

INSTITUTE	DIPLOMA STUDIES
PROGRAM	DIPLOMA ENGINEERING (CHEMICAL ENGINEERING)
SEMESTER	2
COURSE TITLE	ELECTRICAL PUMPS AND VALVES OPERATION SKILL
COURSE CODE	09CH2103
COURSE CREDITS	2

Objective:

- 1 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

Course Outcomes: After completion of this course, student will be able to:

- 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 and electrical transducer used for it.
- 5 Different Types of Temperature measurement Devices and electrical transducer used for it.
- 6 Different Types of Pressure measurement Devices and electrical transducer used for it

Pre-requisite of course:NA

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
0	0	4	0	30	20	25	25

Contents : Unit	Topics	Contact Hours
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.	12

Contents : Unit	Topics	Contact Hours
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.	12
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	12
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	10
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	10
Total Hours		56

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	Experiment - 1 To study, working and operating practice of reciprocating pumps, single acting piston pump, double acting simplex pump	4
2	Experiment - 2 To study and measurement of various electrical quantities by using electrical measuring instruments.	4
3	Experiment - 3 To study construction, working and operation of electrical motor used for reciprocating pumps, single acting piston pump, double acting simplex pump.	4
4	Experiment - 4 Working and operating practice of diaphragm pump and centrifugal pump.	2
5	Experiment - 5 Working, construction and operation of electrical motor used for diaphragm pump and centrifugal pump	4
6	Experiment - 6 Working and operating practice of isolation valve, regulating valve, back flow prevention valve and pressure relief valve	2

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
7	Experiment - 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.	2
8	Experiment - 8 Working and operating practice of gate valve and globe valve	2
9	Experiment - 9 Working, construction and operation of electrical motor and control system used for gate valve and globe valve	2
10	Experiment - 10 Working and operating practice of ball valve and diaphragm valve.	2
11	Experiment - 11 Working, construction and operation of electrical motor and control system used for ball valve and diaphragm valve.	2
12	Experiment - 12 Working and operating practice of venturi meter	2
13	Experiment - 13 Working and operating practice of orifice Meter	2
14	Experiment - 14 Working and operating practice of rotameter	2
15	Experiment - 15 Working and operating practice of pitot-tube.	2
16	Experiment - 16 Working, construction and operation of electrical transducer used for flow measurement devices	2
17	Experiment - 17 Working and operating practice of U-tube manometer	2
18	Experiment - 18 Working and operating practice of inclined tube manometer	4
19	Experiment - 19 Working and operating practice of pressure gauges.	2
20	Experiment - 20 Working and operating practice of thermowell	2
21	Experiment - 21 Working and operating practice of thermister	2
22	Experiment - 22 Working and operating practice of temperature pyrometer	2
23	Experiment - 23 Working, construction and operation of electrical transducer used for pressure and temperature measurement devices	2
Total Hours		56

Textbook :

- 1 Unit Operation of Chemical Engineering , W. L. McCabe, J. C. Smith, P. Harriott, McGraw-Hill, 2018

References:

- 1 Mass Transfer Operations , Mass Transfer Operations , by R. E. Treybal, McGraw Hill, 1981
- 2 Unit Operation-1, Unit Operation-1, K. A. Gavhane, Nirali Publication, 2001
- 3 Text Book of Electrical Technology Vol-I, II, III and IV, Text Book of Electrical Technology Vol-I, II, III and IV, B. L. Theraja, S. Chand &Co. Ltd., 2014
- 4 Basic Electrical Engineering, Basic Electrical Engineering, V.N. Mittal, ata-McGraw-Hill, 2006

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember / Knowledge	Understand	Apply	Analyze	Evaluate	Higher order Thinking / Creative
40.00	40.00	10.00	10.00		

Instructional Method:

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

Supplementary Resources:

- 1 https://onlinecourses.nptel.ac.in/noc24_me69/preview