



Semester – II

Subject Name: Electric Pumps and Valves Operation Skill

Subject Code: 09CH1103

Diploma Branches in which this subject is offered: Chemical Engineering

Objective: To understand the basic operating technique and working of Industrial pumps, valves, Flow measurement, and Temperature – Pressure measurement device used in chemical process industries, also understand application of measuring instruments of electrical parameters, construction & operation of electrical motors used for pump and valve operation. Also understand electrical control strategy for value control as well as various electrical transducers used for flow, pressure and temperature measurement

Credits Earned: 3 Credits

Course Outcomes: After learning the course the student should be able to work and operate:

1. Different type of Industrial Pumps and Valves.
2. Basic electrical parameters measuring instruments
3. Different type of electrical motor used for pump and valve operation
4. Different Types of Flow Measurement Devices.
5. Different Types of Temperature measurement Devices.
6. Different Types of Pressure measurement Devices.
7. Different types of electrical transducer used for flow, temperature and pressure measurement

Pre-requisite of course: NA.

Teaching and Examination Scheme

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
Theory	Tutorial	Practical		ESE	IA	CSE	Viva	Term work	
0	0	6	3	00	30	20	25	25	100



Contents:

Sr. No.	Content	Total hrs.	%weightage
1	Pumps : Classification of pumps and basic technology related to operation, operating practice of reciprocating pumps, Positive displacement pump, centrifugal pump, rotary pumps, Measurement of various electrical quantities and application of various electrical measuring instruments. Construction and operation of electrical motor used for all above pump application.	20	24
2	Valves: Classification of valves and basic technology related to operation and working, of Isolation valve, regulating valve, back flow prevention valve, pressure relief valve, gate valve, globe valve, ball valve and diaphragm valve Working, construction and operation of electrical motor and control system used for various valve.	20	24
3	Flow measurement : Classification of flow measurement devices, basic technology related to measurement. Operating practice of venturi meter, orifice meter, rotameter, pitot-tube Working, construction and operation of electrical transducer used for flow measurement devices	20	24
4	Temperature measurement devices: Working and operating practice of Thermometer, Thermocouple, Thermistors, Thermowell and Pyrometer. Working, construction and operation of electrical transducer used for temperature measurement devices.	12	14
5	Pressure measurement devices: Working and operating practice of U-tube manometer, Inclined tube Manometer, Pressure gauge. Working, construction and operation of electrical transducer used for pressure measurement devices.	12	14

References:

1. " Unit Operation of Chemical Engineering ", by W. L. McCabe, J. C. Smith, P. Harriott.
2. "mass transfer Operations ", by R. E. Treybal
3. "Unit Operation-1", by K. A. Gavhane
4. B. L. Theraja, "A Text Book of Electrical Technology Vol-I, II, III and IV ", S. Chand &Co. Ltd. 2014
5. V.N. Mittal, "Basic Electrical Engineering". Tata-McGraw-Hill, 2nd edition, 2006.



6. "Theory & Performance Of Electrical Machines Electrical machines" by J. B. Gupta
7. "A course in Electrical and Electronic Measurements and Instrumentation" by A. K. Sawhney

List of Jobs/Experiments:

1. To study, working and operating practice of reciprocating pumps, single acting piston pump, double acting simplex pump.
2. To study and measurement of various electrical quantities by using electrical measuring instruments.
3. To study construction, working and operation of electrical motor used for reciprocating pumps, single acting piston pump, double acting simplex pump.
4. Working and operating practice of diaphragm pump and centrifugal pump.
5. Working, construction and operation of electrical motor used for diaphragm pump and centrifugal pump.
6. Working and operating practice of isolation valve, regulating valve, back flow prevention valve and pressure relief valve
7. Working, construction and operation of electrical motor and control system used for isolation valve, regulating valve, back flow prevention valve and pressure relief valve.
8. Working and operating practice of gate valve and globe valve.
9. Working, construction and operation of electrical motor and control system used for gate valve and globe valve.
10. Working and operating practice of ball valve and diaphragm valve.
11. Working, construction and operation of electrical motor and control system used for ball valve and diaphragm valve.
12. Working and operating practice of venturi meter.
13. Working and operating practice of orifice Meter
14. Working and operating practice of rotameter.
15. Working and operating practice of pitot-tube.
16. Working, construction and operation of electrical transducer used for flow measurement devices
17. Working and operating practice of U-tube manometer
18. Working and operating practice of inclined tube manometer.
19. Working and operating practice of pressure gauges.
20. Working and operating practice of thermowell.
21. Working and operating practice of thermister.
22. Working and operating practice of temperature pyrometer.
23. Working, construction and operation of electrical transducer used for pressure and temperature measurement devices.



Instructional Method:

- a. The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory.
- b. Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory.