

PLANNED SYLLABUS COVERAGE(Theory)

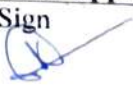
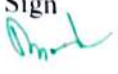
G P Kangra		Department: <u>Instan. Engg</u> Subject <u>Control System</u>				
		Course <u>Program Core</u> Duration <u>06 months</u>				
SYLLABUS COVERAGE		Total Periods <u>56 (Th.)</u> Theory <u>56</u>				
Sr. No.	Period Nos.	Topic	Details	Instruction Reference	Additional Study Recommended	Remarks
01	10 (01 to 10)	Intro. to Control System.	- Basic terminology used in control system - Open & Closed Loop Control System - Requirements of a Good Control System - Basic Concept of T.F. & mathematical model for Mass Spring Damper system. - Concept of Poles & Zeros - Intro. to L.T.	Automatic Control System - B.C. Kuo (Pearson) & Linear Control System by B.S. Manke (Khanwa)	Control System Engg. - I.T. Nagarkar & M. Gupta (New Age) & Modern Control Engg. - K. Ogata (PHI)	
02	10 (11 to 20)	Block Dia. & SFG Representation	- Fundamentals of Block Dia. - Ad. & Dis. ad. of Block dia. - Derivation of T.F. of Closed Loop System. - Block. dia. reduction rule - SFG, Mason's Gain formula, Conversion of a Block dia. to SFG - Block dia. v/s SFG	- do -	- do -	
03	14 (21 to 34)	Time Domain Analysis	- Intro to Time Domain Analysis - Transient & Steady State Response. - Std. Test Signals - Impulse, Step, Ramp & Parabolic - Steady State Error - Type of Control System	- do -	- do -	

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.	11 (35 to 41)	Stability Analysis using Time Domain Tech. - I	- S.S. Error & Type of System 1st & 2nd Order C.S - Time Domain Specification. - Basic Concept of Stable System & Unstable system - Relative Stability - Routh Hurwitz Criterion - Simple Rule on Routh Hurwitz criterion.	- do -	- do -	
05.	11 (46 to 56)	Stability Analysis using Time Domain Tech. - II	- Intro. to Root Locus - Angle & Magnitude Criterion - Rules of Construction of Root Locus - Simple Rule on Root Locus.	- 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

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Date 27/01/26	HOD Sign 
Date 27/01/26	Principal Sign 

Use additional sheets (if required).

Practical Planning & Coverage Status

Department: Instrumentation Engg.
Course: Program Control

Lab. Log: Control System Lab
Subject: Control System

Sr. No.	Details of Practical	Availability of		Likely Turn/Date	Actual Date	Responsibility	HOD Sign.	Remarks
		Equipment Set up	STD Ref. Write up					
1	To simulate closed loop CS	Trainer Kit	Lab Manual	G1- Mon G2- Tue				
2	To observe the response of 1 st order CS for any stimulus	Trainer Kit	Lab Manual	G1- Mon G2- Tue				
3	To observe the response of Type 0 CS for any stimulus	Trainer Kit	Lab Manual	G1- Mon G2- Tue				
4	To observe the response of 1 st order CS for any stimulus	Trainer Kit	Lab Manual	G1- Mon G2- Tue				
5	To observe the response of Type-I control system for any stimulus	Trainer Kit	Lab Manual	G1- Mon G2- Tue				
6	To observe the response of 2 nd order CS for any stimulus	Trainer Kit	Lab Manual	G1- Mon G2- Tue				
7	To observe the response of Type-2 CS for any stimulus	Trainer Kit	Lab Manual	G1- Mon G2- Tue				

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22/10/2024
HOD/In-charge

Principal Signature with date

PLANNED SYLLABUS COVERAGE(Theory)

G P Kangra		Department: <u>Instrumentation Engg.</u> Subject <u>Industrial Instrumentation - I</u>				Remarks
SYLLABUS COVERAGE		Course <u>Program Core</u> Duration <u>06 months</u>				
		Total Periods <u>42</u> Theory <u>42</u>				
Sr. No.	Period Nos.	Topic	Details	Instruction Reference	Additional Study Recommended	
1	01-08 (08)	Basics of II & Temp. meas.	Intro to II, Intro to temp. scale conversion from one scale to another, concept of thermal expansion, method of temp. meas. expansion type temp. meas. Bimetallic thermometer, liquid in glass thermometer	Ind. Instru. & control by S.K. Singh (TMH) & Ind. Instr. by BC Nakra	Instrument Engineer's Handbook by B.G. Liptak	
2	9-20 (12)	Electrical type temp. meas.	Concept of thermal expansion coefficient of resistance RTD principle const. & working concept of lead wire compensation in RTD, thermistor principle construction & types, working, thermocouple working principle, thermocouple const. types of thermocouple, concept of cold junction compensation, pyrometers			
	21-27 (07)	Basics of level measurement	Intro to level meas. units of level meas. methods of level meas. direct methods Indirect methods visual level indicator Hook type level Ind. float type level Ind. Displace type level Ind.			
4	28-36 (09)	Indirect level meas.	Indirect methods : Pr. gauge method, Air Bellow, Air Purge System, Resistive type, Capacitive type, Gamma ray/Radiation type, ultra Sonic level type			

