

# ERODE SENGUNTHAR ENGINEERING COLLEGE



(An Autonomous Institution, Affiliated to Anna University) PERUNDURAI, ERODE - 638 057

# **UG Curriculum and Syllabus**

(1 to 8 Semesters)

## B.E – ELECTRONICS AND INSTRUMENTATION ENGINEERING

**Choice Based Credit System (CBCS)** 

**REGULATION 2019** 





ERODE SENGUNTHAR ENGINEERING COLLEGE (An Autonomous Institution, Affiliated to Anna University) PERUNDURAI, ERODE - 638 057



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B.E. ELECTRONICS AND INSTRUMENTATION ENGINEERING

**Choice Based Credit System (CBCS)** 

(For the students admitted during the Academic year 2020-21 and

Onwards)

**REGULATION 2019** 

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#### ERODE SENGUNTHAR ENGINEERING COLLEGE (AUTONOMOUS), ERODE - 638 057

#### VISION AND MISSION OF THE INSTITUTE

#### VISION OF THE INSTITUTE

Vision of Erode Sengunthar Engineering College is to become a World Class Technical Institution and Scientific Research Centre for the Benefit of the Society

#### MISSION OF THE INSTITUTE

- Create Positive difference to Society through Innovative Teaching Learning Process.
- Impart Value Based Technical Education to the Students from across various Socio Economic backgrounds.
- Build State of art infrastructure for high quality Research and Development capabilities on par with the finest in the Globe and widen student's horizons beyond Class Room.
- Bring out Competent, Ethically Strong and Quality Professionals.

#### DEPARTMENT OF ELCTRONICS AND INSTRUMENTATION ENGINEERING

#### VISION AND MISSION OF THE DEPARTMENT

#### VISION OF THE DEPARTMENT

The department is committed to solve real time problems in the field of Process and Automation for the benefit of industry and humanity with ethical values in global level.

#### MISSION OF THE DEPARTMENT

- To make effective Electronics and Instrumentation Professionals for facing current scenarios in society
- To formulate and shape the talent for autonomous and lifelong learning in the technological changes
- To uphold energetic associations with industries and research institutes for widen student's horizons
- To enhance the managerial and technical skills of student and faculty through continuous learning

#### PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

- I. Excel in Electronics and Instrumentation profession and higher education through innovative teaching learning process.
- II. To promote involvement in Automation software used for design and analysis.
- III. Graduates will be able to examine, design, develop and maintain the Automation systems of an industry and propose solutions through research.
- IV. Exhibit Skilled and Moral code of behavior, communication talent, team work and all-time learning to resolve societal problems.



#### PROGRAM OUTCOMES (POs)

**PO1: Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

**PO2:** Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

**PO3:** Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

**PO4: Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

**PO5: Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

**PO6: The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

**PO7: Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development. **PO8: Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

**PO9: Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

**PO10: Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

**PO11: Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

**PO12: Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

#### PROGRAM SPECIFIC OUTCOMES(PSOs)

**PSO1: Real World Knowledge:** An ability to design, analysis and control of physical, chemical processes with the knowledge of its associated hazards/disasters and preparedness.

**PSO2: Expertise in Instrumentation Software:** An ability to develop and debug program in the instrumentation oriented software.

PSO3: Potential in Automation: Apply instrumentation system and superior controller for automation

Chairman - BoS Dept. of EIE - ESEC

### ERODE SENGUNTHAR ENGINEERING COLLEGE (AUTONOMOUS), ERODE DEPARTMENT OF ELECTRONICS AND INSTRUMENTATION ENGINEERING

#### **REGULATIONS – 2019**

### CHOICE BASED CREDIT SYSTEM

#### I TO VIII SEMESTERS CURRICULAM

Induction Program (Mandatory)	3 weeks duration
Induction program for students to be offered right at the start of the first year	<ul> <li>Physical activity</li> <li>Creative Arts</li> <li>Universal Human Values</li> <li>Literary</li> <li>Proficiency Modules</li> </ul>
	<ul> <li>Lecture by Eminent People</li> <li>Visits to local Areas</li> <li>Familiarization to Dept. / Branch &amp;Innovations</li> </ul>

	B.E. EL		CS AND INS mum credit					GINEE	ERING			
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THEORY			No. Inc. Anna Anna A								10-1	
Code No	Course	Objec	tive & Outco	omes	L	Т	P	С	Max	imum	Marks	Categ
		PEOs	POs	<b>PSOs</b>					CA	ES	Total	ory
19BS101	Calculus and its Applications	I, II	1,2,3,4,12	1	3	1	0	4	40	60	100	BS
19BS102	Engineering Physics	I, II	1,2,4,5,6, 8,9	1,2	2	0	2	3	40	60	100	BS
19BS103	Engineering Chemistry	<u>,</u> 1, 11	1,2,3,4,5, 7,12	in the first	3	0	0	3	40	60	100	BS
19HS101	Communicative English	IV	2,3,6,9,10 ,12		3	0	0	3	40	60	100	HS
19ES101	Python Programming	1, 11, 111	1,2,3,4,12	2	3	0	0	3	40	60	100	ES
19TPS01	Soft Skills - I	IV	8,9,10,12	-	1	0	1	1.5	40	60	100	EEC
PRACTICA	Ĺ				1							SE S
19ES104	Python Programming Laboratory	1, 11, 111	1,2,3,4,5, 12	2	0	0	2	1	60	40	100	ES
19BS105	Chemistry Laboratory	1,11	1,2,3,4,5, 12	-	0	0	4	2	60	40	100	BS
19ES107	Workshop Practices	II	1,3,9, 12	-	0	0	2	1	60	40	100	ES
				TOTAL	15	1	11	21.5	420	480	900	-

Chairman - BoS Dept. of EIE - ESEC

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THEORY							1.1		1.5			1
Code No	Course	Objec	tive & Outc	omes	L	T	P	C	Max	imum	Marks	Cate
		PEOs	POs	PSOs		1.7			CA	ES	Total	gory
19BS201	Vector Calculus and Complex Variables	1,11	1,2,3,4,12	1	3	1	0	4	40	60	100	BS
19BS205	Physics for Electronics Engineering	1,11	1,2,3,4,5, 7	-	3	0	0	3	40	60	100	BS
19MC201	Environmental Science and Engineering	1,11	1,2,3,4,5, 6,7,8,12		3	0	0	0	40	60	100	MC
19ES206	Semiconductor Devices and Circuits	I,II	1,2,3,4,12	-	3	0	0	3	40	60	100	ES
19ES210	Principles of Civil and Mechanical Engineering	- II (- (	1,6	-	3	0	0	3	40	60	100	ES
	Language Elective	IV	2,3,6,9,10 12	-	3	0	0	3	40	60	100	HS
19TPS02	Soft Skills - II	IV	8, 9, 10, 12	-	1	0	1	1.5	40	60	100	EEC
PRACTICA	L			1.00	1	S	an i			2		
19ES223	Electronics Devices and Circuits Laboratory	_I,II, III	1, 9	-	0	0	4	2	60	40	100	ES
19ES221	Engineering Drawing	I	1,2,3,5,10 12	-	0	0	4	2	60	40	100	ES
		10.00		TOTAL	19	1	9	21.5	400	500	900	-

		- 1 I	SEM	ESTER I	11	Chiefe's	1	rkië -				
THEORY		1					1.00					
Code No	Course	Objec	tive & Outo	omes	L	T	P	C	Max	imum	Marks	Cate
		PEOs	POs	<b>PSOs</b>			200		CA	ES	Total	gory
19BS304	Transform Techniques and their Applications	1, 11	1, 2,3,4		3	1	0	4	40	60	100	BS
19EI301	Sensors and Transducers	I, II	1, 2, 3	-	3	0	0	3	40	60	100	PC
19EI302	Circuit Theory	1, 11, 111	1,2,5	( ) <b>-</b> ( )	2	2	0	4	40	60	100	PC
19EI303	Electrical Measurements	1,11, 111	1, 2, 3, 4		3	0	0	3	40	60	100	PC
19ES304	Electrical Machines	1,11	1,2		3	0	0	3	40	60	100	ES
19EC303	Signals and Systems	11,111	1,2,3,4,5, 6,11,12		3	1	0	4	40	60	100	ES
19TPS03	Quantitative Aptitude, and Logical Reasoning - I	IV	1,2,9,10,1 2		2	0	0	0	40	60	100	EEC
19MC301	Indian Constitution	IV	6,8,10,11, 12	-	2	0	0	0	40	60	100	MC
PRACTICA	AL.				3	1			1.5		9	
19ES307	Electrical Machines and Electric Circuits Laboratory	1,11,111	1,2,3,4,5, 9	Y -	0	0	4	2	60	40	100	ES
19EI304	Sensors and Measurements Laboratory	1, 11	1,2,3,9		0	0	4	2	60	40	100	PC
	2 N 199	11	A STANDARD	TOTAL	21	4	8	25	440	560	1000	190

1.00			SEME	STER I	V					-		
THEORY												
Code No	Course	Objec	tive & Outco	omes	L	Т	P	С	Max	imum	Marks	Catego
		PEOs	POs	<b>PSOs</b>		1			CA	ES	Total	У
19BS402	Numerical Methods	I, II	1, 2,3		3	1	0	4	40	60	100	BS
19ES403	Object Oriented Programming	11, 111	1,2,3,4,12	-	3	0	0	3	40	60	100	ES
19EI401	Linear Integrated Circuits and Applications	11	1, 2,	-	3	0	0	3	40	60	100	PC
19EI402	Digital Principles and System Design	1,11	1,2,3,4,12	-	2	1	0	3	40	60	100	PC
19EI403	Industrial	1,11	1,2,3,4,12	/.	2	0	2	3	40	60	100	PC
	Internet of Things							1.1	1.1	5		
19ES405	Thermodynamics and Fluid Mechanics	,	2,3,4,12		3	0	0	3	40	60	100	ES
19TPS04	Quantitative Aptitude, and Logical Reasoning - II	IV	1,2,9,10, 12	-	2	0	0	0	40	60	100	EEC
PRACTICA	L C C					21			6			
19ES404	Object Oriented Programming Laboratory	11,111	1,2,5,9		0	0	4	2	60	40	100	ES
19EI404	Linear and Digital Integrated Circuits Laboratory	1,11	1,2,3,4,9	-	0	0	4	2	60	40	100	PC
19HS401	Language Skills	IV	5, 9,10,12	-	0	0	2	0	100	0	100	EEC
			Т	OTAL	18	2	12	23	500	500	1000	-

			SEM	ESTER V	V							
THEORY			. C. L. M. P									1.8
Code No	Course	Objec	tive & Outo	omes	L	T	P	С	Max	imum	Marks	Catego
		PEOs	Pos	PSOs					CA	ES	Total	y
19EI501	Automatic Control Systems	11,111	1,2,3,4,5, 6,11,12	1, 3	3	1	0	4	40	60	100	PC
19EI502	Industrial Instrumentation-I	,	2,3,4	3	3	0	0	3	40	60	100	PC
19EI503	Industrial Instrumentation–II	11,111	3,4,5,6,7	3	3	0	0	3	40	60	100	PC
19EI504	Microprocessors and Microcontrollers	,	5,7,9,12	- <b>1</b> -	3	0	0	3	40	60	100	PC
19HS505	Universal Human Values 2 : Understanding Harmony	I,II,III,IV	1,6,7,10, 12	3	2	1	0	3	40	60	100	HS
19TPS05	Quantitative Aptitude, and Logical Reasoning - III	IV	9,10,11, 12	-	2	0	0	0	40	60	100	EEC
PRACTIC	AL							in in				(f.):-
19EI506	Industrial Instrumentation Laboratory	11,111	3,4,5,6,9, 10	3	0	0	4	2	60	40	100	PC
19EI507	Microprocessors and Microcontrollers Laboratory	II, III	2,3,4,9,10	-	0	0	4	2	60	40	100	PC
19EI508	Internship/ Industrial Training	I,IV	1,2,3,4,5, 6,7,8,9,10 11,12	1,2	0	0	2	1	100	0	100	EEC
6.1				TOTAL	16	2	10	21	460	440	900	-

			SEM	ESTER V	/I				-			TO SHOT
HEORY	10 manutersh 1 m	ST T	1	Datio	3-00		199			advar.	0.00	1000
Code No	Course	Objec	tive & Outo	omes	L	T	P	C	Max	cimum	Marks	Catego
		PEOs	Pos	PSOs					CA	ES	Total	V
19EI601	Industrial Automation	II,III, IV	1,3,5	1, 2, 3	3	0	0	3	40	60	100	PC
19EI602	Process Control	11,111	1,2,3,4,5, 6	1, 3	2	2	0	4	40	60	100	PC
19EI603	Analytical Instruments	11,111	2, 3, 4, 12	1, 3	3	0	0	3	40	60	100	PC
	Professional Elective – 1		-	-	3	0	0	3	40	60	100	PE
100	Open Elective – 1	11 2 2 1	-	-	3	0	0	3	40	60	100	-
19TPS06	Quantitative Aptitude, and Logical Reasoning – IV	IV	1,2,9, 10,12		2	0	0	0	40	60	100 100	OE EEC
PRACTIC	AL		The state of the s						L			
19EI604	Process Control Laboratory	11,111	2,3,4,5,6, 9,10	1, 3	0	0	4	2	60	40	100	PC
19EI605	Industrial Automation Laboratory	II,III,IV	1,2,3,5,9	1, 2, 3	0	0	4	2	60	40	100	PC
19HS601	Career Skills	IV	1,5,7,8,9, 12		0	0	2	0	100	0	100	EEC
the second second		The and	nissi is b	TOTAL	16	2	10	20	460	440	900	

