

PLANNED SYLLABUS COVERAGE (Theory)

GPK-F-17

Syllabus Coverage		Department: Instrumentation Engineering Subject : Industrial Instrumentation-II Course : Program Core Duration: 06-08-26 To 28-11-2026 Total Period: 56 (4 per week*14 weeks) Theory : 56				
S	N	Period Nos	Topic	Details	Instruction Reference	Additional Study Recommended
1		10Hrs	Basic flow measurement Techniques	Basic flow meas. Techniques Basic concept of Bernoulli's Thm Methods of flow measurements Variable head/Differential Pressure/Obstruction type flow meters. Basic operating principles & concept of A. Head Primary elements of Diff ⁿ flow meters: Orifice plate, Venturi tube, flow nozzle, Pitot tube Variable Area flowmeters: Datanometers.	Industrial Instrumentation and Control; S. K. Singh; TMH. Instrumentation Measurement and Analysis; B. C. Nakra and K. K. Chaudhary; TMH. Industrial Instrumentation; Umesh Rathore S. K. Kataria	Internet
2		14 Hrs	Miscellaneous flow Measurement	Misc. flow measurements. Velocity type flow meas - Electromagnetic flow meter Turbine type flow meter Target type flow meter Ultrasonic flow meter Vortex type flow meter Anemometers, Mass flow measurements - Coriolis Mass Fm, Impact type Fm, +ve disp. Fm, open channel flow measurement Techniques.	- do - -	-----do-----
3		12 Hrs	Basic Pressure Measurement Techniques	Basic Pressure meas. Tech. Manometers - UTube, Baromet inclined Manometer, Inell type Manometer, Elastic Pressure Transducers: Bourdon tube C-type Burdon Gauge, Diaphragm, Bellow type, Force Balance type - Dead weight Tester.	- do - -	-----do-----
4		14 Hrs	Miscellaneous Pressure Measurement	Misc. Pressure measurement Electrical type Pressure meas. technique: strain gauge Pressure Transducers.	- do - -	-----do-----

6 Hrs

Potentiometric Pressure Transducers. Capacitive Pressure Transducers. LVDT Type Pressure Transducers. Measurement of Vacuum: Pirani Gauges, Capsule Gauge, Macleod Gauge, Thermal Conductivity Gauge

Class Tests.
Revision
Problem Solving

Approved

Date:

03/08/2016

HOD Sign.



Date:

Principal Sign



Practical Planning & Coverage Status

Department: Instrumentation Engg.

Laboratory: Advanced Control Lab (Room No.

Course: IEPC 303 (Program Core)

Subject: Industrial Instrumentation - II Lab.

Sr. No.	Details of Practical	Availability of		Likely Turn/Date	Actual Date	Responsibility	HOD Sign.	Remarks
		Equipment Set up	STD Ref. Write up					
01	To observe the working of Rotameter (Variable area flowmeter) for any fluid flow.	PCT-trainer experimantal kit	Textbook & user manual of Rotameter	G1: 3rd, 4th G1: 1st, 2nd				
02	To observe & measure the flow rate using Turbine type flowmeter	do	Textbook & user manual of turbine type flowmeter	G1: 3rd, 4th G2: 3rd, 4th				
03	To study the bourdon tube type pressure gauge & identify its parts.	C-type bourdon gauge & simulator	Textbook & user manual of C-type bourdon tube pressure gauge	G1: 5th, 6th G2: 5th, 6th				

Approved/ Not approved

HOD Sign with date

Principal Signature with date

Practical Planning & Coverage Statement

Department: Instrumentation Engg. Laboratory: Advanced Control Lab (Room No. 3)
 Course: IEPC 303 (Program Core) Subject: Industrial Instrumentation-II Lab.

Sr. No.	Details of Practical	Equipment Set up	Availability of STD Ref. Write up	Likely Turn/Date	Actual Date	Responsibility	HOD Sign.	Remarks
04	To study the construction of dead-weight tester & its use in the calibration of field instruments.	Dead-weight tester.	Textbook & User manual	G1: 7th, 8th G2: 7th, 8th				
05	To study the positive displacement type flow meter	—	Textbook & User manual	G1: 9th G2: 9th				
06	To study the different manometers	U-tube manometer	do —	G1: 10th G2: 10th				
07	Revision.			G1: 11th, 12th, 13th, 14th G2: 11th, 12th, 13th, 14th				

Approved/ Not approved

[Signature]
 HOD Sign with date

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 Principal Signature with date

PLANNED SYLLABUS COVERAGE(Theory)

