

RGPV (DIPLOMA WING) BHOPAL		OBE CURRICULUM FOR THE COURSE		FORMAT-3	Sheet No. 1/5
Branch	Electronics & Instrumentation		Semester	IV	
Course Code	404	Course Name	Process Instrumentation		
Course Outcome 1	To understand and measure following physical parameter humidity, viscosity & Moisture.			Teach Hrs	Marks
Learning Outcome 1	Explain the various devices used for moisture measurement. (Cognitive)			5	10
Contents	Definition of moisture, Hot wire electrode type hygrometer, dewcell, Electrolysis type hygrometer, commercial type dew point meter, moisture terms, different methods of moisture measurement.				
Method of Assessment	External (End semester Theory Exam)				
Learning Outcome 2	Explain the humidity measurement. (Cognitive)			5	10
Contents	Definition of humidity, Industrial consistency meters, humidity terms, dry and wet bulb methods				
Method of Assessment	External (End semester Theory Exam)				
Learning Outcome 3	Explain the viscosity measurement. (Psychomotor)				
Contents	Definition of viscosity, viscosity terms, Say bolt viscometer, Rota meter type viscometer, capillary tube type viscometer				
Method of Assessment	Internal (practical test in laboratories)				
Learning Outcome 4	To measure the humidity, viscosity & moisture. (Psychomotor)			10	10
Contents	<ul style="list-style-type: none"> • To Measure the humidity using hygrometer • To Measure the viscosity using say bolt universal viscometer • To Measure the Moisture using hygrometer • To make a small project for humidity & moisture measurement 				
Method of Assessment	External (End semester practical Exam)				

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Branch	Electronics & Instrumentation		Semester	IV
Course Code	404	Course Name	Process Instrumentation	
Course Outcome 2	Explain the various methods of level measurements		Teach Hrs	Marks
Learning Outcome 5	Explain the different type mechanical instrument for level measurement. (cognitive)		8	10
Contents	Definition of level measurement, method of level measurement, Sight Glass, hook Gauge, float type, magnetic level gauge, Buoyancy and displacement gauge.			
Method of Assessment	External (End semester Theory Exam)			
Learning Outcome 6	Explain the construction and working of hydrostatic type level measurement. (Cognitive)		7	10
Contents	Pressure gauge, air bellows, air purge system, liquid purge system, force balance method			
Method of Assessment	Internal(mid semester theory Exam)			
Learning Outcome 7	Explain the various electrical type level measurement gauges & nuclear radiation and ultrasonic sensor. (Cognitive)		15	10
Contents	level switches, level measurement using displacer and torque tube ,bubbler method. Boiler drum level measurement, differential pressure method hydra step systems, Electrical types of level gauges using resistance, capacitance method, nuclear radiation and ultrasonic sensors.			
Method of Assessment	External(End semester Theory Exam)			
Learning Outcome 8	To Measurement level using different methods (Psychomotor)			
Contents	<ul style="list-style-type: none"> • To measure level using float type method • To measure level using capacitive prove method • To measure and control level using PLC • To control the level of any tank, make a small project 			
Method of Assessment	External(End semester practical Exam)			

RGPV (DIPLOMA WING) BHOPAL	OBE CURRICULUM FOR THE COURSE	FORMAT- 3	Sheet No. 3/5
Branch	Electronics & Instrumentation	Semester	IV