			SEME	STER V	/11	ne l		X				1
THEORY						199		1001	1221	STORE P	A A DOOR	1000000
Code No	Course		ctive & Outco	omes	L	Т	P	C	Max	imum	Marks	Catego
10.8		PEOs	Pos	PSOs			1000		CA	ES	Total	Joalego
19EI701	Computer Control of Process	,	1,2,3,4,5	1, 2, 3	3	0	0	3	40	60	100	PC
19EI702	Industrial Data Networks	,	1,2,3,4,7,12	1, 2, 3	3	0	0	3	40	_60	100	PC
19EI707	Robotics and Automation	,	1,2,3,5	3	3	0	0	3	40	60	100	PC
-	ProfessionalElecti ve – 2	-	-		3	0	0	3	40	60	100	PE
	Open Elective – 2		-	014 <u>0</u> 44	3	0	0	0	10		100	
PRACTIC	AL				3	0	0	3	40	60	100	OE
19EI703	Computer Control of Process Laboratory	,	1,2,3,4,5, 9	1, 2, 3	0	0	4	2	60	40	100	PC
19EI704	InstrumentationSy stem Design Laboratory	II,III,IV	3,4,5,9,10	1, 3	0	0	4	2	60	40	100	PC
19EI705	Mini Project	II,III, IV	1,2,3,4,5,6, 7,8,9,10,11, 12	1, 3	0	0	2	1	100	0	100	EEC
19EI706	ComprehensiveR eview	I, IV	1,2,3,4,5,6, 7,8,9,10,11, 12	-	0	0	2	0	100	0	100	EEC
-			6.26	TOTAL	15	0	12	20	520	380	900	_

Chairman - BoS Dept. of EIE - ESEC

			SEME	STER V	111				2.20			
THEORY			D. D. D. A.					17/1 11				
Code No	Course	Obje	ctive & Outco	omes	L	T	P	C	Max	imum	Marks	Catego
	we wanted and a state	PEOs	Pos	PSOs		1 312	1		CA	ES	Total	v
- Jack	Professional Elective – 3			- 34	3	0	0	3	40	60	100	PE
38 - 50	Professional Elective – 4		-		3	0	0	3	40	60	100	PE
PRACTICA	L de statut dat dat	- 1-0				1	-					
19EI801	Project Work	,   ,  ∨	1,2,3,4,5,6, 7,8,9,10,11, 12	1, 3	0	0	12	6	60	40	100	EEC
				TOTAL	6	0	12	12	140	160	300	-

	ELE	C	TI\	1	ES
-	-	-	-	-	and a lot of

Code No.	Course	Objec	ctive & Outcomes		1		40	T
		PEOs	Pos	PSOs	L	Т	P	C
19HX201	English for Engineers	IV	2,3,6,9,10, 12		3	0	0	2
19HX202	Hindi	IV	2,3,6,9,10, 12		3	0	0	0
19HX203	Japanese	iv	2,3,6,9,10, 12		0	0	0	3
19HX204	French	and the second se		and the second sec	3	0	0	3
TOTIXEOT	Trench	IV	2,3,6,9,10, 12	i di sen mi	3	0	0	3

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	course	0	bjective & Outcom	they are the	L	T	P	0
the second star		PEOs	Pos	PSOs				
10511/01	PRC		AL ELECTIVE - I					
19EIX01	Digital Signal Processing	11,111	1,2,3,5	26 F	3	0	0	3
19EIX02	Digital Control System	11,111	1,3,4,12	1	3	0	0	3
19EIX03	Field Instruments and Process Automation	,	1,2,3,4,5,6,7,8, 9,10,11	1, 3	3	0	0	3
19EIX04	Applied Soft Computing	11,111	1,2,5,11,12	1, 3	3	0	0	3
19EIX05	Smart and Wireless Instrumentation	,	1,2,3,4,5,6,9,12	3	3	0	0	3
	PRO	FESSION	AL ELECTIVE - II		d		1	1 .
19EIX06	Instrumentation	11,111	1,2,3,5	1, 3	3	0	0	3
19EIX07	Instrumentation in Petrochemical Industries	,	1,3,5	1, 3	3	0	0	3
19EIX08	Instrumentation and Control in Iron and Steel Industries	11,111	2,3,4,5,7,8,10,1 1	1, 3	3	0	0	3
19EIX09	Instrumentation and Control in Paper Industries	11,111	1,2,3,4,5	1, 3	3	0	0	3
19EIX10	Instrumentation in Agriculture	11,111	1, 2, 3, 4, 5,6, 7, 12	1, 3	3	0	0	3
	PROF	ESSION	AL ELECTIVE - III	1.	1.1	10.00	The Party of the	-
19EIX11	Embedded System	,	1, 2, 3, 4, 5,6		10		-	
19EIX12	System Identification	11,111	1,3,4,5,7	-	3	0	0	3
19EIX13	Adaptive Control	11,111	1,3,4,5,8	-	3	0	0	3
19EIX14	Optimal Control	11,111	1,3,5,8	-	3	0	0	3
19EIX15	Optimal State Estimation	11,111			3	0	0	3
		11,111	1, 2, 3, 4, 5,9, 11	-	3	0	0	3
	PROF	ESSION/	L ELECTIVE - IV					-
19EIX16	Data Analytics	,	1,3,5	3	3	0	0	3
19EIX17	Virtual Instrumentation	11, 111	1,2,3,4,5	100	-			_
19EIX18	Advanced Process Control	11,111	1, 2, 3, 4, 5,8	1, 2, 3 3	3	0	0	3
19EIX19	Fibre optics and Laser Instrumentation	11,111	1, 2, 3, 4, 5,6	-	3	0	0	3
19EIX20	Instrumentation in Food Processing Industries	11,111	1, 2	1, 3	3	0	0	3

Code No.	Course	the second s	ELECTIVES	L	Т	P	C	
and the second second		PEOs	POs	PSOs			-	-
19EIY01	Radar and Navigation Aids	11, 111	2,3,4,12	in the second	3	0	0	3
19EIY02	Electronic Instrumentation	11, 111	2,3,4	-	3	0	0	3
19EIY03	Sensor Technology	11, 111	2,3		3	0		
19EIY04	Instrumentation in Aerospace and Navigation	II, III	2,3,4,12	ev negle br	3	0	0	3
19EIY05	Industrial Process Automation	II, III	2,3,4,12	nd erai fid	3	0	0	3
19EIY06	Programmable Logic Controller	II, III	2,3,4,5,11,12	of portabile	3	0	0	3

CodeNo.	Course	0	bjective & Outcor	nes	L	T	P	C
		PEOs	POs	PSOs	100000		1002 0	-
19EIZ01	Entrepreneurship Development	IV	10, 11	-	1	0	0	1
19EIZ02	Industrial Safety Standards for Instrumentation Products		1, 2, 3, 6, 7,8	3	1	0	0	1
19EIZ03	Detailed Instrumentation Engineering	11,111	1, 2, 3, 5, 6	3	1	0	0	1
19EIZ04	Calibration Techniques	II, III	1, 2, 3, 7	3	1	0	0	1
19EIZ05	IoT using Raspberry Pi	11,111	1, 2, 3	2,3	1	0	0	1
19EIZ06	Modeling and Analysis of Instrumentation	II,III, IV	1, 2, 3, 5, 7	1, 2, 3	1	0	0	1
19EIZ07	High Temperature Instrumentation	II,III, IV	1, 2, 3, 7	3	1	0	0	1
19EIZ08	Design Of Low Cost Automation for Industries	11,111	1, 2, 3, 5, 6,7	3	1	0	0	1
19EIZ09	Energy Management Systems In Industries	11,111	1, 2, 3, 5, 6,8	8.040	1	0	0	1
19EIZ10	Smart Plant Instrumentation	11,111	1, 2, 3, 5, 6	3	1	0	0	1

S.No.	Category	Siteri	e nos Hillori	Credi	its Pe	r Sem	lester	•		Total Credit	Credits in %	Range	of Total dits
		1	11		IV	V	VI	VII	VIII	orount		Min	Max
1	BS	12	7	4	4				62500	27	16	15	20
2	HS	3	3			3		wart	1 Defe	09	5	5	20
3	ES	5	10	9	8					32	20		
4	PC			12	11	17	14	13		67		15	20
5	PE	101601	11000		-		- 1991 BIX		-		41	35	45
6	OE						3	3	6	12	7	5	10
7			1	-			3	3	A. 16	6	4	4	10
7	EEC	1.5	1.5		North State	1	T	1	6	11	7	5	the second s
Sec. 2	Total	21.5	21.5	25	23	21	20	20	12	164	100	5	10

**BS**-BasicScience

HS-Humanities and Social Science

**OE**-Open Elective

MC -- Mandatorycourse

ES- EndSemesterExamination

ES-Engineering Science

PE- Professional Elective

PC- Professional Core

Chairman - BoS Dept. of Maths - ESEC

CA – ContinuousAssessment

Constraint and the second s	ELECTRONICS AND INSTRUMENTAT Course Name	Ho	Ire/M	look	Credit	R 2019 Total	Semester Maximum	
and the second second		L	T	P	C	Hours	waximum	warks
19BS101	CALCULUS AND ITS APPLICATIONS	3	1	0	4	60	100	
Course Objec	tive (s): The purpose of learning this cou	irse i	s to	-	1.1.2		100	
<ul> <li>Interpret</li> </ul>	the introductory concepts of Limit and co	ontin	lity					
<ul> <li>Interpret</li> </ul>	the introductory concepts of calculus, the	is wi	llen	ahla	them to	model and		Π.,
phenom	ena involving continuous change of varial	blee	ii chi	abic		model and	a analyze pr	iysica
<ul> <li>Find eige</li> </ul>	en values and eigen vectors which is one	Dies					4 N E	
arising in	the field of engineering.		le p	Jwen	ui loois i	o nandle	practical pro	blems
Summar	ize and apply the methodologics invol	und	in a	a huina				
several	ize and apply the methodologies invol variables.	vea	in s	oivin	g proble	ms relate	d to function	ons of
						heeningans		
Course Outco	enough confidence to identify surface an mes: At the end of this course, learners v	d are	ea th	ere b	y solving	g using int	egration	
Apply dif	ferentiation to colve maxima and minim	d IIIN	e ab	le to:				
differenti	ferentiation to solve maxima and minima ation to differentiatefunctions	prot	blem	s use	both the	e limit defi	nition and ru	les of
<ul> <li>Identify a</li> </ul>	and model the real time making and							
and solv	nd model the real time problems using	first	orde	r line	ar differe	ential equi	ations. Reco	ognize
	suie iligitel older ordinary differentialedi	ation	10					
Characte	he characteristics of a linear system with	Eige	en va	lues	and Eige	envectors.		
<ul> <li>Integrate</li> </ul>	rize the functions of several variables and	d get	the	solut	ions of th	nesame.		
	the functions for evaluating the surface a S AND CONTINUITY	area	andv	olum	e.	n) shakin	Stewart Street	
Conresentation	of a function Limit of a finite of a			34	Supersition.		Cherry Street	12
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the of one ve		_					211 205.0	
incor differenti	NARY DIFFERENTIAL EQUATIONS		-				Tol: Tol:	12
inear unerentia	al equations of second and higher order	er w	ith c	onsta	ant coeff	icients. L	inear differe	
								d of
and of para	notors for second order differential eduat	ions	-Vibr	ating	string-E	lectrical ci	ircuits	
OUTUIN MOLI	IVARIABLE CALCULUS							12
acobian's Unoc	vo Variables and their solutions- Total	Dif	ferer	itial ·	- Deriva	tive of in	nplicit functi	ons-
	not an ou maxima and minima.				in the second			0110
	IPLE INTEGRALS				t and the		95	
	n with constant and variable Limite Deale							12
Area and auchia	Linits-Regio	on of	inte	gratic	n -Chan	ae the ord	der of integr	12
	n with constant and variable Limits-Region ntegral in Cartesian coordinates. Triple in	on of ntegr	inte al in	gratic Carte	on -Chan esian co	ge the ord	der of integra	12 ation
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Unit V EIGEN	VALUES AND EIGEN VECTORS	D		Can		ordinates.		ation
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Chairman - BoS Dept. of Maths - ESEC

Department	ELECTRONICS AND INSTRUMENTAT	and the second se					Semester I	
Course Code	Course Name	Hour		and the second second	Credit		Maximum M	ark
19BS102	ENGINEERING PHYSICS (Laboratory	2	T 0	P 2	C 3	Hours 60	100	3
	Embedded)	-		-		00.	100	
Course Object	tive (s): The purpose of learning this cours	se are					interest of the	
	ance the fundamental knowledge in differen		als.					
	sify the information regarding the ultrasonic			its a	oplicatio	ns.		
	al the needs of fiber optics and laser applic							
<ul> <li>To upgrade</li> </ul>	ade the knowledge in quantum mechanics	S.			Gildin's			
	sis the role of thermal properties in the ma		nd a	oplic	ations.			
Course Outco	omes: At the end of this course, learners	s will be	able	e:	sel lo a		10 Date	
<ul> <li>To gain k</li> </ul>	nowledge on the basics of properties of ma	atter and	its a	pplic	ations			
<ul> <li>To acquir</li> </ul>	e knowledge on the concepts of Ultrasonic	and the	ir ap	plica	tions			
<ul> <li>To have a</li> </ul>	adequate knowledge on the concepts of fib	er & Las	er ar	nd th	eir appl	ications		
<ul> <li>To get kn</li> </ul>	owledge on advanced Physics concepts o	f quantu	m th	eorv	and its	applicat	tions in tunne	lina
microsco	opes			,		appiloa		ing
<ul> <li>To unders</li> </ul>	stand knowledge on the concepts of therm	al prope	rties	of n	naterials	and the	eir application	s in
expansion	on of joints and heat exchangers	Yaica - E	1910	100	зØ			•
	PERTIES OF MATTER							6
lasticity - Stre	ss-strain diagram and its uses - torsional	stress a	nd d	eforr	nations	- twistir	ng couple - to	rsic
endulum: theo	ry and experiment - bending of beams - be	ending m	nome	ent -	cantile	ver: theo	ry and experi	me
uniform and n	on-uniform bending: theory and experimen	t - I-shap	ped g	girde	rs.			
	RASONICS							-
itroduction-Cla				The later of the l				6
an avatav an it.	assification of Sound- Ultrasonic Product	tion - M	agne	etost	riction	generato	or - Piezo ele	ectri
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Exp No.	Name of Experiments (Any Five)
101	Determination of Rigidity Modulus – Torsion Pendulum
2	Determination of Young's Modulus by Non-Uniform Bending Method
3	Determination of Young's Modulus by Uniform Bending Method
4	Determination of Wavelength, and Particle Size using Laser
5	Determination of Acceptance Angle in an Optical Fiber.
6	Determination of Thermal Conductivity of a Bad Conductor – Lee's Disc Method.
7	Determination of Velocity of Sound and Compressibility of Liquid – Ultrasonic Interferometer
8	Determination of Wavelength of Mercury Spectrum – Spectrometer Grating
9	Determination of Band gap of a Semiconductor
10	Determination of Thickness of a thin wire – Air Wedge Method

Chairman - BoS Dept. of Physics - ESEC

Chairman - BoS Dept. of EIE - ESEC

Chairman - BoS -Dept of Physics - ESEC

Department	ELECTRONICS AND INSTRUMEN	ITATION	I ENGIN	IEERING	R 2019	Semester I	BS
Course Code	Course Name		/Week	Credit	Total	Maximum Ma	irks
	and the second	LT	-	С	Hours		
19BS103	ENGINEERING CHEMISTRY	3 0		3	45	100	
	jective (s): The purpose of learning t						
	the basic concepts of water character				thoas.		
	indamental concepts of electrochemis						
	the principles and generation of ene	rgy in ba	itteries a	and nuclea	ir reactors.		
	edge on polymers.						
	pes of fuels and the manufacture of s				Jels.	No. No.	
	tcomes: At the end of this course, lea			Die to:			
	udents conversant with water treatme			mathada			
	action involved in corrosion and corr				knowlodge	on onorgy store	
<ul> <li>Impart know devices</li> </ul>	vledge on renewable energy sources	like nuci	ear and	i to impart	knowledge	e on energy stora	ige
	ynthesis & industrial application of po	alumoro					
<ul> <li>Aware the s</li> <li>Impart know</li> </ul>	an far til den versenen er anseneren som helde forsener som ut her en er er er er ande det er er er er er er er		uid and	nrimory	secondar	v and synthetic)	and
combustion	The second s	(solid liq	ulu, yas	s, primary,	Secondar	y and synthetic)	anu
	CHEMISTRY	11112	1917		11-11-11-1	1	9
	r – types – Estimation of hardness of	of water	by EDT	A method	Dome	stic water treatn	1075
	scales,sludge,priming,foaming,causti						
phosphate, sodiur	n aluminate and calgon) .External tre	atment -	- Demin	eralization	process -	Reverse Osmos	sis
Unit II ELECTR	OCHEMISTRY AND CORROSION			÷			9
Electrochemical c	ell - redox reaction, electrode poten	ntial- Nei	nst equ	uation (der	rivation an	d problems). Ele	ectro
	Standard Hydrogen Electrode-Calo					al & electrocher	nical
correction (aslyoni	a differential coration) turned factor						moun
	c, differential aeration) - types-factor		icing co	prrosion ra	te corrosic	on control - sacri	
anode and impres	sed current cathodic protection method		icing co	prrosion ra	te corrosic	on control - sacri	ficial
anode and impres	sed current cathodic protection methor SOURCES	od.					ficial 9
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MD Chairman - BoS Dept. of Chemistry - ESEC

Chairman - BoS Dept. of EIE - ESEC

Department	ELECTRONICS AND INSTRUMENT	ΓΑΤΙΟΝ Ε	N	GIN	EERING	R 2019	Semester I HS
Course Code	Course Name	Ho /Wo	2000		Credit	Total Hours	Maximum Marks
		L 1	-	Ρ	С		
19HS101	COMMUNICATIVE ENGLISH	3 (	)	0	3	45	100
<ul> <li>Acquire t</li> <li>Develop</li> <li>Enhance</li> <li>Improve</li> <li>Develop</li> <li>Course Outcon</li> <li>Improve</li> <li>Develop</li> <li>Acquire t</li> <li>Enhance</li> </ul>	tive (s): The purpose of learning this of pasic English grammar. Istening skills to listen lectures and but the reading skill to comprehend technor writing skills to express thoughts freel speaking skills to speak fluently in reas mes: At the end of this course, learner language usage in LSRW skills. Istening skills to comprehend general the ability to understand different writted the writing skills to express the ideas	asic video nical writir y. Il contexts rs will be I / technic en texts.	os. ngs ab al 1	le to talks	5.		
	icate fluently in real time context.						9
Parts of speech	- Word formation - Sentence types (d	eclarative	, ir	npe	rative, ex	clamator	
Unit II LIST	Subject - Verb agreement		-	1		der and	9
	pecific information: Short conversa	tions / r	no	nolo	ques -	Gan filli	
onversations -	Felephone etiquette - Note-taking - Lis rrics - Clear individual sounds - Word	stening fo					
Unit III REA			X				9
	sentences - Prediction - Skimmine ext and sentence structure - Close rea		t -	Sc	anning f	for speci	fic information -
Unit IV WRIT		14.20		1	1.1.1.1	a data	9
Paragraph writing vriting- E-mail –	g (descriptive, narrative, expository & Instructions	persuasiv	e)	- Let	tter (form	al and info	ormal) - Dialogue
	AKING	F					9
experiences and disagreement -	<ul> <li>Giving personal and factual informative future plans - Mini-presentation - Expr Likes and dislikes</li> </ul>						
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Press. 20 4. Anderson	, Kenneth et al. Study Speaking: A	<b>•</b> •		· ·			D D

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	ELECTRONICS AND INSTRUME		the second s	and the second sec		R 2019	Semester I	
Course Code	Course Name		rs /W	-	Credit	Total	Maximum N	lark
4050404	DVTUON DDOOD ( MM/NO	L	T	P	C	Hours	100	
19ES101	PYTHON PROGRAMMING	3	0	0	3	45	100	
Course Object								
The purpose o	f learning this course is to							
<ul> <li>Underst</li> </ul>	and problem solving concepts.							
	and why Python is a useful scripti	ng lang	uage	for de	evelopers a	and to read	d and write sin	nple
Python (	programs.							
	Python programs with conditiona	he and	loons					
	hon data structures — lists, tuples							
	output with files in Python	s, uictio	nanes	5.				
Course Outco							and the second second	
and the second se								
	nis course, learners will be able to							
	oblems solving techniques to rea							
	ze and construct common program						and input/out	put.
<ul> <li>Design,</li> </ul>	code, and test Python programs u	using Li	ist, Τι	ples	and Strings	S		
<ul> <li>Write co</li> </ul>	de using dictionaries and function	IS						
<ul> <li>Read an</li> </ul>	d write data from/to files in Pytho	n Progr	ams.					
	PUTATIONAL THINKING					- Course		9
ntroduction to (	Computational Thinking -From a	bacus	to ma	chine	e – The firs	st Softwar	e -First Mode	ern
Computer- Infor	mation and data - Converting in	nformat	ion ir	nto da	ata -Data (	Capacity	Problem Solvi	na
echniques: Ge	eneral problem Solving concept	s-: Ala	orithr	n. Ps	seudo-code	and Flo	wchart Proble	em
Solving with See	quential Logic Structure- Problem	n Solvin	a wit	h De	cisions - Pr	oblem So	lving with Loo	DS
Case Study: Ra	ptor and Scratch Tools.					00.00000000		P .
	ODUCTION TO PYTHON	11.591		1	1 X F	14	Contraction of the second	9
and the second se	s - Setting up path - Working with	th Pyth	on -		Basic Syn	tax - Vai	iable and Da	
vpes - Operato	r- Conditional Statements - Loop	oina – C	Contro	I Stat	tements		abio and be	
	ING MANIPULATION, LIST AND							9
				- Sti	ring slices -	- Function	and Methods	
Creating List - A	ccessing list - Operations on List	- Worki	ina wi	th list	ts - Functio	n and Me	hods – Creati	na
uple - Tuple Op	erations- Functions and Methods	S	ing m	un no		in and mo	inous oreau	ing
	TIONARIES AND FUNCTIONS	1	1.40	-	S. 4.4.5			9
	aries - Accessing values in did	tionarie	- 29	Work	ing with d	ictionaries	- Properties	
unctions - Det	fining a function - Calling a fur	action -	- Tvn	es o	f functions	- Functio	n Arguments	
	ctions - Global and local variables		1.36	00 0	i iunotiono	i unou	on 7 agamente	,
	JLES, FILES AND EXCEPTION		ING	-			-	9
Andules - Impor	ting module - Math module - Rand	dom m	dula	- Par	kanes - Co	mposition	Files - Openi	na
nd closing file.	File Opening Modes - Reading	and a	writing	- Fac	Exages - Co	ne Excer	tion Handling	ng
vcention - Exce	eption Handling - Except clause -	Try fir	nally o		o User Defi	ned Exce	ntions	, -
EXT BOOK(S)	ption handling - Except clause -	119,11	lany (	Jaus	e Oser Dell	neu Likce	puons	-
	law and Kanny Limit #O		<b>T</b> 1.1.1					
	ley and Kenny Hunt, "Computa	ational	Inink	ang 1	for the Mod	dern Prob	lem Solve	er,
	n & Hall/CRC, 2014.		1334			1	and the second	
	kle, "Problem Solving and Progra	amming	Con	cepts	", 9th Editio	on, Pearso	on Education,	New
Delhi, 20								
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	11.							
EFERENCE(S)	11.	ng Usin	g Pyt	hon".	Mount St. M	Mary's Un	iversity, 2013.	
EFERENCE(S) 1. Brian Hei	11. ) nold, "Introduction to Programmir							
EFERENCE(S) 1. Brian Hei 2. Michael [	11. nold, "Introduction to Programmir Dawson ,"Python Programming fo	or the A	bsolu	te Be	eginner", 3r	d Edition,	2010.	
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	LECTRONICS AND INSTRUME						Semester I EEC
Course Code	Course Name		urs/\	Veek P	Credit C	Total Hours	Maximum Mark
19TPS01	SOFT SKILLS- I		0	Р 1	1.5	30	100
and the second se	Objective (s): The purpose of lea		-	Acres 1	and the second sec	50	100
	basic grammar knowledge in			ourse	10 10		
	Speaking Skills in English	n Engi	1311.				
	e Verbal and Non-verbal Com	muni	ratio	n Ski	lle		
	Confidence and Emotional I				115		
	Inter Personal Skills.	intenig	ence				
	Dutcomes: At the end of this cou	ureo lo	arno	re will	ha able to		
	mpetent knowledge of gram		ame	5 WIII	be able to		
	uent English by enriching Vo		-	nowl	odao		
						l communic	ation
	od Presentation Skills throug						ation.
	any Situation with confidence		_			lable.	
	a team by having team coherence	ce and	deall	ng wit	n people.	1	C
	ve English – Written English	Tana		Vorb	Contono	o Constructi	6
	Grammar - Parts of Speech -					e Constructio	on.Dialogues an
	Writing. Exercises to practice an	ia impr	ovet	nese s	SKIIIS.	the strength of the	6
	ve English – Spoken English oms & Phrases – Synonyms – Ar			1	10		250
ocabulary - Idi						unoractiona	Writing Everaine
		ntonym	is.Dia	alogue	s and Cor	versations –	Writing. Exercise
o practice and in INIT 3 Art of Verbal Commun	nprove these skills. Communication & The Hidden I nication - Effective Communication	Data In ion - Ac	nvolv ctive	r <b>ed</b> listenii	ng –Parap	hrasing – Fe	6 edback.
o practice and in INIT 3 Art of 0 Verbal Commun Ion Verbal Cor dealing with fee INIT 4 World	nprove these skills. Communication & The Hidden I hication - Effective Communication munication - Body Language o lings in communication. of Teams – Part -01	Data In ion - Ac of self a	nvolv ctive and o	r <b>ed</b> listenii thers.	ng –Parap Importanc	hrasing – Fe ce of feelings	6 edback. in communicatio
o practice and in INIT 3 Art of Verbal Communi- Ion Verbal Cor dealing with fee INIT 4 World Self Enhancement	nprove these skills. Communication & The Hidden I hication - Effective Communication munication - Body Language of lings in communication. of Teams – Part -01 ent - importance of developing a	Data In ion - Ac of self a	nvolv ctive and o	r <b>ed</b> listenii thers.	ng –Parap Importanc	hrasing – Fe ce of feelings	6 edback. in communicatio
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o practice and in         INIT 3       Art of of         Verbal Community         Ion Verbal Correlation         dealing with feed         INIT 4       World         world         world         inelf Enhancement         motional intellig         INIT 5       World         world         inportance of Terret         ith Groups – Do         EFERENCES:         1.       The Severa         2.       All the bo         3.       Man's see         4.       The grea         5.       Goal - E         6.       Working voltation         7.       Excel in E	nprove these skills. Communication & The Hidden I inication - Effective Communication munication - Body Language of lings in communication. of Teams – Part -01 ent - importance of developing a ence. of Teams – Part -02 eam work – Team vs. Group - At ealing with People- Group Decision en Habits of Highly Effective Peoples oks in the "Chicken Soup for the arch for meaning – Viktor Frankl test miracle in the world – OgMar iyahu Goldratt. with Emotional Intelligence - Davi	Data In ion - Ac of self a asserti asserti ttribute on Mak ple - S Soul" s ndino id Gole el Publi	ve sl es of series eman icatio	red listenin thers. kills- c a succ en R. c s. ns	ng –Parap Importanc leveloping cessful tea	hrasing – Fe ce of feelings self-confide m – Barriers	6 edback. in communicatio 6 nce – developin 6 involved Workin
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o practice and in JNIT 3 Art of a Verbal Communi- JNIT 4 World Self Enhancemen- motional intellion JNIT 5 World mortance of Te- vith Groups – De- EFERENCES: 1. The Seven- 2. All the bold 3. Man's se 4. The grean- 5. Goal - E 6. Working a 7. Excel in E 8. Developinal 9. Essential 10. Effective 11. "Strategio	nprove these skills. Communication & The Hidden I incation - Effective Communication munication - Body Language of lings in communication. of Teams – Part -01 ent - importance of developing a ence. of Teams – Part -02 eam work – Team vs. Group - At ealing with People- Group Decision on Habits of Highly Effective Peoples and the "Chicken Soup for the arch for meaning – Viktor Frankl test miracle in the world – OgMar iyahu Goldratt. with Emotional Intelligence - Davis inglish – Sundra Samuel, Samuel of Communication Skills by Krish s of Effective Communication, Lu	Data In ion - Ac of self a asserti asserti ttribute on Mal ple - S Soul" s ndino id Gole el Publi nna Mo udlow a te Serie	ve sl es of series eman icatio han a ind P es Bo	red listenin thers. kills- c a succ en R. c an R. c s.	ng –Parap Importanc leveloping cessful tea Covey. Covey.	hrasing – Fe ce of feelings self-confide m – Barriers m – Barriers erji; MacMillar e Hall of India andel	6 edback. in communicatio 6 nce – developin 6 involved Workin



