

V R SIDDHARTHA ENGINEERING COLLEGE (Autonomous) :: Vijayawada-7
DEPARTMENT OF ELECTRONICS & INSTRUMENTATION ENGINEERING

Course code/Name: 17EI3501 Control Systems
Class: III Year (V Semester), Section-A & B
Faculty Name: Mr. P Rajesh

Dt: 17.06.2019

Lesson Plan/ Course Handout

S. No	Class No.	Topic Name	Delivery Method	Assessment Methods	Course Outcome Covered	Cognitive levels of learning					
						K1	K2	K3	K4	K5	K6
1	1	Syllabus & COs, Overview	Green Glass Board	-	-						
2	2	Control system terminology	Green Glass Board	Home Assignment Semester end exam	CO1	√					
3	3	Examples of simple control Systems- Open loop and closed loop control systems, closed loop system versus open loop system	Green Glass Board	Assignment Test Semester end exam	CO1		√				
4	4	Effect of feedback on overall gain, Stability, Sensitivity and external noise	Green Glass Board	Assignment Test Semester end exam	CO1				√		
5	5	Formulation of differential equations for electrical, mechanical and electromechanical systems	Green Glass Board	Home Assignment Semester end exam	CO2				√		
6	8	Analogous systems - Force-	Green Glass	Assignment Test Semester end exam	CO2						√

		Voltage, Force-Current, Torque-Voltage, Torque-Current Analogies	Board								
7	10	Block diagram representation of control systems-Block diagram of a closed-loop system, Block diagram reduction rules	Green Glass Board	Assignment Test Semester end exam	CO2			√			
8	15	Signal flow graphs and Mason's gain formula	Green Glass Board	Assignment Test Semester end exam	CO2	√					
13	20	Standard test signals - Step, ramp, parabolic and impulse signals	Green Glass Board	Sessional Test Semester end exam	CO3					√	√
14	21	Time response of first-order systems to standard test signals	Green Glass Board	Sessional Test Semester end exam	CO3						√
15	25	Step response of second order systems-Response of second-order system to the unit step input	Green Glass Board	Sessional Test Semester end exam	CO3						√
16	26	Time domain specifications-Derivation of expressions for Rise time, Peak time, Peak overshoot, Settling time & Steady state error	Green Glass Board	Sessional Test Semester end exam	CO3					√	
17	28	Steady state errors and error constants- K_p, K_v and K_a , Types of control systems	Green Glass Board	Home Assignment Semester end exam	CO3					√	

18	29	Stability definitions - Bounded Input and Bounded Output (BIBO) stability, Stability study based on poles of closed-loop transfer function, Absolute and relative stability	Green Glass Board	Home Assignment Semester end exam	CO3	✓					
19	30	Routh–Hurwitz criterion - Routh stability criterion, Difficulties in the formulation of the routh table, Application of Routh stability criterion to linear feedback systems	Green Glass Board	Home Assignment Semester end exam	CO3		✓				
27	31	The root locus concept- Introduction, Root locus concepts	Green Glass Board	Assignment Test Semester end exam	CO4	✓	✓				
28	32	Magnitude and angle conditions	Green Glass Board	Assignment Test Semester end exam	CO4						✓
29	33	Properties and construction of the root loci	Green Glass Board	Assignment Test Semester end exam	CO4		✓				
30	37	Frequency domain specifications	Green Glass Board	Home Assignment Semester end exam	CO4		✓				
31	38	Correlation between time and frequency response	Green Glass Board	Assignment Test Semester end exam	CO4		✓				
32	39	Bode plot - Magnitude plot, Phase plot	Green Glass Board	Assignment Test Semester end exam	CO4						✓

33	44	Determination of phase margin and gain margin, Stability analysis from bode plots	Green Glass Board	Assignment Test Semester end exam	CO4							√
34	45	Polar plots	Green Glass Board	Home Assignment Semester end exam	CO4			√				
35	48	Nyquist stability criterion	Green Glass Board	Home Assignment Semester end exam	CO4			√				
36	52	Nyquist Plot-Introduction, Principle of argument	Green Glass Board	Home Assignment Semester end exam	CO4		√					
40	53	Concepts of state, State variables	Green Glass Board	Sessional Test Semester end exam	CO5	√						
41	54	State model of linear systems	Green Glass Board	Sessional Test Semester end exam	CO5		√					
42	55	State variable representation using phase variables	Green Glass Board	Sessional Test Semester end exam	CO5				√			
43	57	Derivation of transfer function from state model	Green Glass Board	Home Assignment Semester end exam	CO5	√						
44	58	Characteristic equation, Eigen values, Eigenvectors	Green Glass Board	Sessional Test Semester end exam	CO5	√		√				
45	59	Solution of state equations (derivations only)	Green Glass Board	Sessional Test Semester end exam	CO5			√				