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Sr. No.	Period Nos.	Topic	Details	Instruction Reference	Additional Study Recommended	Remarks
5	37-42 (6)	Fundamentals of pressure & flow measurement	Intro. to pressure meas. diff. types of pressure measurement, absolute Gauge & vacuum pressure units of pressure & their inter conversion, intro to flow measurement, diff types of flow laminar & turbulent, concept of volumetric & mass flow rate concept of Reynold number in flow meter, diff. units of flow meas.			

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Practical Planning & Coverage Status

Department: Instrumentation Engg.

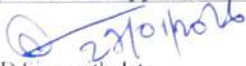
Laboratory: Ind. Instrumentation - I

Course: Program Case

Subject: Ind. Instrumentation - I

Sr. No.	Details of Practical	Availability of		Likely Turn/Date	Actual Date	Responsibility	HOD Sign.	Remarks
		Equipment Set up	STD Ref. Write up					
1	To demonstrate the const. of RTD observe the I/P of RTD in the form of change in resistance with variation in temp.	Trainer Kit	Lab Manual	G1- Wed G2- Thu				
2	To study the concept of contact type temp. measurement & to measure temp. using RTD on trainer kit.	Trainer Kit	Lab Manual	G1- Wed G2- Thu				
3	To study the concept of non contact type temp. measurement & to measure temp. using IR Thermometer.	Trainer Kit	Lab Manual	G1- Wed G2- Thu				
4	To observe the structure of visual level indicator & its working	Trainer Kit	Lab Manual	G1- Wed G2- Thu				
5	To observe the low & high level ind. in a process vessel or tank	Trainer Kit	Lab Manual	G1- Wed G2- Thu				
6	To demonstrate the const. & working of pressure gauge.	Trainer Kit	Lab Manual	G1- Wed G2- Thu				
7	To demonstrate the const. & working of temp. gauge	Trainer Kit	Lab Manual	G1- Wed G2- Thu				

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PLANNED SYLLABUS COVERAGE(Theory)

G P Kangra		Department: <u>Instrumentation Engg</u> Subject <u>Process Control - I</u>				
SYLLABUS COVERAGE		Course <u>Program Core</u> Duration <u>06 months</u>				
		Total Periods <u>42</u> Theory <u>42</u>				
Sr. No.	Period Nos.	Topic	Details	Instruction Reference	Additional Study Recommended	Remarks
1	1-12 (12)	Intro. to Process Control	1.1 Intro. to Process Control 1.2 Block diagram representation of Process control system 1.3 Various components/Elements & terms of PCS, sensor/transducers, controller, Final control element, Error Detector, controlled variable, Process variable, set point, Manipulated variable, disturbance. 1.4 Process characteristics: Process equation, process load, process lag, self regulation 1.5 Control system parameters: Error, control lag, Dead time, cycling, reverse direct action	Process Control Inst. tech. by Curtis D. Johnson Pearson Education	www.nptel.com	
2	13-24 (12)	Discontinuous controllers mode	2.1 Intro & classification of controllers 2.2 Important terminology and issues related to controllers: Proportional Band, Neutral zone, Gain, reset time, Derivative time 2.3 Discontinuous controllers: on-off control mode, Multi position controllers, mode floating control mode	-do-		
3	25-36 (12)	Continuous controllers mode	3.1 Proportional controllers 3.2 Integral controllers 3.3 Derivative controllers 3.4 PI controllers 3.5 PD controllers 3.6 PID controllers	-do-		

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Sr. No.	Period Nos.	Topic	Details	Instruction Reference	Additional Study Recommended	Remarks
4	(37-42) (6)	Process Control System	4.1 Feedback & feed forward control 4.2 Cascade control 4.3 Ratio control	-do-		

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Practical Planning & Coverage Status