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<b>Course Code</b>	Course Name		l EN lour		EERING Credit	R 2019 Total	Semester I Maximum	ES Mark
	1	/	Wee T	k P	C	Hours		
19ES104	PYTHON PROGRAMMING LABORATORY	0	0	2	1	30	100	
Course Object							1	
	learning this course is to							
	st, and debug simple Python programs							
	nt Python programs with conditionals a		ns				(4)	
	tions for structuring Python programs.	110 100	p0.					
	nt compound data using Python lists, t	inles (	dictic	nari	88			
- Read an	d write data from/to files in Python.	ipics, i	aiotic	man	63.		When Section 12	
Course Outco		W V		2.1	1			
	is course, learners will be able to							
	st, and debug simple Python programs							
	nt Python programs with conditionals a							
	Python programs step-wise by defining					em.		
	on lists, tuples, dictionaries for represe	nting o	comp	oun	d data.			
	d write data from/to files in Python.		4					
List of Experin								
1. Find the	Greatest among three numbers without	t using	third	d var	iable			
2. Sum of th	ne Digits of a Number					n.		
3. Generatio	on of Prime Numbers							
4. Implement	nt a sequential search							
	calculator program							
	tring functions							
	nt Selection Sort and Stack							
	l write into a file							
9. Demonst	are usage of pasic regular expression		1-1-	vali				
	rate usage of basic regular expression rate use of advanced regular expression	ns for	data		dation			
10. Demonstr	rate use of advanced regular expression	ns for	data	van	dation.			
10. Demonstr 11. Demonstr	rate use of advanced regular expression rate use of List and Dictionaries					es into inte	ernal Data Str	uctu
10. Demonstr 11. Demonstr 12. Demonstr	rate use of advanced regular expression rate use of List and Dictionaries rate use of Create Comma Separate F					es into inte	ernal Data Str	uctu
10. Demonstr 11. Demonstr 12. Demonstr LATFORM NEI	rate use of advanced regular expression rate use of List and Dictionaries rate use of Create Comma Separate F EDED					es into inte	ernal Data Str	uctu
10. Demonstr 11. Demonstr 12. Demonstr LATFORM NEI Python 3 interp	rate use of advanced regular expression rate use of List and Dictionaries rate use of Create Comma Separate F					es into inte	ernal Data Str	uctu
10. Demonstr 11. Demonstr 12. Demonstr LATFORM NEI Python 3 interp EXT BOOK(S)	rate use of advanced regular expression rate use of List and Dictionaries rate use of Create Comma Separate F EDED reter for Windows/Linux	les (C	SV),	Load	d CSV file			
10. Demonstr 11. Demonstr 12. Demonstr LATFORM NEI Python 3 interp EXT BOOK(S) 1. David Rile	rate use of advanced regular expression rate use of List and Dictionaries rate use of Create Comma Separate F EDED reter for Windows/Linux ey and Kenny Hunt, "Computational T	les (C	SV),	Load	d CSV file			
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Department	ELECTRON	IICS AND INSTRUMENT	TATION E	ENGI	NEERING	R 2019	Semester I BS
Course Code		Course Name	Hour	s/	Credit	Total Hours	Maximum Marks
		all and the second	LT	P	С	6	S1 3
19BS105		STRY LABORATORY	0 0	4	2	60	100
		purpose of learning this o					
<ul> <li>Determine</li> </ul>	nation of tota	I, temporary & permaner	nt hardne	ss of	water by E	DTA method.	
<ul> <li>Determine</li> </ul>	nation of chlo	oride content of water sam	mple by A	rgent	tometric m	ethod.	
<ul> <li>Estimation</li> </ul>	on of iron co	ntent of the given solution	n using p	otenti	ometer.		
		ngth of given hydrochlor		ing pl	H meter		
		ion of strong acid vs stro			1.1	All a nui a sua	
ourse Outcon	nes: At the e	end of this course, learne	rs will be	able	to		
<ul> <li>Make the</li> </ul>	e student to	acquire practical skills in	n the det	ermin	ation of wa	ater quality pa	arameters through
volumetr	ic analysis.						
Acquire	the knowledg	ge about chloride conten	t in water	samp	ole.		
		acquire practical skills ab					c titrations.
		to estimate hydrochloric		ater s	ample usir	ig pH meter.	
		about conductance of ior	IS.	N		and the second	and the state of the
List of Experi							
CHEMISTRY (							
		I, temporary & permaner					
		oride content of water sar					
		solved oxygen content in alinity in Water Sample	water sa	mple	using wini	ders method	
		ngth of given hydrochlori	e acid us	ina nl	H motor		
		ngth of acids in a mixture				vity meter	
		ion of strong acid vs stro		using	goonadouv	ity motor.	
		ntent of the given solution		otenti	ometer.		
		ion of strong acid vs stro					
		ecular weight of polyviny		using	Ostwald v	iscometer	
		ntent of the water sample					
12. Estimatio			3				0.00002
LIST OF EQUI	PMENT (CH	EMISTRY)					
	S. No	Description of E	quipmen	t _	Quanti	ty required	
	1	Potentiometer			10	) Nos.	
				_	11	) Nos.	
	2	pH meter			1	1105.	
	2	pH meter Conductivity meter				) Nos.	
					10	Directory and the second	

Chairman - BoS Dept. of Chemistry - ES=0



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Depart	and the second se	ELECTRONICS AND INSTRUM	ENTAT	ION E	NGIN	IEERING	R 2019	Semester I			
Course	Code	Course Name	Ho	urs/W	eek	Credit	Total	Maximum M	ark		
19ES	107	WORKSHOP PRACTICES	L	T	P	С	Hours				
L. Constant	1		0	0	0 2 1 30 100						
<ul> <li>F</li> <li>A</li> <li>C</li> <li>C</li> <li>Course</li> </ul>	Provide quipme cquire Develop Provide Develop	tives: The purpose of learning the hands-on training in fabrication of ent / tools. the skill for making fitting joints a the skill for preparing the green hands-on training in assembling a the skill for making wood/sheet r omes: At the end of this course, he e simple components using carpo	of comp nd hous sand mo and disn netal mo earners	onent sehold ould. nantlir odels will be	s usir pipe ng of p using able	line conne petrol engir suitable to to:	ections usi nes, gear l pols.	ng suitable too poxes and pum	ols.		
• P • A	repare ssemb	ing joints and household pipe line green sand mould. le and dismantle petrol engines, g nple models using wood and she	gear bo:	xes ar			ools.				
Exp. No		N	ame of	Expe	imen	its					
1	Formi	ng of simple object in sheet meta	l using s	suitab	e too	ls (Examp	e: Dust Pa	an / Soap Box)	)		
2	Fabric Makin box)	ation of a simple component usir g a simple compónent using car	ng thin a pentry p	ond thi	ck pla tools	ates. (Exar . (Example	nple: Bool e: Pen sta	< rack) nd/Tool box/ L	.ette		
4		re a "V", Half-round or Square joi	nt from	the air	ven m	nild steel fl	at plate.		-		
5	Const bend, pump)	ruct a household pipe line connec gateway and taps (or) Construc using pipes, bend, gate valve, fl	ctions u t a pipe anges a	sing p e coni nd foo	ipes, nectio ot valv	Tee-joint, on for dom /e.	Four-way	joint, elbow, un lication (centrif	nior fuga		
6	Prepa	re a green sand mould using soli	d patter	n/split	patte	rn.		1 - V			
7	Disma	ntling and assembly of Centrifuga	al Gear	Pump	/ Gea	ar box.	1				
8	Disma	ntling and assembly of two-strok	e and fo	ur-str	oke p	etrol enain	e.	A PARTY			
9	a) Pre b) Gas	paration of butt joints, lap joints a Welding practice.	nd T- jo	ints by							
10	Mini D	roject (Fabrication of small comp	a manufa V								

S.No.	NAME OF THE EQUIPMENT	QUANTITY
1.	Assorted components for plumbing consisting of metallic pipes, plastic pipes, flexible pipes, couplings, unions, elbows, plugs and other fittings	15 sets
2.	Carpentry Vice (fitted to work bench)	15 Nos.
3.	Standard woodworking tools	15 Sets.
4.	Models of industrial trusses, door joints, furniture joints	5 each
5.	Power Tools: (a) Rotary Hammer	2 Nos.
	(b) Demolition Hammer	2 Nos.
	(c) Circular Saw	2 Nos.
2	(d) Planer	2 Nos.
	(e) Hand Drilling Machine	2 Nos.
	(f) Jigsaw	2 Nos.
6.	Arc welding transformer with cables and holders	5 Nos.
7.	Welding booth with exhaust facility	2 Nos.
8.	Welding accessories like welding shield, chipping hammer, wire brush, etc.	5 Sets.
9.	Oxygen/and acetylene gas cylinders, blow pipe and other welding outfits	2 Nos.
10.	Centre lathe	2 Nos.
11.	Hearth furnace, anvil and smithy tools	2 Sets.
12.	Moulding table, foundry tools	2 Sets.
13.	Power Tool: Angle Grinder	2 Nos.
	Study-purpose items: Centrifugal pump, Air-conditioner	One each.

Chairman - BoS Dept. of Mech Engg. - ESEC



Department	ELECTRONICS AND INSTRUMEN					R 2019	Semester II B
Course Code	Course Name	Ho	1	Neek	and the second se	Total Hours	
		L	Т	P	C		Marks
19BS201	VECTOR CALCULUS AND COMPLEX VARIABLES	3	1	0	4	60	100
<ul> <li>Summa</li> <li>Apply the Difference</li> <li>Implement</li> <li>Develope</li> <li>Develope</li> <li>Defining</li> </ul>	ctive (s): The purpose of learning this rize problems related to fundamenta ne methodologies involved in solving tiation and Vector Integration. ent the Complex Analysis, an elegan statics. b enough confidence to identify and n iate solutions, using the skills learne g a complex function and solving thro omes: At the end of this course, lear	l prine probl t met node d in tl ough o	ciple: lems hod I mat heir i comp	s of Vo relate in the thema nteraco	ed to funda study of h tical patte stive and s tegration	amental princi eat flow, fluid rns in real wo	dynamics and rld and offer
<ul> <li>Charact</li> <li>Apply the Recognition</li> <li>Identify</li> </ul>	erize the calculus of vectors. he theoretical aspects of vector integ ize the differentiation properties of c the complex functions and their map concepts of integration to complex f	ral ca omple ping	lculu ex fui in ce	s in th nction	ieir core a s. complex p	anes.	
Unit I DIF	FERENTIATION OF VECTORS			0.004			12
ector point fu elds – Scalar	nction- Directional derivative - Gradie	ent -D	Diver	gence	-Curl - Sc	olenoidal – Irre	otational vector
	EGRATION OF VECTORS			-			12
Vork done - L	ine Integral - Surface integral- Gro					e- Stoke's Th	
	orem- Applications involving cubes a ALYTIC FUNCTIONS	na pa	aralle	epipe	ed.		1:
nalytic Functi	ons- Necessary and Sufficient cor mination of Analytic Function using I	nditior Ailne	ns of Thor	f Ana npsor	lytic Func 1 method -	tion- Propert Applications t	ies of Analytic
Unit IV MA	PPING OF COMPLEX FUNCTIONS	111	0.1				12
onformal map alued function	ping- Application of transformation: to s - Linear fractional Transformation (	ansla Biline	ation, ear tr	rotation ansfor	on, magnit mation).	fication and in	version of multi
Unit V COI	MPLEXINTEGRATION						12
	amental Theorem - Cauchy's Integra - Cauchy's Residue Theorem	Forn	nula	- Tayle	or's and La	aurent's serie	s-Classification
EFERENCE(				2			
	reyszig, Advanced Engineering Math	emat	tics, <sup>-</sup>	Tenth	Edition, W	liley India Priv	vate Limited,Ne
Compar	Wylie and C. Louis Barrett, Advance ny Ltd, 2003						
Delhi, 1							- 5-1 - 1 - A
	. O. Neil, Advanced Engineering M Limited, 2012	lathe	matio	cs, Se	eventh Ed	ition, Cengag	e Learning Ind
	mes, Advanced Engineering Mathem						