46	60	State transition matrix and its properties	Green Glass Board	Home Assignment Semester end exam	C05		✓				
47	61	Computation of state transition matrix by Laplace transform method	Green Glass Board	Sessional Test Semester end exam	C05						✓
48	63	Controllability	Green Glass Board	Sessional Test Semester end exam	C05		✓				
49	64	Observability	Green Glass Board	Sessional Test Semester end exam	C05		✓				

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V R SIDDHARTHA ENGINEERING COLLEGE (Autonomous):: Vijayawada-7
DEPARTMENT OF ELECTRONICS & INSTRUMENTATION ENGINEERING

Course code/Name: 17EI3502 Digital Signal Processing

Dt: 17.06.2019

Class: III Year (V Semester), Section-A & B

Faculty Name: Mr. V. Naga Prudhvi Raj & Dr. S. Srinivasulu Raju

Lesson Plan/ Course Handout

S. No	Class No.	Topic Name	Delivery Method	Assessment Methods	Course Outcome Covered	Cognitive levels of learning					
						K1	K2	K3	K4	K5	K6
UNIT-I											
1	1	Syllabus & COs, Overview	Black- Board	-	-						
2	2	Basic elements of digital signal processing system-introduction, block diagram, applications of DSP	Black- Board	Assignment Test Semester end exam	CO1	√					
3	3	Classification of signals	Black- Board	Assignment Test Semester end exam	CO1				√		
4	4	Operations on signals	Black- Board	Assignment Test Semester end exam	CO1			√			
5	5	Classification of systems	Black- Board	Assignment Test Semester end exam	CO1				√		
6	6	Sampling theorem	Black- Board	Home Assignment Semester end exam	CO1		√				
7	7	Fourier Transform of Basic Signals	Black- Board	Assignment Test Semester end exam	CO1			√			
8	8	Properties of Fourier Transforms	Black- Board	Assignment Test Semester end exam	CO1		√				
9	9	Properties of Fourier Transforms	Black- Board	Assignment Test Semester end exam	CO1		√				

10	10	Analysis of Discrete-Time Linear-Time-Invariant Systems	Black- Board	Assignment Test Semester end exam	CO1				√		
11	11	Correlation of Discrete-Time Signals	Black- Board	Home Assignment Semester end exam	CO1		√				
12	12	Z-transform and ROC of finite and infinite duration sequences	Black- Board	Assignment Test Semester end exam	CO1		√				
13	13	Properties of Z-Transform	Black- Board	Home Assignment Semester end exam	CO1		√				
14	14	Inversion of the Z-Transform	Black- Board	Home Assignment Semester end exam	CO1			√			
15	15	Inversion of the Z-Transform	Black- Board	Home Assignment Semester end exam	CO1			√			
16	16	The one sided Z-Transform and its properties	Black- Board	Home Assignment Semester end exam	CO1		√				
17	17	Solution of Linear Constant-Coefficient Difference Equations	Black- Board	Home Assignment Semester end exam	CO1				√		
UNIT-II											
18	18	Introduction to DFT and Properties of DFT	PPT	Sessional Test Semester end exam	CO2		√				
19	19	Properties of DFT	Black- Board	Sessional Test Semester end exam	CO2		√				
20	20	Linear convolution using DFT	Black- Board	Sessional Test Semester end exam	CO2			√			
21	21	Circular Convolution	Black- Board	Sessional Test Semester end exam	CO2			√			
22	22	Fast Fourier Transforms (FFT)-DIT FFT	Black- Board	Sessional Test Semester end exam	CO2			√			
23	23	Fast Fourier Transforms (FFT)-DIT FFT	Black- Board	Sessional Test Semester end exam	CO2			√			
24	24	Fast Fourier Transforms (FFT)-DIF FFT	Black- Board	Home Assignment Semester end exam	CO2			√			