G P Kangra		Department: <u>I-E</u> Subject <u>Process Control-II</u>		Course <u>Program Core</u> Duration <u>06 months</u>		SYLLABUS COVERAGE	
Sr. No.		Period Nos.		Total Periods <u>56</u> Theory <u>56 (Th.)</u>			
Topic		Details		Instruction Reference		Additional Study Recommended	Remarks
01	10 (01 to 10)	Controller Tuning	- Basics of Controller Tuning (Overview) - Criteria for Good Control: ISA, IAE & ITAE - Process Reaction Curve (Cohen Coon Method) - Ziegler-Nichols method	Process Control Inst. Tech. Bb Curtis D. Johnson (PHE) & Process Control Swicksta Blomst (Oxford)	Instrument Engineer Handbook - Bala G. Liptak (CRC Press)		
02	12 (11 to 22)	Process Control Components	- Intro. to elements of the final control, signal conversion elements, actuators & control elements - Electromechanical Relay - Pneumatic flapper Nozzle system & its applications - I/P Converter - Pneumatic Relays - Solenoid coil - Single & Double Acting Pneumatic cylinder	- do -	- do -		
03	12 (23 to 34)	Control Valve	- Intro. to Control Valve - Control Valve Construction - Valve Sizing - Control Valve Characteristics:	- do -	- do -		

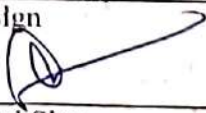
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To be approved from concerned HOD within seven days from beginning of semester & will be kept with the concerned teacher in his file.

Sr. No.	Period Nos.	Topic	Details	Instruction Reference	Additional Study Recommended	Remarks
04	12 (35 to 46)	Hydraulic - Pneumatic - Electronic Controllers	- Valve positions - Basic Selection criteria for Control Valve - Introduction - Comparison of Hydraulic v/s Pneumatic - Concept of Pneumatic Controller: Hydraulic, Pneumatic, Electronic	- do -	- do -	
05	10 (41 to 56)	Miscellaneous Topics of Process Control	- Some basic examples of PC System: Heat Exchanger, Stirrer Tank, Liquid Level - Control objectives - Safety, Environmental Protection, Equipment Protection, Smooth plant operation, Product Quality, Energy Optimization, Monitoring & diagnosis. - Benefits of PC Systems - Process Controllers - Basic Idea of Levels of Process Control Systems	- do -	- do -	

Extra Topics to be covered beyond the scope of the syllabus (as required by industry/ as recommended by Teacher which he/ she finds necessary)

Sr. No.	Period No.	Topic Covered	Instruction Reference	Additional Study recommended	Remarks

Approved / Not approved	
Date 03/08/2026	HOD Sign 
Date 03/08/2026	Principal Sign 

Use additional sheets (if required).

PLANNED SYLLABUS COVERAGE(Theory)

G P Kangra		Department: <u>Insten. Engg.</u> Subject <u>AI & U</u>				
SYLLABUS COVERAGE		Course <u>Program Elective</u> Duration <u>06 Months</u>				
		Total Periods <u>56</u> Theory <u>56 (Th.)</u>				
Sr. No.	Period Nos.	Topic	Details	Instruction Reference	Additional Study Recommended	Remarks
01	10 (01 to 10)	Basic Fundamentals	- Introduction - Need of Insten. - Adv. of Inst. & Plant Automation - Role of Insten. Engineers in Industry - PID/Instrumentation Symbols - Basic PID Diagrams - Pn/Level/Temp./Flow Control Loop.	Process Control Inst. Tech. By Curtis D. Johnson (PHZ)	Instrument Engineers Handbook By Bela G. Liptak (C.R.C. Press)	
02	12 (11 to 22)	Selection of Instruments + CT-I	Selection of Instruments (their criteria) as per requirements for measurement of - Pressure, Level, Flow, Temperature, pH & Speed.	- de -	- de -	
03	14 (23 to 36)	Inst. in Plant Utilities + CT-II	Inst. used in following utilities in Plant:- ↳ Boiler (Steam Generator) ↳ Water Treatment (DM & RO Plant) ↳ Air Compressor & Air Distribution System	- de -	- de -	

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PLANNED SYLLABUS COVERAGE(Theory)

G P Kangra		Department: <u>Instn. Engg.</u> Subject <u>AIEU</u>				
SYLLABUS COVERAGE		Course <u>Program Elective</u> Duration <u>06 Months</u>				
		Total Periods <u>56</u> Theory <u>56 (Th.)</u>				
Sr. No.	Period Nos.	Topic	Details	Instruction Reference	Additional Study Recommended	Remarks
04	10 (37 to 46)	Erection & Commissioning of Instruments	→ Fuel Storage & forwarding system for Boiler operation → HVAC & its Chiller system for Centralized AC system. - Intro. to Erection & Commissioning - P&ID Requirement for Erection/Installation - P&ID requirement for Commissioning - study of Hook up drawing, P&ID and Control, wire up - Loop checking - Concept of Instruments earth & Power earth - Need of Calibration of Inst. - Check points for first start up - Tasks of Commissioning engineer at site.	- do -	- do -	
05	10 (47 to 56)	Maintenance of Instruments	- Objectives of Maintenance - Types of Maintenance ↳ Planned & Unplanned - Breakdown Maintenance - Preventive Maintenance ↳ Periodic & Predictive maintenance - Comparison of	- do -	- do - + Maintenance of Instruments & Systems by L. D. Goettsche (ISA)	