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Department	epartment         ELECTRONICS AND INSTRUMENTATION ENGINEERIN           ourse Code         Course Name         Hours / Week					R 2019	Semester II B
Course Code	Course Name	Hour	T	P	Credit	Total Hours	Maximum Mark
19BS205	PHYSICS FOR ELECTRONICS ENGINEERING	3	0	0	3	45	100
<ul> <li>To under</li> <li>To under</li> <li>To becor</li> <li>To becor</li> </ul>	tive (s): The purpose of learning this cours stand the essential principles of electrical stand the properties of magnetic materials ne skillful in semiconductors. ne proficient in dielectric materials.	properties s and its	appl	icatio	ons.		-
To streng	othen the basic knowledge on the nanoma mes: At the end of this course, learners w	aterials a	nd qu	uantu	im conc	cepts.	
<ul> <li>To gain k</li> <li>To acquir</li> <li>To get kr</li> <li>To have to the total sector of total</li></ul>	converses. At the end of this course, learners we chowledge on electrical properties of mate re knowledge on basics of magnetic mate howledge on semiconducting materials and the necessary understanding on dielectric stand the basics of nanomaterials and the ECTRICAL PROPERTIES OF MATERIA	erials, rials and d its prop material eir applica	its a pertie ls an	s, d its :			s devices
Classical free e Wiedemann-Fr	lectron theory - Expression for electric anz law – Success and failures – Fermi- and insulators - Energy bands in solids– t	al condu Dirac sta	atisti	cs –	Density	of energ	ictivity, expressio gy states – metals
				100		and the second	9
susceptibility-ty magnetization a Applications of M Unit III SE ntroduction- typ pand gap semic Carrier concent semiconductors)	tism in materials – magnetic field and ind pes of magnetic materials – Ferromagn nd Curie temperature – Domain Theory, H Agnetic materials. <b>MICONDUCTOR PHYSICS</b> es of semiconductors - Intrinsic Semicond conductors – Carrier concentration in intri tration in N-type & P-type semicondu and its experiment- Applications. <b>ELECTRIC PROPERTIES OF MATERIAL</b>	etism: o Hysteresi ductors – rinsic sei uctors –	rigin is the - Ene mico	and eory, ergy k	exchar soft and band dia tors – e	nge inter d hard m agram – extrinsic	action- saturation agnetic materials direct and indirect semiconductors
olarization- Fre Mosotti relation Aaterials-Proper	als: various types of Polarization mechanis quency and temperature dependence of p - various dielectric breakdown mechanism ties and applications. NOELECTRONIC DEVICES	polarizati	ion-d	ielec	tric loss	- intern	al field - Clausius
Vanomaterials I Juantum dots - s	ntroduction – synthesis-top down and b size dependence of Fermi energy– quantu notubes: preparation- chemical vapour dep	um confir	neme	nt –	applica	tions- tra	insistor-MOSFET
1. Kasap, S. 2. Umesh K	C. —Principles of Electronic Materials and Mishra &Jasprit Singh, —Semiconductor I.A. —Solid State Physics: Structure and	Device F	Physi	cs ar	nd Desig	gn, sprin	ger,2008.
2009. REFERENCE(S 1. Garcia, N.	<b>):</b> . & Damask, A. —Physics for Computer S G.W. —Fundamentals of Nanoelectronics.						2012.

Chairman - BoS Dept. of Physics - ESEC

Course Code	ELECTRONICS AND INSTRUMENTA				R 2019	Semester II M
	Course Name		Contract of the local data and the	Credit	Total	Maximum Marks
		L	T P	C	Hours	100
19MC201	ENVIRONMENTAL SCIENCE AND ENGINEERING	3	0 0	0	45	100
-	s): The purpose of learning this course is	s to				
	ature and facts about environment.					
<ul> <li>Finding and</li> </ul>	implementing scientific, technological and	d econ	omic so	olutions t	o environ	imental problems.
<ul> <li>Know the type</li> </ul>	pes of natural resources and the individua	al role	in conse	erving th	e resourc	ces.
	owledge to various social issues by unde					
<ul> <li>Study the management</li> </ul>	integrated themes and biodiversity, r	natural	resou	rces, po	ollution o	control and waste
	At the end of this course, learners will be	e able	to:	1.217		
	knowledge in maintaining ecological b			nake use	e of their	knowledge in the
	of biodiversity.	- circuite e				
	ole of human being in maintaining a clean	onviro	nment	and used		nment for the future
	경험 방법 특별 가장 가 있었다. 것 같은 것 같	envire	minent	anu usei	urenviro	
generations.			:- 44			nd concernation of
	constituents of environment, precious re	esourc	es in tr	ie enviro	onment a	nd conservation of
natural resou						
	e of government and Non-Government	organ	ization	and exp	plain the	various rain water
harvesting te			ne. Tre			
	ir awareness about population growth,					
	knowledge in role of information technolo	ogy in e	environr	ment & h	uman he	
	TEMS AND BIODIVERSITY					10
nvironment: Scope	e – importance - need for public awaren	iess -C	concept	is of an	ecosyste	m - Structure and
inction of an ecos	ystem - Producers, consumers and dec	compo	sers - I	-ood cha	ains- too	d webs - types of
cosystem - structi	are and functions of forest ecosystem	and r	iver ec	osystem	- Blogi	versity - value of
iodiversity - consul	nptive use-productive use - social - ethi	cal - a	aestheti	c values	- Hotspo	ots of blodiversity -
	ty - Habitat loss - poaching of wildlife and	man w	ildlife c	onflicts.	Jonserva	ation of biodiversity
In-situ and Ex-situ		-	-			10
	MENTAL POLLUTION	ution	Mator	nellution	Cail n	8
ollution: Causes -	effects and control measures of Air poll te management - Causes - effects -control	ution -	vvater	furban	- Soll p	trial wastes - Role
	evention of pollution - Disaster managem					
Unit III NATURAI		iento -	1 10003	- cyclon	c- ianaon	
orest resource - 0		tor ros		1150-016		9
round water - confli	se-over exploitation -deforestation - Wat	ter res	ource -	use-ove	er utilizati	on of surface and
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M. Chairman - BoS Dept. of Chemistry - ES: Dept. of EIE - ESEC

- .K. Trivedi, "Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standard", Vol. I and II, Enviro Media.
- 4. Dharmendra S. Sengar, "Environmental law", Prentice Hall of India PVT LTD, New Delhi, 2007. 4. Rajagopalan, R, "Environmental Studies-From Crisis to Cure", Oxford University Press 2005
- 5. Cunningham, W.P. Cooper, T.H. Gorhani, "Environmental Encyclopedia", Jaico Publ., House, Mumbai, 2015.

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	ELECTRONICS AND INSTRUMENTA					R 2019	Semester II	
Course Code	Course Name	Ηοι	irs/V	leek	Credit	Total Hours	Maximum N	/larks
		L	Т	P	С			_
19ES206	SEMICONDUCTOR DEVICES AND CIRCUITS ctive (s): The purpose of learning this of	3	• 0	0	3	45	100	
<ul> <li>Unders</li> <li>Be exp</li> <li>Familia</li> <li>Explore</li> <li>Learn t</li> <li>Course Outc</li> <li>Explain</li> <li>identify</li> <li>Analyze</li> </ul>	tand the structure of basic electronic de osed to active and passive circuit eleme rize the operation and applications of tr the characteristics of amplifier gain an he required functionality of positive and omes: At the end of this course, learned the structure and working operation of and differentiate both active and passive the characteristics of different electron and adapt the required components to	evice ents. ansis d fre <u>nega</u> ers wi basi ve el nic de	s. quer ative ill be c ele emer evice	ike B feed able ctron nts es suc	esponse. <u>back sys</u> to: ic device ch as dio	etems. es. des and transis	stors	
	the acquired knowledge in design and					circuit.		
	JUNCTION DEVICES	curren	<i>j</i> 0.0		ementere		•	9
		istics	and	Bias	ing UJT,	Thyristors and	d IGBT - Struc	9 ture
	al model – Analysis of CE, CB, CC am	nlifio	re G	ain a	nd froqu	oncy response	- MOSEET e	mall
	Analysis of CS and Source follower – G							
	ILTISTAGE AMPLIFIERS AND DIFFE					Joneo Thgi ne	quoney analy	9
IMOS cascad tages –Single ypes (Qualita	le amplifier, Differential amplifier – Cor tuned amplifiers – Gain and frequency tive analysis).	nmor resp	n mo onse	de a	nd Differ	ence mode and tion methods, j	alysis – FET i power amplifie	ers –
Jnit V   FEE	DBACK AMPLIFIERS AND OSCILLA	TOR	S					9
or oscillations,	negative feedback – voltage / current, phase shift – Wien bridge, Hartley, Co	serie Ipitts	and	hunt Crys	feedbac tal oscilla	k –positive fee ators.	dback – Cond	ition
2. Sedra a EFERENCE( 1. Balbir K	. Bell," Electronic devices and circuits", and smith, "Microelectronic circuits",7th	Ed., and	Oxfo circu	its" P	niversity HI learni	Press ng private limite	ed, 2nd edition	n 201
	A Neamen, "Electronic Circuit Analysis	and	Des	ian" 1	Tata McC	araw Hill, 3rd E	dition, 2003.	
	L.Boylestad, "Electronic devices and cil							
	B Northron "Analysis and Annli					lastronia Ciro	uito to Diam	and in

 Robert B. Northrop, "Analysis and Application of Analog Electronic Circuits to Biomedical Instrumentation", CRC Press, 2004.

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Department	ELECTRONICS AND INSTRUMENTA					R 2019	Semester II ES
Course Code	Course Name	Hou	T T	-	Credit	Total	Maximum Mark
19ES210	PRINCIPLES OF CIVIL AND		T 0	P 0	C 3	Hours 45	100
1923210	MECHANICAL ENGINEERING	3	0	0	3	45	100
<b>Course Objectiv</b>	e (s): The purpose of learning this cours	se is to		-			100
	c knowledge on Civil and Mechanical Er		ina				
	the materials and measurements used i			orin	ha		
	exposure on the fundamental elements					turos	
	students to distinguish the components a						t unite IC onginos
and R & AC	U 1		king p	IIIC	the of h	ower plan	r units, ic engines,
	es: At the end of this course, learners wi	ll be ab	le to:		1.1		
	the Civil and Mechanical Engineering co			Pro	iects		
	usage of construction material and prop					ion materi	als
	stances and area by surveying		ouon c	1.00	monuou	on materi	uio.
	components used in power plant cycle.						
	te working principles of petrol and diesel	onging	in the second				
	he components of refrigeration and Air c						
Elaborate ti	A – OVER		ning cy	cie.	·	-	
Unit I S	COPE OF CIVIL AND MECHANICAL E		FRINC	1			9
	Engineering - Civil Engineering contribu				fare of	Society -	
	Engineering – Structural, Construction,						
Vater Resources		, Ocole	Chinica	п, с		nemai, m	ansponation and
					Course to		
	nanical Engineering - Mechanical Engi						
	lisciplines in Mechanical Engineering		uction	A	utomob	lie, Energ	ly Engineering -
nterdisciplinary co	ncepts in Civil and Mechanical Engineer B – CIVIL ENG		ING			and a second	The second second
Unit II S	URVEYING AND CIVIL ENGINEERING					and the second s	9
	- classification - principles - measurem				- angle	s – levelin	
of areas- contours	- examples	cinto or	distant	.03	angie	5 ICVCIIII	g-uctermination
	laterials: Bricks – stones – sand – ceme	nt – co	ocrete	- 5	teel - tin	nber – mo	dern materials
	UILDING COMPONENTS AND STRUC				1001 111	1001 1110	9
LOT ARE REPORTED TO THE REPORT OF THE REPORT	s of foundations - Bearing capacity and s			eal	uiremen	t of good	
ivil Engineering S	tructures: Brick masonry – stonemasonr	v – hea	ims -	colu	imns -	intels – ro	ofina – floorina –
lastering – floor ar	ea, carpet area and floor space index - T	vpeso	f Brida	esa	and Dan	ns – water	supply - sources
nd quality of wate	r - Rain water harvesting - introduction to	o high v	vav an	d ra	ilway.		
Unit IV IN	ITERNAL COMBUSTION ENGINES AN	ND POV	VÉR F	LA	NTS		9
	wer Plants - Internal combustion engine					lant - Wo	orking principle of
etrol and Diesel E	Engines – Four stroke and two stroke o	cycles -	- Com	oari	son of	four strok	e and two stroke
ngines - Working	principle of steam, Gas, Diesel, Hydr	o - ele	ctric a	nd	Nuclear	Power p	lants working
	principle of steam, Gas, Diesel, Hyur						
	Turbines, Reciprocating Pumps (single	acung					
erminology of Ret	Turbines, Reciprocating Pumps (single EFRIGERATION AND AIR CONDITION	ING S'	YSTE				9
	Turbines, Reciprocating Pumps (single	ING S'	YSTE		pressio	n and abs	9
ayout of typical do	Turbines, Reciprocating Pumps (single EFRIGERATION AND AIR CONDITION	le of va	YSTEI apour	om		n and abs	9
ayout of typical do EXT BOOK(S):	Turbines, Reciprocating Pumps (single EFRIGERATION AND AIR CONDITION frigeration and Air Conditioning. Princip mestic refrigerator–Window and Split ty	le of va pe roon	rster apour Air c	om	itioner.		9 sorption system–
ayout of typical do EXT BOOK(S): 1. Shanmugan	Turbines, Reciprocating Pumps (single EFRIGERATION AND AIR CONDITION frigeration and Air Conditioning. Princip mestic refrigerator–Window and Split ty n Gand Palanichamy MS," Basic Civil an	le of va pe roon	rster apour Air c	om	itioner.		9 sorption system–
ayout of typical do EXT BOOK(S): 1. Shanmugan PublishingC	Turbines, Reciprocating Pumps (single EFRIGERATION AND AIR CONDITION frigeration and Air Conditioning. Princip mestic refrigerator–Window and Split ty	le of va pe roon	rster apour Air c	om	itioner.		9 sorption system–
ayout of typical do EXT BOOK(S): 1. Shanmugan PublishingC EFERENCE(S):	Turbines, Reciprocating Pumps (single EFRIGERATION AND AIR CONDITION frigeration and Air Conditioning. Principle mestic refrigerator–Window and Split type n Gand Palanichamy MS," Basic Civil an o.,NewDelhi,1996.	le of va pe roon nd Mech	YSTEI apour n Air c nanica	ond En	<u>itioner.</u> ngineerir		9 sorption system–
ayout of typical do EXT BOOK(S): 1. Shanmugan PublishingC EFERENCE(S): 1. Palanikuma	Turbines, Reciprocating Pumps (single EFRIGERATION AND AIR CONDITION frigeration and Air Conditioning. Principle mestic refrigerator–Window and Split type n Gand Palanichamy MS," Basic Civil an o.,NewDelhi,1996. r, K. Basic Mechanical Engineering, ARS	le of va pe room nd Mech S Public	YSTEI apour on Air c nanica	En	<u>itioner.</u> ngineerin 10.	ng", Tata I	9 sorption system–
ayout of typical do EXT BOOK(S): 1. Shanmugan PublishingC EFERENCE(S): 1. Palanikuma 2. Ramamruth	Turbines, Reciprocating Pumps (single EFRIGERATION AND AIR CONDITION frigeration and Air Conditioning. Principle mestic refrigerator–Window and Split type n Gand Palanichamy MS," Basic Civil an o.,NewDelhi,1996.	IING SY le of va pe roon nd Mech S Public atRaiPu	rster apour on Air c nanica cations blishin	En	<u>itioner.</u> ngineerin 10.	ng", Tata I	9 sorption system–