25	25	Fast Fourier Transforms (FFT)-DIF FFT	NPTEL	Home Assignment Semester end exam	CO2			√			
26	26	Inverse FFT using DIT FFT	Black- Board	Sessional Test Semester end exam	CO2			√			
27	27	Inverse FFT using DIF FFT	Black- Board	Home Assignment Semester end exam	CO2			√			
UNIT-III											
28	28	Analog filter approximations: Design of analog Butter worth filter	PPT	Assignment Test Semester end exam	CO3						√
29	29	Analog filter approximations: Design of analog Butter worth filter	Black- Board	Assignment Test Semester end exam	CO3						√
30	30	Analog filter approximations: Design of analog Chebyshev filter	Black- Board	Assignment Test Semester end exam	CO3						√
31	31	Analog filter approximations: Design of analog Chebyshev filter	Black- Board	Assignment Test Semester end exam	CO3						√
32	32	Design of IIR digital filters from analog filters-Matched z-Transform	Black- Board	Assignment Test Semester end exam	CO3						√
33	33	Impulse invariance method-Introduction, design of IIR filter	Black- Board	Assignment Test Semester end exam	CO3						√
34	34	Bilinear transformation method-Introduction, design of IIR filter	Black- Board	Assignment Test Semester end exam	CO3						√
35	35	Design Examples- IIR filter design using impulse variance method and bilinear transformation method	Black- Board	Assignment Test Semester end exam	CO3						√
36	36	Frequency transformations	Black- Board	Home Assignment Semester end exam	CO3						√
37	37	Direct-Form structures- Direct form I and II realizations	Black- Board	Home Assignment Semester end exam	CO3						√

38	38	Cascade-Form structures and Parallel-Form structures	Black- Board	Home Assignment Semester end exam	CO3													✓
UNIT-IV																		
39	39	Linear phase FIR Filters, Frequency response and location of the zeros of linear phase FIR filters	Black- Board	Sessional Test Semester end exam	CO4			✓										
40	40	Fourier series method of designing FIR filters	Black- Board	Sessional Test Semester end exam	CO4													✓
41	41	Design of linear phase FIR filters using Windows- Rectangular window	Black- Board	Sessional Test Semester end exam	CO4													✓
42	42	Design of linear phase FIR filters using Windows- Triangular window	Black- Board	Sessional Test Semester end exam	CO4													✓
43	43	Design of linear phase FIR filters using Windows- Hamming window	Black- Board	Sessional Test Semester end exam	CO4													✓
44	44	Design of linear phase FIR filters using Windows- Hanning window	Black- Board	Sessional Test Semester end exam	CO4													✓
45	45	Design of linear phase FIR filters using Windows- Blackman window	Black- Board	Sessional Test Semester end exam	CO4													✓
46	46	Design of Linear phase FIR filters by the Frequency Sampling method	Black- Board	Sessional Test Semester end exam	CO4													✓
47	47	Comparison of FIR and IIR filters	Black- Board	Sessional Test Semester end exam	CO4												✓	
48	48	Basic structures for FIR systems- Direct-Form structures	Black- Board	Sessional Test Semester end exam	CO4													✓
49	49	Basic structures for FIR systems- Cascade-Form structures	Black- Board	Sessional Test Semester end exam	CO4													✓
50	50	Basic structures for FIR systems- Cascade-Form structures	Black- Board	Sessional Test Semester end exam	CO4													✓

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Module Coordinator

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Program Coordinator

G.N.
Head of the Department

V R SIDDHARTHA ENGINEERING COLLEGE (Autonomous) :: Vijayawada-7
DEPARTMENT OF ELECTRONICS & INSTRUMENTATION ENGINEERING

Course code/Name: 17EI3503 Embedded Systems & Micro Controllers
 Class: III Year (V Semester), Section-A & B
 Faculty Name: Mrs. M. Kranthi

