

# GUJARAT TECHNOLOGICAL UNIVERSITY

## DIPLOMA IN INSTRUMENTATION & CONTROL

### SEMESTER- VI

Subject Name: **APPLIED INSTRUMENTATION**

Sr. No.	Subject Content	Hrs.	Pract. Hrs.
1	<b>1.0 WATER TREATMENT PLANT</b> 1.1 Overall view , diagram of a water treatment plant and short description of processes involved. 1.2 Demineralizing water treatment system and its logic control concept. 1.3 Effluent water treatment system. 1.4 Control system in water treatment plant ie. PH, Vacuum Filtration sludge dewatering, multiple hearth incinerator for sludge disposal.	7	8
2	<b>2.0 SELECTION OF INSTRUMENTS</b> 2.1 Factors affecting selection of pressure instruments, temp. instruments, flow instruments, level instruments.	5	6
3	<b>3.0 INSTRUMENTS AIR SUPPLY SYSTEM</b> 3.1 Designing Factors – Sizing criteria, Pressure level, Source criteria ,Typical system schematic diagram for large intermediate or small instrument air requirements, Reciprocating two stage air compressors, Desiccant and heated dryers, Distribution System for instrument air at user plant, Typical schematic diagram with two filters / regulators in parallel and common air header with multiple branching for instruments of control room	7	6

4	<b>4.0 PLANT INTERLOCKS AND SPECIAL CONTROL SCHEMES.</b> 4.1 Need for plant interlocks, simple interlock circuit for any one process. 4.2 Schematic diagram, working and one application for the Following control Schemes : a. Cascade control b. Ratio control c. Feed forward control and d. Split range control.	5	12
5	<b>5.0 INSTALLATION AND COMMISSIONING OF INSTRUMENTS.</b> 5.1 Instrumentation and general requirement, Engineering Drawings for mechanical flow sheets, Panel drawings, Instrument location plans and electrical wiring details, requirements for instrument piping and tubing – impulse line, requirement for cabling and earthing , pre-installation testing, 5.2 Calibration of instruments, piping , pneumatic lines, impulse lines and cables 5.3 Check points for good installation practices, loop checking, typical Checkout procedure for Flow & Temp. Transmitter, Control valve. 5.4 Plant startup procedures and tuning of controllers.	9	12
6	<b>6.0 MAINTENANCE OF INSTRUMENTS.</b> 6.1 Need for maintenance, breakdown, preventive and predictive maintenance records, history card system etc., maintenance / calibration tools and instruments listing pneumatic calibrator, electronic calibrator, dead weight tester for pressure instruments, constant temp. bath and oven etc. 6.2 Maintenance requirements for : Pressure gauges and Pressure Transmitters / DP transmitters. Temperature gauges, Temp. Transmitter, Rotameter, Control valve, Sight glasses, P0ressure-temp- flow level switches, recorders and indicators, I to P converter, P to I converter.	9	12
	<b>Total</b>	42	56

**Note :- Above are the minimum experiences required, but the college can do more experiences if possible.**

Reference Books:

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|---|--------------|
| 1. Applied process control instrumentation                  | John Potwin. |
| 2. Applied Instrumentation in the Process Industries vol,II | WG Andrew.   |
| 3. Hand book of maintenance engineering.                    | H. P. Gerg.  |