4. ShanthaKumarSRJ., "Basic Mechanical Engineering", Hi-tech Publications, Mayiladuthurai, 2000.

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Chairman - BoS Dept. of Mech Engg. - ESEC

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Department	ELECTRONICS AND INSTRUM					R 2019	and the second se
Course Code	Course Name	Hou	rs/We	Р	Credit C	Total Hours	Maximum Marks
19TPS02	SOFT SKILL - II	1	0	1	1.5	30	100
1919502	SOFT SKILL - II		0	11	1.5	50	100
<ul> <li>Train th</li> <li>Coach t</li> <li>Develop</li> <li>Develop</li> <li>Teach i</li> </ul>	ctive (s): The purpose of learning e Students on Group Discussion he students on Interview Skills. Presentation Skills. Business Etiquette. mportance of Ethics and Values.	Do's and E	)on'ts.		2		
	omes: At the end of this course,						
<ul><li>Attend t</li><li>Present</li><li>Behave</li></ul>	ate Group Discussion with Confic he interview with positive attitude them very well by enhancing the very well in official gathering and bod ethics and values in their Per	e by having eir Presenta d Meeting b	Mock tion S y kno	Inte kills. wing	rviews. Etiquette		
	JP DISCUSSION	o official carrier				2	6
	lerstanding the objective and skil	lls tested in	a GD	) – G	eneral ty	pes of G	2.50
	- Mock GD & Feedback						
JNIT 2 INTE	RVIEW SKILLS	T. L. V	-	U			6
nterview hand	ling Skills - Self preparation ch	ecklist – G	roomi	ing ti	ips: do's	& don'ts	<ul> <li>mock interview</li> </ul>
edback		- 4.					T
	ENTATION SKILLS		1911-193			1150	6
Presentation SI	kills - Stages involved in an effect	ive present	ation -	-sele	ection of	topic, cor	ntent, aids – Engagi
he audience -	Time management - Mock Prese	entations &	Feed	back	(		La L
JNIT 4 Busir	ess Etiquette	- Sec					6
Grooming etiqu	ette – Telephone & E-mail etiqu	ette – Dini	ng etid	quett	e – do's	& Don'ts	in a formal setting
low to impress		terres and the	85	and the second	- A - La	5 19 . 73	
JNIT 5 Ethics	5			9.04	1. 34.05	14,153	6
thics – Importa	ance of Ethics and Values – Choic	ces and Dile	emma	s fac	ced – Dise	cussions	from news headlin
REFERENCE E							
	en Habits of Highly Effective Pe			R. Co	ovey.		
	ooks in the "Chicken Soup for th		ies.				
	earch for meaning – Viktor Frank						
	atest miracle in the world – OgMa	andino					
	Eliyahu Goldratt.						
	with Emotional Intelligence - Da						
	English - Sundra Samuel, Samu						
	ing Communication Skills by Kris						
	als of Effective Communication, L						idia.
10. Effective	e Presentation Skills (A Fifty-Minu						
	ic interviewing" by Richaurd Can	np, Mary E	. Vielł	nabei	r and Jac	k L. Sim	onetti – Published
11. "Strateg Wiley In	dia Pvt. Ltd e Group Discussion: Theory and						

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Course Code	ELECTRONICS AND INSTRUMENTA	-			ERING	R 2019	Semester II ES
course code	Course Name		Hour Wee	k	Credit	Total Hours	Maximum Marks
		L	Т	Ρ	C		and the second se
19ES223	ELECTRONICS DEVICES AND CIRCUITS LABORATORY	0	0	4	2	60	. 100
<ul> <li>Illustrate</li> <li>Determi</li> <li>Design</li> <li>Design</li> <li>Analyze</li> <li>Course Outco</li> <li>Underst</li> <li>Analyze</li> <li>Analyze</li> <li>Apply th</li> <li>Design</li> <li>Design</li> <li>LIST OF EXPI</li> <li>Charace</li> <li>Single</li> <li>Different</li> <li>Single</li> <li>Different</li> <li>Single</li> <li>S</li></ul>	<b>ctive (s):</b> The purpose of learning this co e the VI characteristics semi conductor of ine the various parameters of solid state an oscillator circuit using R, L, C compo- an amplifier circuit using Transistors the application of solid state devices	device device nents s will l device pplica ents. ener of ircuit) poth w s of a or, Stu ators with remen	es. ces b be al s. ttions diode emitt vave Con udy c induce tts	ble to ble to s form nmo of ligi ctive	common of s n Emitter nt activat and cap	collector and amplifier ed relay circui acitive filters	

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	ELECTRONICS AND INSTRUMEN						and the second se
Course Code	Course Name	Hou		/eek	Credit	Total	Maximum Mark
19ES221	ENGINEERING DRAWING	L	T	P	С	Hours	
		0	0	4	2	60	100
<ul> <li>Learn conv</li> <li>Draw ortho</li> <li>Draw the p</li> <li>Draw the s</li> <li>Draw the is</li> </ul> Course Outcom <ul> <li>Recognize</li> <li>Draw the p</li> <li>Draw the p</li> <li>Draw the p</li> <li>Draw the s</li> <li>Draw the is</li> </ul>	res: The purpose of learning this coventions and use of drawing tools in graphic projection of points and line rojection of planes and simple solid ection of solids and obtain the develometric projection of the given solides: At the end of this course, learned the conventions and apply dimensi rthographic projection of points and rojection of planes and simple solid ection of solid drawings and develometric projection of the given objection of the given o	a making es. Is. elopment ds. ers will be ioning co t lines. Is. pment o ects. ation)	eng of s e ab once f sur	surfac le to: pts w	ces of give	ven solid: iting simp n solids.	ole objects.
	phics in engineering applications – ze, layout and folding of drawing sh						
NITI PLANE							12
arabola and hyp iangle, square an INIT II PROJEC Orthographic proje f straight lines (o	constructions, Curves used in engi erbola by eccentricity method – Co ad circle – Drawing of tangents and <b>TION OF POINTS AND LINES</b> ection- Principles-Principal Planes- Inly First angle projections) inclined inclinations by rotating line method.	normal t	on of to the le pr	f cycl e abo rojec	loid – co ove curv	es. ection of	n of involutes of 11 points. rejection
	TION OF PLANES & SOLIDS						12
rojection of plane mple solids like	es (polygonal and circular surfaces) prisms, pyramids, cylinder, cone an nes by rotating object method.	inclined d trunca	to t ted	ooth f solid:	the princ s when t	ipal plan he axis i	es. Projection of
	TION OF SECTIONED SOLIDS AI	ND DEV	ELO	PME	NT OF	SURFAC	ES 12
ectioning of abov rincipal planes ar	ve solids in simple vertical position ad perpendicular to the other – obta and sectioned solids – Prisms, pyr	when the	e cut e sh	tting ape	plane is of sectio	inclined f	to the one of the
NIT V ISOMET	RIC PROJECTIONS						12
rinciples of isom yramids, cylinder EXT BOOK(S):	etric projection – isometric scale s, cones- combination of two solid o	–lsomet objects ir	ric p n sin	orojeo nple v	ctions of vertical p	simple oositions.	solids - Prisms,
<ol> <li>Natrajan K</li> <li>Venugopal Limited,200</li> <li>EFERENCE(S):</li> <li>Bhatt N.D.</li> </ol>	and Panchal V.M., "Engineering Dr	ng Graph	nics"	, Nev	w Age In	ternation	al (P)
	0. arwal and Agarwal C.M., "Engineeri w Delhi,2008.	ng Draw	ing"	, Tata	a McGra	w Hill Pu	blishing Compan
The second se	hna K.R., "Engineering Drawing" (V	ol. 1&11 c	omb	bined	), Subha	s Stores	, Bangalore,2007 Press, New

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	ELECTRONICS AND INSTRUMENTA	TION	I EN	GIN	EERING	R 2019	Semester III BS
Course Code	Course Name	201516	lour: Neel		Credit	Total Hours	Maximum Marks
A		L	Т	T P C			
19BS304	TRANSFORM TECHNIQUES AND THEIR APPLICATIONS	3	1	0	4	60	100
<ul> <li>Find the</li> <li>Find La equation</li> <li>Underst them to</li> <li>Implement</li> </ul>	and the concepts of Fourier series, Tra model and analyze the physical pheno ent the Fourier Transform an elegant m rize and apply the mathematical aspe	ontin ion ir ansfo mena ietho	uous n tim orms a d in 1	s sig le sp anc the s	bace and I Bounda study of s	solve second ry Conditions, ignals	l order differential which will enable
<ul> <li>into a co</li> <li>Formula</li> <li>Recogniusing Fo</li> <li>Apply the frequence</li> </ul>	Z-transform to convert a discrete-time s omplex frequency domain representation te a function in frequency domain when ze the periodicity of a function and for ourier series. e Fourier transform, which converts the cies, each of which represents a freque	neve mula ne tin	r the te th ne fu	fun e sa incti	ction is de ame as a on into a ent.	efined in time combination c sum of sine v	domain of sine and cosine
	nd solve the engineering problems in th RANSFORM	e are	ea of	hea	it, wave e	equations.	12
	lementary Properties - Inverse Z-Trans	eform	- C	onvo	olution Me	athod- Partial	
	rence Equations using Z-Transform.	Jioin				ourou i unuar	indetion method
	LACE TRANSFORM			1.1	S		12
aplace Transfo unction- Prope	orm- Existence Condition -Transforms or rties- Transforms of Derivatives and In riodic Functions - Inverse Laplace trans	ntegra	als -	Initi	al and Fi	nal Value The	tion, Unit impulse orems - Laplace
	RIER SERIES	10					12
	tions - General Fourier series - Odd an	nd ev	en fi	unct	ions - Ha	If range cosine	e and sine series
Root mean squ			_		1. C. 1. N.		
	RIER TRANSFORM					<u></u>	12
	Theorem- Fourier Transform and Inver nsforms of Simple Functions - Convolu						ine Transforms -
and the second se	LICATIONS OF PARTIAL DIFFERENT					arsidentity	12
lassification of imensional Wa	Second Order Quasi Linear Partial Difference of ave Equation - One Dimensional Heat E Fourier Series Solutions in Cartesian (	fferer Equa	ntial tion	Equa	ations - F		Solutions of One
EFERENCE(S 1. E. Kreys		natics	s, Ei	ghth			

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Department	ELECTRONICS AND INSTRUMENTA					R 2019	SemesterIII	PC
Course Code	Course Name	Hou			Credit	Total	Maximum N	larks
		L	Т	Р	С	Hours		
19EI301	SENSORS AND TRANSDUCERS	3	0	0	3	45	100	-
	ctive (s): The purpose of learning this c							
	ne methods of measurement, classificati							
	tand the behavior of transducers under	r statio	anc	dyr	amic co	nditions a	nd hence to mo	del the
transdu					. to	1		
	oosed to different types of resistive trans				ir applica	ation areas		
	knowledge on capacitive and inductive							
	owledge on variety of transducers and					and Sma	t transducers.	
	omes: At the end of this course, learner					entele acin	ad to colvo pro	blowso
	ne mathematical knowledge and science	e & en	ginee	ering	fundam	entais gair	ied to solve pro	biems
	ng to measurement applications. the problems related to sensors &trans	ducor	~					
	he right sensor/transducer for a given a							
	ine the static and dynamic characteristic			ucer	s usina :	software p	ackages.	
	and fiber optic sensor, smart traducer a					t.	J	
	ENCE OF MEASUREMENTS AND CLA					NSDUCE	RS	
	dards - Static calibration - Classificati							- Error
nalysis – Stati	stical methods – Odds and uncertainty –	- Class	ificat	ion o	of transd	ucers – Se	lection of transc	ucers.
	RACTERISTICS OF TRANSDUCERS						1	9
	eristics: - Accuracy, precision, resolu							
	Mathematical model of transducer, Zero	o, I an	dllo	rder	transdu	cers, Resp	onse to impulse	, step,
mp and sinus		-	-					
	IABLE RESISTANCE TRANSDUCERS eration, construction details, character		and	annl	ications	of notonti	omotor strain (	
	mometer, Thermistor, hot-wire anemom							jauye,
	IABLE INDUCTANCE AND VARIABLE							9
	ducers: - Principle of operation, constru							
duction poter	ntiometer – Variable reluctance transdu	ucers	- Sy	nchr	os – Mi	crosyn - F	Principle of ope	ration,
	etails, characteristics of capacitive tra						Signal Condition	ning –
	Capacitor microphone, Capacitive press	ure se	nsor,	Pro	ximity se	ensor.		
	ER TRANSDUCERS	1.4			-			9
ezoelectric tra	ansducer – Hall Effect transducer – Ma	igneto	elas	tic se	ensor –	Digital tran	sducers - Fibe	r optic
	k & Thin Film sensors (Bio sensor & ( & Air pollution) – Introduction to MEM							
andard (IEEE		5 – III	uout			art transuu		chace
EXT BOOK(S		E .						
	n E.O. and Manik D.N., "Measurement S	vstem	s" 61	h Ec	lition. Mo	Graw-Hill	Education Pvt. I	td. 20
	H.K.P., Instrument Transducers – Ar							
	ty Press, Cambridge, 2003						ee anna eesaga	,
EFERENCE(S				-				
	Liptak, Instrument Engineers' Handbook	k. Proc	ess	Mea	suremer	t and Ana	lysis, 4th Edition	n, Vol.
	C Press, 2003.	2						
	nabis, Sensors and Transducers, 2nd e	dition	Pre	ntice	Hall of	ndia, 2010	. E.A.	
	Bentley, Principles of Measurement Sys							
	n, Engineering Science, Elsevier Newne							
	D.V.S., Transducers and Instrumentation					Hall of In	dia Pvt. Ltd., Ne	w Dell
2010.			_					Constant of Constants
2010.								