Department: Instrumentation Engg.
Course: Program Code

Laboratory: Process Control - I Lab
Subject: Process Control - I

Sr. No.	Details of Practical	Availability of		Likely Turn/Date	Actual Date	Responsibility	HOD Sign.	Remarks
		Equipment Set up	STD Ref. Write up					
1	To familiarize with feedback element controller & final control element of any process control system	Trainer Kit	Lab. Manual	G1 - Pui G2 - Sot				
2	To observe the response of on/off controller	Trainer Kit	Lab Manual	G1 - Pui G2 - Sot				
3	To observe proportional control action of a PI controller	Trainer Kit	Lab Manual	G1 - Pui G2 - Sot				
4	To observe Proportional Integral Control Action of PI control	Trainer Kit	Lab Manual	G1 - Pui G2 - Sot				
5	To observe PD control action of a PD controller	Trainer Kit	Lab Manual	G1 - Pui G2 - Sot				
6	To observe PID control action of a PID controller	Trainer Kit	Lab Manual	G1 - Pui G2 - Sot				
7	To study cascade control system	Trainer Kit	Lab Manual	G1 - Pui G2 - Sot				
8	To study Ratio control system	Trainer Kit	Lab Manual	G1 - Pui G2 - Sot				

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PLANNED SYLLABUS COVERAGE(Theory)

G Ka SY CO	Sr. No.	ABUS RAGE	Period Nos.	Department: <u>Instr. Engg</u> Subject <u>Opto Electronics</u>		Instruction Reference	Additional Study Recommended	Remarks
				Course <u>Program Elective</u>	Duration <u>6 months (14 weeks)</u> <u>27 January to 27 May 2026</u>			
				Total Periods <u>42(T), 28(P)</u>	Theory <u>14 week x 3 per week = 42</u>			
				Topic	Details			
1			04 Hrs	Fundamentals of Light	Wave & Particle Theory of Light; Introduction to EM Spectrum, Various Photometric & Radiometric units & measurement. Definition of Photometry & Radiometry Def. of Luminous Intensity & Luminous flux.	Optics by Chaitak TMH Opto Electronics by Intilson & Hawks PHI	Internet Chatgpt Neptel Vedioz etc	
2			12 Hrs	Source of Light	Concept of Natural & Manmade light sources incandescent lamp, Gas discharge lamp, LED, Advantages and disadvantages of LED. Laser. Semiconductor Gas lasers, Application of lasers.			
3			06 Hrs	Photo detector	Intro. to Photo detector Principle of Photodetection Photodiode, Photo resistor Photo transistor, Photo multiplier tube.	do	do	
4			10 Hrs	Fibre Optics	Fundamentals of Optical Fibre, principle of light propagation through Fibre Total Internal Reflection Construction of Optical Fibre Cable. Core, Clad, Jacket Single & Multi mode Step & Graded Index Fibre.	do	do	

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Sr. No.	Period Nos.	Topic	Details	Instruction Reference	Additional Study Recommended	Remarks
05	04 Hrs	Miscellaneous Topics	Basic Concept of losses in OFC. Comparison of OFC with Co-axial cable Opto coupler Optical Power Meters OTDR	do do	do. do.	
06	06 Hrs	Revision Class Test Doubt Clear Sessions.	Class Test-I Class Test-II Revision. Doubt clear Sessions.	—	—	

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Sr. No.	Period No.	Topic Covered	Instruction Reference	Additional Study recommended	Remarks
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Practical Planning & Coverage Status

Department: Instru. Engg.
Course: Program Elective

(Yrsem)
Laboratory: Measurement Lab.
Subject: Opto Electronics.

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 determine the characteristics of LED.	Optical Comm Kit	Manual	Examp. Monday-9I Tuesday-9II				
02	To determine the characteristics of Laser diode.	Optical Comm Kit	Manual	do.				
03	To determine the characteristics of any Photodetector	LDR Kit	Manual	do.				
04	To demonstrate the Core-Clad-Jacket OFC	OFC Splices Tool kit	Manual	do.				
05	To demonstrate the working of Optical power meter.	Optical Power Meter	Manual	do.				
06	To measure N.A. (Numerical Aperture) of OFC	OFC & NA Meas. Kit	Manual	do.				
07	To observe the working of Optocoupler	Opto Coupler Kit.	Manual	do.				

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Practical Planning & Coverage Status

Department: Instrumentation Engg. (Hr.)
 Course: Program Elective - II

Laboratory: Measurement Lab.