Course Code	404	Course Name	Process Instrumentation	
Course Outcome 3	To understand construction and working principle of various type Fluid flow.		Teach Hrs	Marks
Learning Outcome 9	Explain the types of flow meters(Cognitive)		8	10
Contents	Definition of flow, type of flow, Reynolds's number, Bernoulli's equation for flow restriction variable head type flow meters, orifice plate, venturimeter, flow nozzle, Dall tube, installation of head flow meters, piping arrangement for different fluids, pitot tube, quantity meters, area flow meters, calibration of flow meters, thermal mass flow meter.			
Method of Assessment	External (End semester Theory Exam)			
Learning Outcome 10	Explain the mass flow meters.(Cognitive)		7	10
Contents	Weirs, Flume, Angular momentum mass flow meter, Coriolis mass flow meters Thermal mass flow meter.			
Method of Assessment	Internal (mid semester theory Exam)			
Learning Outcome 11	Explain the Different flow meters.(Cognitive)		15	10
Contents	Positive displacement flow meters, construction details and theory of operation of Nutating disc, reciprocation piston meter, oval gear and helix type flow meters, turbine flow meter theory and installation, magnetic flow meter.			
Method of Assessment	External (End semester Theory Exam)			
Learning Outcome 12	To measure the flow using various instruments(Psychomotor)			
Contents	<ul style="list-style-type: none"> • To measure the Flow using venture meter • To measure the Flow using orifice plate • To measure the Flow using magnetic flow meter • To make a small project to measure fluid Flow 			
Method of Assessment	External (End semester practical Exam)			

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Branch	Electronics & Instrumentation		Semester	IV	
Course Code	404	Course Name	Process Instrumentation		

Course Outcome 5	To understand construction and working principle of various type Industrial Innovations.	Teach Hrs	Marks
Learning Outcome 13	Instrument and Process equipment Symbols. (Cognitive)	10	10
Contents	Line type, Process/instrument line connections, instrument bubbles ,process valve type , valve actuator type ,valve failure mode		
Method of Assessment	External(End semester Theory Exam)		
Learning Outcome 14	To understand process devices symbols. (Cognitive)		
Contents	Liquid level measurement devices symbol, flow measurement devices symbol, pressure vessels symbol, functional diagram symbols, single line electrical and fluid power diagram symbol.		
Method of Assessment	Internal (Assignment)		
Learning Outcome 15	Illustrate the Application Of Instrumentation. (Psychomotor)		
Contents	<ul style="list-style-type: none"> • Student should be encouraged to collect information regarding process instrumentation used in various process control applications. • Documentation may be made on the collected topics. 		
Method of Assessment	Internal (Assignment)		

Suggested List of Experiments*:

S.no	Experiments	CO
1.	To Study the Buoyancy and displacement gauge level measurement	CO 404.1
2.	To Study of the direct method in Sight glass measurement	CO 404.1
3.	To Study the capacitance method in level measurement	CO 404.2
4.	To Study dry and wet bulb Psychrometer measurement	CO 404.2
5.	To Study the mass flow meter and types of mass flow meter	CO 404.2
6.	To Study of the Thermal mass flow meter.	CO 404.3
7.	To Study of the electromagnetic flow meter	CO 404.3
8.	To Study of the laser Doppler anemometer systems	CO 404.4
9.	To Study of the vortex shedding flow meter	CO 404.4

10.	To Study of the reciprocation piston oscillator	CO 404.4
11.	To Study of the angular momentum mass flow meter	CO 404.5
12.	To Study of the ultrasonic flow meters	CO 404.5
13.	To Study of the orifice plate and Explain the types of orifice plats	CO 404.5

Ten experiments in a semester as per the discretion of the subject teacher.

Major Equipment/Materials:

1.	Cathode Ray Oscilloscope(CRO)/Digital Storage Oscilloscope(DSO)
2.	Dual Power Supply
3.	Function generator
4.	Digital/Analog Multimeter
5.	Breadboard, discrete components, wires
6.	Linear IC Trainer
7.	PLC Trainer
8.	SMPS Trainer

Reference Books/Tex Books :

S.NO.	Title	Author
1.	Electrical & electronics measurements & Instrumentation	A.K Sawhney
2.	Industrial Instrumentation	S.k Singh
3.	Principals of Industrial Instrumentation	D. Patranabis
4.	Mechanical & Industrial Measurements	R.K Jain
5.	Measurement system applications & design	D.S Kumar
6.	Instrumentation Measurement & Analysis	B.C Nakra & K.K. Choudhary
7.	Electronics Measurement	W.D Cooper
8	Lessons in industrial instrumentation	Tony R. Kuphaldt
9	Instrumentation	Carr
10	Mechanical Measurements and Instrumentation & Control	A.K. Sawhney Puneet Sawhney