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Department	ELECTRONICS AND INSTRUMEN				a standard and a stand	R 2019	Semester II	PC
Course Code	e Course Name		Hours/Week Credit			Total	Maximum	Marks
		L	Т	P	C	Hours		
19EI302	CIRCUIT THEORY	2	2	0	4	60	100	
	ve (s): The purpose of learning this co	ourse is t	0					
	electric circuits and its analysis							
	owledge on solving circuit equations us			theor	ems			
	the phenomenon of resonance in coul	1000000 00 10000 X-1	uits.					
	on obtaining the transient response of o						4	
	Phasor diagrams and analysis of three				1.1.1.1.1.			
· · · · · · · · · · · · · · · · · · ·	nes: At the end of this course, learners	s will be	able	to:				
	ne electric circuits.		0.5		1			
	network theorems to compute various							
	tank circuit for given frequency and ar						and parallel.	
	ne transient response of RL, RC and R			ith D	C and A	C input.		
<ul> <li>Analyze t</li> </ul>	ne three phase circuit with different typ	es of loa	ads.		A CONTRACTOR	- G		
	SIC CIRCUIT ANALYSIS							12
	choffs laws – DC and AC Circuits – R							
	method of analysis for D.C and A.C. of	circuits -	- Pha	sor D	)iagram ·	- Power,	Power Facto	r and
nergy								
	TWORK THEOREMS FOR DC AND A				1100172	- 100 M	Contraction of the	12
	n: voltage and current division, source							
lovton& Theorem	n – Superposition Theorem – Maximur	m power	trans	ster t	neorem -	<ul> <li>Recipro</li> </ul>	ocity Theorem	
	SONANCE AND COUPLED CIRCUIT		uality	fact	ar and D	andwidth	Colf and m	12
	ed resonance – their frequency respon ficient of coupling – Tuned circuits – S					andwidth	- Sell and m	utual
	ANSIENT RESPONSE	ingle tui	ieu c	noun	5.			12
	se of RL, RC and RLC Circuits using La	aplace tr	ansf	orm fo	or DC inr	out and A	C with sinus	
	ization of two port networks in terms of					, at an a .		orucai
	REE PHASE CIRCUITS	i N						12
hree phase bala	nced / unbalanced voltage sources - a	analysis	of th	ree p	hase 3-v	vire and 4	4-wire circuits	with
	nnected loads, balanced & un balance		sor di	agra	m of volt	ages and	currents - p	ower
	measurements in three phase circuits.		1.1	1.5	4		Start Study	
TEXT BOOK(S)			. –					
	Hayt, Jack E. Kemmerly, and Steven	M. Durb	in, Ei	ngine	ering Cir	cuit Anal	ysis, Eighth E	aition
	Graw Hill, 2013			~ 1	1.0		TIMO	
	Iminister and Mahmood Nahvi, —Elect			Scha	um's Ou	time Serie	es, Tata McG	raw H
Publishing	Company, New Delhi, Fifth Edition Re	eprint 20	16.					
REFERENCE(S			motic	nall	to Nou	Dolhi /	1006)	
	SR, "Electric Circuits Analysis," New A							ы. Li
(2007).	AandShyam Mohan SP, "Circuits an							
	i A, "Circuits Theory (Analysis and syn							
	Alexander, Mathew N.O. Sadiku, "Fun							