Dt: 17.06.2019

Lesson Plan/ Course Handout

S. No	Class No.	Topic Name	Delivery Method	Assessment Methods	Course Outcome Covered	Cognitive levels of learning					
						K1	K2	K3	K4	K5	K6
UNIT-I Embedded systems											
1	1	Syllabus & COs, Overview	Black- Board	-	-						
2	2	Definition , Embedded Systems Vs General Computing Systems	Black- Board	Sessional Test	CO1	√				√	
3	3	Basics of Embedded systems	Black- Board	Semester end exam	CO1	√					
4	4	Characteristics of an embedded system	PPT	Semester end exam	CO1	√					
5	5	History of embedded systems	Black- Board	Semester end exam	CO1	√					
6	6	Classification of embedded systems	PPT	Assignment Test	CO1					√	
7	7	Major application areas of embedded systems	PPT	Semester end exam	CO1	√					
8	8	Purpose of embedded systems	PPT	Assignment Test	CO1		√				
9	9	The typical embedded system-core of the embedded system	PPT	Semester end exam	CO2	√					
10	11	Memory of the embedded system	PPT	Assignment Test	CO2			√			
11	13	Sensors and actuators	Black- Board	Semester end exam	CO2		√				

12	14	Communication interface	PPT	Sessional Test Semester end exam	CO2				√			
13	16	Reset circuit , Real time clock, watchdog timer of ES .	Black- Board	Sessional Test Semester end exam	CO2	√						
14	17	Embedded firmware & Revision of I unit	Black- Board	Sessional Test Semester end exam	CO2			√				
UNIT-II 8051 Microcontrollers												
15	18	Architecture of 8051	Black- Board PPT	Sessional Test Semester end exam	CO3		√					
16	19	Pin description of 8051, Features of 8051	Black- Board	Sessional Test Semester end exam	CO3	√						
17	20	Special Function registers of 8051	Black- Board	Home Assignment Semester end exam	CO3		√					
18	21	Addressing modes of 8051	Black- Board	Semester end exam	CO3		√					
19	22	Tutorial for Sessional exam	Black- Board	Semester end exam	CO3						√	
20	23	Instruction set of 8051	Black- Board	Home Assignment Semester end exam	CO3	√						
21	25	Memory organisation of 8051	PPT	Semester end exam	CO3		√					
22	26	Timers and Counters , Ports of 8051	PPT	Semester end exam	CO3			√				
23	27	Basic Programs on 8051	Black- Board	Assignment Test Semester end exam	CO3							√
24	29	Simple Programs on 8051	Black- Board	Assignment Test Semester end exam	CO3							√
25	31	Programs on timers , counters	Black- Board	Assignment Test Semester end exam	CO3							√
26	32	Programs on Interrupts	Black- Board	Home Assignment Semester end exam	CO3							√
27	33	Programs on Serial communication	Black- Board	Semester end exam	CO3							√
UNIT-III Hardware Interfacing												
28	34	Interfacing with LEDs (Seven-	PPT	Home Assignment	CO4							√

		segment numeric display)		Semester end exam											
29	35	Keyboard Interfacing	Black- Board	Assignment Test Semester end exam	CO4										√
30	36	LCD interfacing	Black- Board	Home Assignment Semester end exam	CO4										√
31	37	ADC (Parallel and Serial ADC)	Black- Board	Assignment Test Semester end exam	CO4			√							
32	38	DAC (DAC interfacing)	Black- Board	Semester end exam	CO4			√							
33	39	Sensors and signal conditioning (Temperature sensors)	Black- Board	Assignment Test Semester end exam	CO4			√							
34	40	Relays	Black- Board	Home Assignment Semester end exam	CO4				√						
35	41	Opto isolators	Black- Board	Home Assignment Semester end exam	CO4			√							
UNIT-IV ARM Processor Fundamentals , Instruction set															
36	42	ARM Processor Fundamentals	PPT	Sessional Test Semester end exam	CO5	√									
37	43	ARM Processor Registers	PPT	Sessional Test Semester end exam	CO5				√						
38	44	Program status register, Pipeline	Black- Board	Home Assignment Semester end exam	CO5			√							
39	45	Exceptions, Interrupts and the vector table	Black- Board	Home Assignment Semester end exam	CO5	√									
40	46	Core Extensions	Black- Board	Semester end exam	CO5			√							
41	47	ARM processor families	PPT	Sessional Test Semester end exam	CO5				√						
42	48	ARM Instruction Set Data processing instructions	Black- Board	Semester end exam	CO5										√
43	49	Branch instructions with examples	Black- Board	Sessional Test Semester end exam	CO5										√