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Sr. No.	Period Nos.	Topic	Details	Instruction Reference	Additional Study Recommended	Remarks
			- Preventive v/s Breakdown - Planned v/s Unplanned maintenance. - Std. apparatus used for calibration ↳ Dead weight tester for Pa. measuring inst. ↳ Constant temp. bath for temp. meas. inst. - Important points to be considered for maintenance of various field instruments ↳ Pa. Gauge ↳ PT ↳ Temp. Indicator ↳ RTD ↳ Thermocouple ↳ Level Gauge ↳ Level Transmitter ↳ Flow Transmitter			

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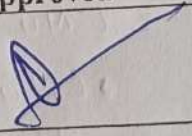
G I Ka gra		Department: <u>Instrumentation Engg</u>		Subject <u>Biomedical Instrumentation</u>	
SYLLABUS COVERAGE		Course <u>Program Elective - IV</u>		Duration <u>14 Weeks</u>	
Sr. No.		Period Nos.		Total Periods <u>T (56), P (28) Theory 56</u>	
Sr. No.		Topic	Details	Instruction Reference	Additional Study Recommended
01	12	Introduction to BI	• Sources / origin of BM/BE signals. • Generalised block diagram of BMI system. • Various types of biomedical electrodes. • Basics of Pulse rate measurement. • BP measurement by using sphygmomanometer and stethoscope. • Basic concept of Telemedicine technology and its applications. • Role of engineers in Health care facilities.	Handbook BMI by R.S. Chandpur	Introduction to Medical Electronics by Mandeep Singh.
02	12	Electrocardiography.	• Introduction to ECG signals. • ECG machine block diagram. • ECG record analysis, applications.	— do —	— do —
03	10	Electromyography.	• Introduction of EMG, EMG signals. • EMG block diagram, applications.	— do —	— do —

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Sr. No.	Period Nos.	Topic	Details	Instruction Reference	Additional Study Recommended	Remarks
04	10	Electroencephalography	• Introduction to EEG, EEG signals. • EEG machine block diagram, application.	-do-	-do-	
05	12	Miscellaneous Medical Equipments	• CT Scan, CT & Cones • Principle, block diagram, working & app^m. • Pacemakers, principle of operations & need of pacemakers. • Different types of pacemakers. • Defibrillators, principle operation, need of defibrillator, different types of defibrillators, Pulse oximetry.	-do-	-do-	

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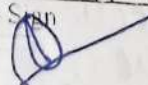
G P Kangra		Department: <u>Instru. Engg</u> Subject <u>OE-1 (Industrial Mechatronics)</u>				
SYLLABUS COVERAGE		Course <u>MAOE 301 (OE-1)</u> Duration <u>6⁸/₂₆ to 28¹¹/₂₆</u>				
		Total Periods <u>56</u> Theory <u>5</u> L: <u>42</u> , DCS: <u>14</u> , No Practical				
Sr. No.	Period Nos.	Topic	Details	Instruction Reference	Additional Study Recommended	Remarks
01	1 to 12 (12)	Introduction to Mechatronics	What is mechatronics, the design process systems, Measurement systems, Control systems, Programmable Logic Controller, Examples of mechatronics systems.	Mechatronics electronic control systems in mechanical & electrical Engg by William Bolton	Mechatronics Swagatam course by Prof. Pushpvardy Man Pathak	
02	13 to 22 (10)	Sensors & signal Conditioning	Data Conversion devices, sensors, micro-sensors, transducers, signal processing devices, timers, Microprocessors, Microcontrollers, PID controllers and PLCs.	-do-	-do-	
03	23 to 33 (11)	Hydraulic systems.	Flow, Pressure & direction control valves, Actuators, supporting Elements, Hydraulic power packs pumps. Design of Hydraulic circuits	-do-	Piping design & fluidizing analysis by TITU Modhans	

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Sr. No.	Period Nos.	Topic	Details	Instruction Reference	Additional Study Recommended	Remarks
04	34 to 44 (11)	Pneumatic Systems.	Production, Distribution & Conditioning of compressed air, System components and graphical representations. Design of systems.	-do-	-do-	
05	45 to 54 (10)	System models.	Mathematical models, Mechanical system building blocks, Electrical system building blocks, Fluid system building blocks, Thermal System building blocks.	-do-	-do-	

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		NA			

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