – Control System Components

Teaching & Evaluation Scheme

Subject Code	Subject Name	Teaching Hours/Week				Credits	Evaluation Scheme/Semester							
							Theory				Practical			
							Sessional Exam		University Exam		Internal		University	Total Marks
		Th	Tu	Pr	Total		Marks	Hrs	Marks	Hrs	Pr/Viva	TW	Pr	
4TE05CSC1	Control System Components	4	0	2	6	5	30	1.5	70	3	--	20	30	**150**

Objectives

- To introduce the students to concepts of various equipments and devices used for process control and its applications

Pre-requisite

- Fundamentals of electrical engineering, measuring instruments and transducers

Course Outlines

Sr. No.	Course Contents	No. of Hours
1.	Control Valves Types, Application and Selection, Capacity testing, Characteristics, Noise calculation and reduction.	6
2.	Components of Hydraulic and Pneumatic Systems Hydraulic Power Pack. Vane pump, ball pump, Valves and their types such as flow control, direction control, pressure control. Flapper valves, nozzle valves, pressure regulating devices, pressure switches.	6
3.	Gears and Gear Trains\ Worm, helical. Contact ration in gear, pitch of gear, design matching, backlash, and differential gear and application of gear as control component.	6
4..	Gyroscope Theory of operation of gyroscope, equation of motion. Transfer function, application of gyro to inertial navigation, restrained & rate-gyro- construction, vertical gyro, gyro characteristics and design consideration, gyroscope shift.	6
5.	Relays and Contactors Relays: Introduction, Classification of Relays, Relay Circuits, Characteristics Contactors : Introduction, Terms and Definitions, Contactor starters for Motor, Rated characteristics of contactors, Tests on Contactors, Application	6

6.	Solenoid Construction, operation, types, specifications, and applications.	6
7.	Servo Motors: AC - DC servomotors, their transfer functions, armature controlled, field controlled dc motors etc. and their applications Synchro: Introduction, operation, construction, static and dynamic errors, residual voltages, and phase shift, zeroing techniques, applications. Stepper Motors: Introduction, Types, Drive Circuits	10
8.	Parameter Sensitive Switches: Flow switches, Level switches, Temperature switches and thermostats, Pressure and differential pressure switches, Proximity switches and limit switches	6

Learning Outcomes:

After the completion of this course the students would be able to**:**

1. Understand the application of various control valves and relays for day to day as well as industrial applications.
2. Understand the applications of different types of motors for day to day as well as industrial applications.

Books Recommended

1. Applied Instrumentation in the Process Industries (Vol. – I) by W. G. Andrew & H.B. Williams; Pub: Gulf Publishing
2. Control Systems Components by M. D. Desai; Pub: Prentice Hall India
3. Switch Gear Protection and Power Systems by Sunil S. Rao; Pub: Khanna
4. Instrument Engineers' Handbook (Vol. – I) by B. G. Liptak; Pub: CRC Press