44	50	Load – store instructions with examples	Black- Board	Sessional Test Semester end exam	CO5					√	
45	51	Program status register instruction with examples	Black- Board	Semester end exam	CO5					√	
46	52	Loading constants with examples	Black- Board	Sessional Test Semester end exam	CO5		√				
47	53	Conditional execution with examples	Black- Board	Sessional Test Semester end exam	CO5		√				

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V R SIDDHARTHA ENGINEERING COLLEGE (Autonomous)
Vijayawada-520 007
DEPARTMENT OF ELECTRONICS & INSTRUMENTATION ENGINEERING

Course code/Name: 17EI2504A Biomedical Electronics
Class: III Year (V Semester)
Faculty Name: Mrs. Swathi Nadipineni

Dt: 10.06.2019

Lesson Plan/ Course Handout

S. No	Class No.	Topic Name	Delivery Method	Assessment Methods	Course Outcome Covered	Cognitive levels of learning					
						K1	K2	K3	K4	K5	K6
1	1	Syllabus & COs, Overview	Black Board	-	-	-	-	-	-	-	-
UNIT-I											
2	2	Biomedical electronic system: System Configuration	Black Board	Assignment Test Semester end exam	CO1				√		
3		Problems faced when measuring a human body		Assignment Test Semester end exam	CO1	√					
4	3	Bio-electric potentials: Resting and action potentials	Black Board	Sessional Test Semester end exam	CO1		√				
5	4	Propagation of action potentials	Black Board	Semester end exam	CO1		√				
6		Electrodes, Half cell Potential (or) Electrode Potential		Home Assignment Semester end exam	CO1						√
7		Purpose of the Electrode Paste, Electrode material		Semester end exam	CO1		√				
8	5	Types of electrodes, Microelectrodes	Black Board & PPT	Assignment Test Semester end exam	CO1				√		
9	6	Depth and Needle electrodes	Black Board & PPT	Home Assignment Semester end exam	CO1				√		
10		Surface Electrodes		Home Assignment Semester end exam	CO1				√		

11	7	Transducers, Active Transducers, Magnetic Induction type transducers	Black Board & PPT	Sessional Test	CO1		√				
12		Piezoelectric type transducers		Semester end exam		CO1		√			
13	8	Photovoltaic type transducers, Thermoelectric type transducers	Black Board & PPT	Semester end exam	CO1		√				
14	9	Passive Transducers, Resistive transducers, Loading effect and sensitivity of a Bridge	Black Board & PPT	Home Assignment Semester end exam	CO1						√
15	10	Strain Gauge	Black Board & PPT	Assignment Test Semester end exam	CO1		√				
16	11	Photoelectric type resistive transducers	Black Board & PPT	Semester end exam	CO1		√				
17		Thermistor type transducers	Black Board & PPT	Semester end exam	CO1		√				
18	12	Metallic wire transducers	Black Board & PPT	Semester end exam	CO1		√				
19		Capacitive transducers	Black Board & PPT	Sessional Test Semester end exam	CO1			√			
20	13	Inductive transducers	Black Board & PPT	Home Assignment Semester end exam	CO1		√				
21		Linear Variable Differential Transformer (LVDT)	Black Board & PPT	Home Assignment Semester end exam	CO1		√				
UNIT-II											
22	14	Bio-signal acquisition: Introduction, Physiological signal amplifiers	Black Board	Semester end exam	CO2		√				
23		Operational Amplifier		Sessional Test Semester end exam	CO2	√					
24		Some basic operational amplifier circuits		Home Assignment Semester end exam	CO2						
25	15	Operational amplifier as voltage	Black Board	Home Assignment	CO2					√	