Subject: Analytical Instruments (Prog. Elective - II)

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 study about the components / parts of a filter photometer.	filter photometer	Manual	Every Wednesday				
02	To observe the working of colorimeter / filter photometer.	do	Manual	Thursday				
03	To study about the components / parts of a single beam spectro photometer.	Single beam Spectroph. M.	Manual					
04	To observe the working of double beam UV-VIS Spectro photometer.	UV-VIS Spect. P. M.	Manual					
05	To study about the components / parts of a flame photometer.	flame photometer	Manual	do				
06	To observe the flame of flame photometer.	flame photometer	Manual					
07	To observe the working of an analytical balance.	Analytical balance	Manual					

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PLANNED SYLLABUS COVERAGE(Theory)

G Ka SYI CO Sr. No.	ABUS RAGE	Department: <u>AS&H</u>		Subject <u>Indian constitution</u>		Remarks
		Course <u>Diploma in EE & ME, IE</u>		Duration <u>3 years</u>		
		Total Periods <u>2/week</u>		Theory <u>28</u>		
	Period Nos.	Topic	Details	Instruction Reference	Additional Study Recommended	
1.	1-7	Unit - 1 Introduction to constitution	History of making of IC, Meaning and importance of IC, features of IC, Preamble & its features, fundamental rights, meaning and limitations, Directive Principles of state policy and fundamental duties, their enforcement and relevance.	Introduction to Constitution of India by DD Basu. Introduction to the constitution of India by M.V. Pylee, 4th edition		
2.	8-14	Unit - 2 Union Government	Structure of union Govt. Union executive President, vice president, PM and council of Ministers, Union legislature, - Parliamentary and parliamentary proceedings. Union judiciary - supreme court of India composition and powers and functions.	— do —		
3.	15-22	Unit - 3 State & Local Govt.	Structure of state Govt. State executive - Governor, chief minister, council of ministers, state legislature - state legislative assembly & council state judiciary - High court Local Govt. Panchayat Raj system with reference to 73rd and urban local self Govt. with reference to 74th amendment.	— do —		

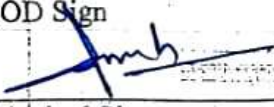
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Sr. No.	Period Nos.	Topic	Details	Instruction Reference	Additional Study Recommended	Remarks
4	23-28	Unit-4 Election Provisions, Emergency provisions, Amendment of the constitution	Election commission of Indian - composition, powers and functions and elected process. Types of emergency - ground, procedure, duration and effects. Amendment of constitution - meaning, procedure and limitations.			

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PLANNED SYLLABUS COVERAGE(Theory)

G Ka SYI CO	R a BUS RAGE	Department: <u>Instrumentation Engg</u>		Subject: <u>Analytical Instrumentation</u>		
		Course <u>Program Elective - II</u>		Duration <u>14 weeks</u>		
		Total Periods <u>42</u>		Theory <u>T (42)</u>		
Sr. No.	Period Nos.	Topic	Details	Instruction Reference	Additional Study Recommended	Remarks
01	11	Introduction	Elements of an Analytical instruments, Properties of analytes, techniques used in analytical instruments. Types of analytical methods, EMR & optical spectrum (UV, visible & IR) Radiometry, Photometry, concept of interaction of Radiation with matter. Laws related to absorption of radiation, Lambert's law, Beer's law & Beer's Lambert law.	Handbook of Analytical Instrumentation by R.S. Khanna Pur	Handbook of Analytical Instrumentation by B.G. Lipton	
02	12	Spectroscopy	Absorption instruments, Various components, Radiation source, optical components and detecting system. UV-Visible absorption spectroscopy, Filter photometer, Single & double beam filter photometer, UV Spectrophotometer, Single beam, double beam type IR spectrophotometer, Basic components of IR Spectrophotometer. Double beam IR Spectrophotometer	← do →	← do →	

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Sr. No.	Period Nos.	Topic	Details	Instruction Reference	Additional Study Recommended	Remarks
03	06	Flame Emission Spectroscopy	Flame photometer, Principle, Construction detail of flame photometer, optical & Recording system	—do—	—do—	
04	05	Atomic Absorption Spectroscopy	Atomic absorption spectroscopy Atomic absorption Spectrophotometer	—do—	—do—	
05	08	Nuclear Magnetic Resonance Spectroscopy	NMR spectroscopy ; Principle Nuclear spin, NE Level, Resonance condition, NMR absorption spectra, chemical shift, NMR block diagram Construction and working.			

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