		source and current source		Semester end exam							
26	16	Common-mode rejection in a Differential amplifier	Black Board	Sessional Test Semester end exam	CO2						√
27	17	Isolation amplifier	Black Board & PPT	Home Assignment Semester end exam	CO2				√		
28	18	ECG Isolation Amplifier Circuit	Black Board & PPT	Sessional Test Semester end exam	CO2				√		
29		Medical Preamplifier Design		Sessional Test Semester end exam	CO2						√
30	19	Bridge amplifiers, Single operational amplifier as bridge voltage amplifier	Black Board & PPT	Sessional Test Semester end exam	CO2					√	
31	20	Bridge Amplifier for Current Readout	Black Board & PPT	Semester end exam	CO2					√	
32		Current amplifier		Semester end exam	CO2		√				
33	21	Line Driving amplifier	Black Board & PPT	Semester end exam	CO2		√				
34		Chopper amplifier, Mechanical Chopper Amplifier		Home Assignment Semester end exam	CO2		√				
35		Nonmechanical Chopper Amplifier		Home Assignment Semester end exam	CO2		√				
36	22	Signal recovery and data acquisition	Black Board & PPT	Semester end exam	CO2		√				
37		Drift compensation in operational amplifiers		Home Assignment Semester end exam	CO2		√				
38		Pattern recognition		Semester end exam	CO2		√				
UNIT-III											
39	23	Display systems and recorders: Oscilloscopes for biomedical measurements	Black Board	Semester end exam	CO3				√		
40	24	CRO used in medical equipment- Cardioscope, Non fade oscilloscopes	Black Board & PPT	Assignment Test Semester end exam	CO3				√		

41	25	Bedside and central monitoring systems, Beside monitors	Black Board & PPT	Assignment Test	CO3				√		
42		Central monitors		Semester end exam		CO3			√		
43	26,27	Instrumentation tape recorders	Black Board & PPT	Semester end exam	CO3	√					
44		Recorders, Strip chart recorders		Assignment Test		CO3					√
45	28	X-Y recorders	Black Board & PPT	Home Assignment	CO3		√				
46		Ultraviolet recorders		Home Assignment		CO3		√			
47	29	Electrocardiography (ECG), Origin of Cardiac Action Potential	Black Board & PPT	Semester end exam	CO3			√			
48	30	ECG Recording set up	Black Board & PPT	Sessional Test	CO3				√		
49	31	Electroencephalography(EEG)	Black Board & PPT	Semester end exam		CO3		√			
50		Brain Waves		Semester end exam	CO3		√				
51	32	Recording Setup	Black Board & PPT	Home Assignment	CO3				√		
52	33	Electromyography(EMG)	Black Board & PPT	Semester end exam		CO3		√			
53		Recording Setup		Home Assignment	CO3				√		
UNIT-IV											
54	34	Electrical safety	Black Board & PPT	Semester end exam	CO4		√				
55		Physiological effects of electricity		Sessional Test		CO4		√			
56	35	Important susceptibility parameters	Black Board & PPT	Home Assignment	CO4	√					
57	36	Macroshock hazards	Black Board & PPT	Semester end exam		CO4		√			
58	37	Microshock hazards	Black Board	Sessional Test	CO4		√				

			& PPT	Semester end exam							
59	38	Electrical safety codes and standards	Black Board & PPT	Sessional Test	CO4	√					
60		Basic approaches to protection against shock		Home Assignment	CO4			√			
61	39	Protection: Power distribution	Black Board & PPT	Home Assignment	CO4			√			
62	40	Protection: Equipment design	Black Board & PPT	Semester end exam	CO4			√			
63	41	Electrical safety analyzers	Black Board & PPT	Sessional Test	CO4		√				
64		Tests of the grounding system in patient-care areas		Semester end exam	CO4		√				
65		Tests of electric appliances		Semester end exam	CO4		√				

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V R SIDDHARTHA ENGINEERING COLLEGE (Autonomous) :: Vijayawada-7
DEPARTMENT OF ELECTRONICS & INSTRUMENTATION ENGINEERING

Course code/Name: 17EI2505/B Fundamentals of Industrial Automation

Dt: 1.07.2019

Class: III Year (V Semester), Section A, B & C

Faculty Name: Mrs. P Sushma Chowdary

Lesson Plan/ Course Handout

S. No	Class No.	Topic Name	Delivery Method	Assessment Methods	Evaluation (Marks)	Course Outcome Covered	Cognitive levels of learning					
							K1	K2	K3	K4	K5	K6
UNIT-I												
1	1	Syllabus & COs, Overview	Black- Board	-	-	-						
2	2	Programmable Logic Controllers (PLC) – Introduction and benefits	Black- Board	Home Assignment Semester end exam	5M 7M	CO1	√					
3	3	Parts of PLC – Parts	Black- Board	Assignment Test Semester end exam	5M 8M	CO1			√			
4	4	Architecture of PLC	Black- Board	Assignment Test Semester end exam	5M 9M			√				
5	5	Basic principles of operation – example of mixer process control system	Black- Board	Semester end exam	2M 5M	CO1			√			
6	6	Input/output system – type, slot word and bit.	Black- Board	Home Assignment Semester end exam	5M 7M	CO1				√		
7	7	Programmable devices – memory,	Black- Board	Home Assignment Semester end exam	5M 6M	CO1				√		
8	8	User communication with PLC circuit	Black- Board	Assignment Test Semester end exam	5M 7M							
9	9	Programming languages and	Black- Board	Home Assignment	5M	CO1		√				

		Software – PLC ladder		Semester end exam	7M									
10	10	Boolean languages and sequential function chart	Black- Board	Assignment Test Semester end exam	5M 9M	CO1							√	
11	11	Ladder diagram instructions – symbols and ladder rung	Black- Board	Assignment Test Semester end exam	5M 9M	CO1								√
12	12	Boolean mnemonics – binary concepts,	Black- Board	Home Assignment Semester end exam	5M 7M	CO1								√
13	13	Ladder circuits for NOT, AND, OR, NAND and NOR	Black- Board	Home Assignment Semester end exam	5M 7M	CO1								√
14	14	Configuration – PLC in industrial Environmental	Black- Board	Home Assignment Semester end exam	5M 7M	CO1							√	
UNIT-II														
14	14	Introduction and historical background – Computer based control system development	Black- Board	Semester end exam	1M 5M	CO2		√						
15	15	Distributed control sub systems- Procontrol system, field stations communication	Black- Board	Sessional Test Semester end exam	3M 8M	CO2		√						
16	16	Local field station – library of functions	Black- Board	Home Assignment Semester end exam	5M 7M	CO2						√		
17	17	Presentation and monitoring device – normal and continuous process displays, process upset displays mal function displays	Black- Board	Sessional Test Semester end exam	5M 7M	CO2								√
18	18	Communication options in Distributed Control Systems – essential requirement	Black- Board	Home Assignment Semester end exam	5M 7M	CO2	√							
19	19	Configuration – operating system, controller function	Black- Board	Home Assignment Semester end exam	5M 7M	CO2		√						

UNIT-III												
20	20	TCP/IP protocol introduction – Structure	Black- Board	Assignment Test Semester end exam	5M 7M	CO3						√
21	21	importance of TCP/IP in automation	Black- Board	Home Assignment Semester end exam	5M 7M	CO3						√
22	22	Communication hierarchy in factory automation	Black- Board	Home Assignment Semester end exam	5M 7M	CO3						√
23	23	I/O bus networks – types,	Black- Board	Home Assignment Semester end exam	5M 7M	CO3				√		
24	24	network and protocol standards, advantages	Black- Board	Assignment Test Semester end exam	1M 5M	CO3	√					
25	25	Field architectural progress- evolution,	Black- Board	Home Assignment Semester end exam	5M 7M	CO3			√			
26	26	architecture progress, types	Black- Board	Assignment Test Semester end exam	5M 7M	CO3						√
27	27	HART protocol introduction	Black- Board	Home Assignment Semester end exam	5M 7M	CO3			√			
UNIT-IV												
28	28	Distributed Control System for Cement plant - Objective of automation system,	Black- Board	Sessional Test Semester end exam	3M 5M	CO4						√
29	29	Cement plant - automation strategy,	Black- Board	Sessional Test Semester end exam	5M 7M	CO4		√				
30	30	Cement plant - blending system control and benefits	Black- Board	Home Assignment Semester end exam	5M 7M	CO4					√	
31	31	Distributed Control System for Water treatment plant – automation	Black- Board	Home Assignment Semester end exam	5M 7M	CO4						√
32	32	Water treatment plant -strategy, DDC.	Black- Board	Home Assignment Semester end exam	5M 7M	CO4					√	
33	33	Distributed Control System for Irrigation canal automation - automation	Black- Board	Sessional Test Semester end exam	1M 7M	CO4		√				

34	34	Irrigation canal automation - strategy, DDC	Black- Board	Sessional Test Semester end exam	5M 7M	CO4											✓	
35	35	Distributed Control System for Thermal power plant- automation strategy, DSS,	Black- Board	Sessional Test Semester end exam	5M 7M	CO4												✓
36	36	M-M interface, software system and communication	Black- Board	Sessional Test Semester end exam	5M 7M	CO4											✓	

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