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	rtment	ELECTRONICS AND INSTRUM						SemesterIII	PC
Cours	seCode	Course Name	Hou	1		Credit	Total Hours	Maximum M	<b>/</b> larks
105	EI303	ELECTRICAL MEASUREMEN	TS 3	T 0	P 0	C 3	45	100	-
		tive (s): The purpose of learning t			0	3	45	100	
		the meters used to measure cur							
		adequate knowledge in the meas			anes	for now	er and ene	eray nower and	enera
		re included.	di ciniciti di	sonn	queo	ioi pon	of and one	ngy, power and	chergy
		e discussion about potentiometer	& instrume	ent tra	ansfo	rmers			
		study of resistance measuring me		Jin ac	11010	innero.			
		study of inductance and capacitar		ireme	ent				
Cours	e Outco	mes: At the end of this course, lea	arners will	be al	ole to	):			1.
		current and voltage,		20 0.					
	Understa	nd AC and DC measurements.							
•	Measure	power and calibration of energy n	neters.						
		current and voltage using potentie				eles:			
		nd the resistance measurement a	ind using b	oridge	circu	uit to me	easure resi	stance, inductar	nce and
	capacita		Den La L						
Unit I	MEA	SUREMENT OF VOLTAGE AND	CURREN	IT					9
		<ul> <li>Ballistic, D'Arsonval galvanome</li> </ul>							
		omparison of moving coil, moving							
		pe – Extension of range and calib	ration of v	oltme	ter a	nd amm	neter – Erro	ors and compen	sation-
.C. ga Jnit II		er- Vibration galvanometer. SUREMENT OF POWER AND E	NEDCY	-			-		9
		neter type wattmeter: – Theory & i	te errore -	Mot	apode	of corre	ction - I P	F wattmeter_Ph	
ading	– Inducti	on type kWh meter – Induction typ	le energy r	neter	- Ca	alibratio	of wattme	ter and Energy	meter
Unit II		ENTIOMETERS & INSTRUMENT	TRANSF	ORN	IERS	B	1 of Wattine	nor and Energy	9
		r:- Basic circuit, standardization -					's) – AC pc	tentiometer:-Dr	vsdale
olar t	ype) type	- Gall-Tinsley (coordinate) type	- Limitatio	ons 8	app	lication	s – Instrun	nent Transforme	er:-C.T
nd P.T	constru	ction, theory, operation and charac	cteristics.						
		ISTANCE MEASUREMENT		-			1 140		9
		low, medium & high resistance:							
		Series and shunt type ohmmeter method – Megger – Direct deflect							
	ement.	method – megger – Direct deneci	tion metho	us –	FILE	e s guar	u-wiremet	iou – Laitin resi	Stance
Unit V		BRIDGES		- 10-				1 1 1 1 1 1 1 1	9
		easurement of inductance, capacit	tance - Q	of coi	I – M	axwell F	Bridge – W	ein's bridge-Sc	
		on bridge –Hay's bridge- Campbel							
		ir compensation - Detectors - Ex				2			
ethod	OOK(S)								2.4
	EW/ Gol	ding &F.C.Widdis, 'Electrical Meas	surements	& M	easu	ring Inst	truments',	A.H.Wheeler& (	Co,2001
EXT B	L. VV. GUI		N		tion	Now De	lhi 2010		
EXT E 1.		i, Electronic Instrumentation, McG	sraw-HIII E	duca	uon,	NEW DO			
EXT E 1. 2.			sraw-Hill E	duca	uon,	New De			
EXT E 1. 2. EFER 1.	H.S. Kals ENCE(S) A.K. Sav							ntation,	
EXT E 1. 2. EFER 1.	H.S. Kals <b>ENCE(S</b> ) A.K. Sav Dhanpat	: /hney, A Course in Electrical & I Rai and Co, New Delhi,2010.	Electronic	Mea	surer	ments 8	Instrume		
EXT E 1. 2. EFER 1.	H.S. Kals ENCE(S) A.K. Sav Dhanpat S.K.Singl	: /hney, A Course in Electrical & I Rai and Co, New Delhi,2010. n, 'Industrial Instrumentation and c	Electronic control', Ta	Mea: ata M	surer cGra	ments 8 w Hill, 2	Instrumer	002.	& Sons.
EXT E 1. 2. EFER 1. 2. 3.	H.S. Kals ENCE(S) A.K. Sav Dhanpat S.K.Singl J.B.Gupt	: hney, A Course in Electrical & I Rai and Co, New Delhi,2010. h, 'Industrial Instrumentation and c a, 'A Course in Electronic and Elec	Electronic control', Ta	Mea: ata M	surer cGra	ments 8 w Hill, 2	Instrumer	002.	& Sons,
EXT E 1. 2. EFER 1. 2. 3.	H.S. Kals ENCE(S) A.K. Sav Dhanpat S.K.Sing J.B.Gupt Delhi, 20	: hney, A Course in Electrical & I Rai and Co, New Delhi,2010. h, 'Industrial Instrumentation and c a, 'A Course in Electronic and Elec 03.	Electronic control', Ta trical Meas	Mea: ata M suren	surer cGra ients	ments 8 w Hill, 2 and Ins	Instrumer nd edn.,20 trumentatio	002. on',S.K.Kataria&	
EXT B 1. 2. EFER 1. 2. 3. 4.	H.S. Kals ENCE(S) A.K. Sav Dhanpat S.K.Singl J.B.Gupt Delhi, 20 Martin U	: hney, A Course in Electrical & I Rai and Co, New Delhi,2010. h, 'Industrial Instrumentation and c a, 'A Course in Electronic and Elec 03. Reissland, 'Electrical Measuren	Electronic control', Ta trical Meas	Mea: ata M suren	surer cGra ients	ments 8 w Hill, 2 and Ins	Instrumer nd edn.,20 trumentatio	002. on',S.K.Kataria&	
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the second statement of the statement of	LECTRONICS AND INSTRUMENT	and a second a second se			and the state of t	and the second se	SemesterIII	I ES Marks
Course Code	Course Name	Hou	1			TotalHour	Maximum	
19ES304	ELECTRICAL MACHINES		T 0	P 0	C 3	s 45	100	
	ive (s): The purpose of learning this	-	-	-	5	45	100	,
<ul> <li>Introduce</li> <li>Introduce</li> <li>Introduce</li> </ul>	the principles of operations of DC r the principles of operations of Tran the principles of operations of Indu the principles of operations of Syno other special machines	nsforme liction m	ers nachi	ines		generator		
Course Outcor	nes: At the end of this course, learn	ners wil	lbe	able	to:			
	ombinational and sequential Circuits							
	nowledge to solve problems associ		th D	C and	d AC Ma	achines.		
	control different machines based or						d working prin	nciple.
<ul> <li>Choose a</li> </ul>	ppropriate machines for a given ap	plication	n wh	ile ca	arrying c	ut projects.		
<ul> <li>Apply the</li> </ul>	knowledge gained to choose app	propriate	e ma	achin	es for s	pecific appl	ication usefu	I for the
society.								
	out the latest developments related	to ma	chin	es ar	nd to lea	arn their cor	ncepts even a	after the
	n of the course.		1.0		A	A States	Sub Contractor	1
	MACHINES							9
C Machinaa	Dringinla of exception and expetitive	AL an all				atan tanan	· · · · · · · · · · · · · · · · · · ·	-
.C. Machines: -	<ul> <li>Principle of operation and construct</li> <li>Characteristics of Motor and G</li> </ul>	ction of	mot	or an Starti	d gener	ator - torque	equation - V	-
xcitation schem	es – Characteristics of Motor and G NSFORMERS	enerato	or – S	Starti	ing, Spe	ed control of	f D.C. Motor.	Various
xcitation schem Unit II TRAI rinciple, Constr fficiency of a tra otential Transfo	es – Characteristics of Motor and G NSFORMERS uction and Types of Transformer ansformer-Introduction to three pha rmer.	enerato	or – : equ	Starti uatior	ing, Spe n - Pha	ed control of sor diagram	f D.C. Motor. is - Regulation	Various 9 on and ent and
xcitation schem Unit II TRAI rinciple, Constr fficiency of a tra otential Transfo Unit III SYNC	es – Characteristics of Motor and G NSFORMERS uction and Types of Transformer ansformer-Introduction to three pha rmer. CHRONOUS MACHINES	enerato - EMF se tran	or – S equisform	Starti uatior mer (	ing, Spe n - Pha Connect	ed control of sor diagram ion. Applicat	f D.C. Motor. is - Regulations of Curre	Various 9 on and ent and 9
xcitation schem Unit II TRAI rinciple, Constr fficiency of a tra otential Transfo Unit III SYNC rinciple of Oper	es – Characteristics of Motor and G NSFORMERS uction and Types of Transformer ansformer-Introduction to three pha rmer. CHRONOUS MACHINES ation, type - EMF Equation and Ph	- EMF se tran	or – : equisform	Starti uatior mer (	ing, Spe n - Pha Connect	ed control of sor diagram ion. Applicat	f D.C. Motor. is - Regulations of Curre	Various 9 on and ent and 9
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xcitation schem Unit II TRAN rinciple, Constr fficiency of a tra otential Transfo Unit III SYNC rinciple of Oper ald Starting Met Unit IV THRE duction motor-p	es – Characteristics of Motor and G NSFORMERS uction and Types of Transformer ansformer-Introduction to three pha rmer. CHRONOUS MACHINES ation, type - EMF Equation and Ph hods, Torque V- Curves, inverted – E PHASE INDUCTION MOTORS principle of operation, Types - Tor	- EMF se tran asor dia	or – S equisforr agra /es.	Starti uatior mer (	n - Pha Connect	ed control of sor diagram ion. Applicat	f D.C. Motor. is - Regulations of Curre	Various 9 on and ent and 9 agnetic 9
xcitation scheme         Unit II       TRAN         rinciple, Constr         fficiency of a tra-         otential Transfo         Unit III       SYNC         rinciple of Oper         ald Starting Met         Unit IV       THRE         duction motor-pontrol of induction	es – Characteristics of Motor and G NSFORMERS uction and Types of Transformer ansformer-Introduction to three pha rmer. CHRONOUS MACHINES ation, type - EMF Equation and Ph hods, Torque V- Curves, inverted – E PHASE INDUCTION MOTORS principle of operation, Types - Tor on motors.	- EMF se tran asor dia - V curv	or — : equisform agra ves. p ch	Starti uatior mer ( ms -	n - Pha Connect Synchro	ed control of sor diagram ion. Applicat onous motor - Starting n	f D.C. Motor. is - Regulations of Curre	Various on and ent and gnetic Speed
xcitation scheme         Unit II       TRAN         rinciple, Constr         fficiency of a tra-         otential Transfo         Unit III       SYNC         rinciple of Oper         eld Starting Met         Unit IV       THRE         nduction motor-pontrol of inductio         Unit V       SING	es – Characteristics of Motor and G NSFORMERS uction and Types of Transformer ansformer-Introduction to three pha rmer. CHRONOUS MACHINES ation, type - EMF Equation and Ph hods, Torque V- Curves, inverted – E PHASE INDUCTION MOTORS principle of operation, Types - Tor on motors. LE PHASE INDUCTION MOTORS	- EMF se tran asor dia - V curv que-slij	or – Sequestorr agra ves. p ch	Starti uatior mer ( ms - aract	n - Pha Connect Synchro eristics	ed control of sor diagram ion. Applicat phous motor - Starting n NES	f D.C. Motor. ns - Regulations of Curre r- Rotating Management nethods and	Various 9 on and ent and 9 agnetic 9 Speed 9
xcitation scheme         Unit II       TRAN         rinciple, Constr         fficiency of a tra-         otential Transfo         Unit III       SYNO         rinciple of Oper         eld Starting Met         Unit IV       THRE         outcolor induction         pontrol of induction         Unit V       SING         ypes of single p         haded pole mot         Brushless D.C	es – Characteristics of Motor and G NSFORMERS uction and Types of Transformer ansformer-Introduction to three pha rmer. CHRONOUS MACHINES ation, type - EMF Equation and Ph hods, Torque V- Curves, inverted – E PHASE INDUCTION MOTORS principle of operation, Types - Tor on motors.	- EMF se tran asor dia - V curv que-slip AND S	or – : equisform agra /es. p ch SPEC	Starti uatior mer ( ms - aract CIAL	n - Pha Connect Synchro eristics MACHII	ed control of sor diagram ion. Applicat onous motor - Starting n NES citor start ca	f D.C. Motor. is - Regulations of Curre r- Rotating Management nethods and pacitor run m	Various 9 on and ent and 9 agnetic 9 Speed 9 otors –
xcitation scheme         Unit II       TRAN         rinciple, Constr         fficiency of a tra-         otential Transfo         Unit III       SYNO         rinciple of Oper         eld Starting Met         Unit IV       THRE         oduction motor-pontrol of induction         Unit V       SING         ypes of single pl         haded pole mot         Brushless D.C.         1.         Fitzgerald	es – Characteristics of Motor and G NSFORMERS uction and Types of Transformer ansformer-Introduction to three pha rmer. CHRONOUS MACHINES ation, type - EMF Equation and Ph hods, Torque V- Curves, inverted – E PHASE INDUCTION MOTORS principle of operation, Types - Tor on motors. LE PHASE INDUCTION MOTORS hase induction motors –Double field or – Repulsion type motor – Universe motorStepper motor. A.E, Kingsley C., Umans, S. and U	- EMF se tran asor dia - V curv rque-slip AND S I revolv sal moto	or – : equisforr agra /es. p ch SPEC ing t or – I	Starti uatior mer ( ms - laract CIAL heory Hyste	ing, Spe n - Pha Connect Synchro teristics MACHII y- Capac eresis mo ctric Ma	ed control of sor diagram ion. Applicat onous motor - Starting n NES citor start ca otor - Switch chinery", Mc	f D.C. Motor. is - Regulations of Current r- Rotating Management nethods and pacitor run model reluctance Graw- Hill,20	Various on and ent and agnetic g Speed 9 otors – e motor
xcitation scheme         Jnit II       TRAN         rinciple, Constr         ficiency of a tra-         otential Transfo         Jnit III       SYNC         rinciple of Oper         ald Starting Met         Jnit IV       THRE         duction motor-pontrol of induction         pontrol of single phaded pole mot         Brushless D.C.         ETERENCK(S):         1.         Fitzgerald         2.         Theraja, E	es – Characteristics of Motor and G NSFORMERS uction and Types of Transformer ansformer-Introduction to three pha rmer. CHRONOUS MACHINES ation, type - EMF Equation and Ph hods, Torque V- Curves, inverted – E PHASE INDUCTION MOTORS orinciple of operation, Types - Tor on motors. LE PHASE INDUCTION MOTORS hase induction motors –Double field or – Repulsion type motor – Universe motorStepper motor. A.E, Kingsley C., Umans, S. and U B.L., "A Text book of Electrical Techn	- EMF se tran asor dia - V curv rque-slip AND S d revolv sal moto lmans S nology"	or – : equision agra ves. p ch <b>BPEC</b> S.D., ', Vol	Starti uatior mer ( ms - haract CIAL Hyste "Elect I.II, S	ing, Spe n - Pha Connect Synchro erristics MACHII y- Capac erresis mo ctric Mac .C Char	ed control of sor diagram ion. Applicat onous motor - Starting n NES citor start ca otor - Switch chinery", Mc id and Co., N	f D.C. Motor. is - Regulative tions of Current - Rotating Man nethods and pacitor run man ed reluctance Graw- Hill,20 New Delhi,20	Various on and ent and agnetic g Speed 9 otors – e motor
xcitation scheme         Unit II       TRAN         rinciple, Constr         fficiency of a tra-         otential Transfo         Jnit III       SYNC         rinciple of Oper         Init IV       THRE         duction motor-pontrol of inductio         Jnit V       SING         ypes of single phaded pole mot         Brushless D.C I         I.       Fitzgerald         2.       Theraja, E         EFERENCE(S):         1.       Abhijit Cha         2.       Deshpand	es – Characteristics of Motor and G NSFORMERS uction and Types of Transformer ansformer-Introduction to three pha rmer. CHRONOUS MACHINES ation, type - EMF Equation and Ph hods, Torque V- Curves, inverted – E PHASE INDUCTION MOTORS principle of operation, Types - Tor on motors. LE PHASE INDUCTION MOTORS hase induction motors –Double field or – Repulsion type motor – Universe motorStepper motor. A.E, Kingsley C., Umans, S. and U B.L., "A Text book of Electrical Techn akrabarti and Sudipta Debnath, "Ele le M. V., "Electrical Machines" PHI I	- EMF se tran asor dia - V curv que-slip AND S d revolv sal moto mans S nology" ectrical Learnin	or – : equ sforr agra ves. p ch SPEC S.D., ', Vol Mac g Pv	Starti uatior mer ( ms - aract heory Hyste "Elec I.II, S hines t. Lto	ing, Spe n - Pha Connect Synchro eristics MACHII y- Capac eresis mo ctric Ma ctric Ma ctric Ma s", McGr l., New I	ed control of sor diagram ion. Applicat onous motor - Starting n NES citor start ca otor - Switch chinery", Mc d and Co., N aw- Hill Edu Delhi,2011	f D.C. Motor. is - Regulations of Curre - Rotating Market - Rotating - Rotating Market - Rotating - Rotating Market - Ro	Various 9 on and ent and 9 agnetic 9 Speed 9 otors – e motor 002. 07.
xcitation scheme         Unit II       TRAN         rinciple, Constr         fficiency of a tra-         otential Transfo         Unit III       SYNC         otential Transfo         Unit III       SYNC         rinciple of Oper         add Starting Met         Unit IV       THRE         oduction motor-pontrol of inductio         Unit V       SING         ypes of single pl         haded pole mot         Brushless D.C I         EFERENCE(S):         1.       Fitzgerald         2.       Theraja, E         EFERENCE(S):         1.       Abhijit Cha         2.       Deshpand         3.       B.S.Guru	es – Characteristics of Motor and G NSFORMERS uction and Types of Transformer ansformer-Introduction to three pha rmer. CHRONOUS MACHINES ation, type - EMF Equation and Ph hods, Torque V- Curves, inverted – E PHASE INDUCTION MOTORS principle of operation, Types - Tor on motors. LE PHASE INDUCTION MOTORS hase induction motors –Double field or – Repulsion type motor – Universe motorStepper motor. A.E, Kingsley C., Umans, S. and U B.L., "A Text book of Electrical Techn akrabarti and Sudipta Debnath, "Ele le M. V., "Electrical Machines" PHI I and H.R.Hiziroglu, "Electric Machine	- EMF se tran asor dia - V curv que-slip AND S d revolv sal moto mology" ectrical Learnin ery and	or - : equ sforr agra ves. p ch SPEC S.D., Vol S.D., Vol Mac g Pv I Tra	Starti uatior mer ( ms - laract heory Hyste "Elec I.II, S hines t. Lto nsfor	ing, Spe n - Pha Connect Synchro eristics MACHII y- Capac eresis mo ctric Mac ctric Mac ctric Mar .C Char s", McGr l., New I mer', Oz	ed control of sor diagram ion. Applicat onous motor - Starting n NES citor start ca otor - Switch chinery", Mc d and Co., f aw- Hill Edu Delhi,2011 kford univers	f D.C. Motor. is - Regulations of Curre - Rotating Market - Rotating - Rotating - Rotating Market - Ro	Various 9 on and ent and 9 agnetic 9 Speed 9 otors – e motor 002. 07.
xcitation scheme         Unit II       TRAN         rinciple, Constr         fficiency of a tra- otential Transfo         Unit III       SYNC         otential Transfo         Unit III       SYNC         rinciple of Oper         eld Starting Met         Unit IV       THRE         duction motor-pontrol of inductio         Unit V       SING         ypes of single pl         haded pole mot         Brushless D.C i         EFERENCE(S):         1.       Fitzgerald         2.       Theraja, E         EFERENCE(S):       1.         3.       B.S.Guru         4.       Del Toro, 1	es – Characteristics of Motor and G NSFORMERS uction and Types of Transformer ansformer-Introduction to three pha rmer. CHRONOUS MACHINES ation, type - EMF Equation and Ph hods, Torque V- Curves, inverted – E PHASE INDUCTION MOTORS principle of operation, Types - Tor on motors. LE PHASE INDUCTION MOTORS hase induction motors –Double field or – Repulsion type motor – Universe motorStepper motor. A.E, Kingsley C., Umans, S. and U B.L., "A Text book of Electrical Techn akrabarti and Sudipta Debnath, "Electrical Machines" PHI I and H.R.Hiziroglu, "Electric Machine V., "Electrical Engineering Fundame	- EMF se tran asor dia - V curv que-slip AND S d revolv sal moto mology" ectrical ery and entals",	or - : equision agra ves. p ch SPEC bor - I S.D., Vol S.D., Vol Mac g Pv I Tra Prei	Starti uatior mer ( ims - laract Hyste "Elec I.II, S hines t. Lto nsfor ntice	ing, Spe n - Pha Connect Synchro eristics MACHII y- Capac eresis mo ctric Mac ctric Mac ctric Mac cresis mo ctric Mac areasis mo ctric Mac cresis mo ctric Mac ctric Mac	ed control of sor diagram ion. Applicat onous motor - Starting n NES citor start ca otor - Switch chinery", Mc d and Co., N aw- Hill Edu Delhi,2011 xford univers ndia, New D	f D.C. Motor. is - Regulations of Curre - Rotating Market - Rotating - Rotating Market - Rotating - Rotating Market - Ro	Various Various 9 on and ent and 9 agnetic 9 Speed 9 sotors – 9 102. 107.
xcitation scheme         Unit II       TRAN         rinciple, Constr         fficiency of a tra-         otential Transfo         Unit III       SYNC         rinciple of Oper         eld Starting Met         Unit IV       THRE         duction motor-pontrol of inductio         Unit V       SING         ypes of single pl         haded pole mot         Brushless D.C I         EFERENCE(S):         1.       Fitzgerald         2.       Theraja, E         EFERENCE(S):       1.         3.       B.S.Guru I         4.       Del Toro, 5.         5.       Nagrath I.	es – Characteristics of Motor and G NSFORMERS uction and Types of Transformer ansformer-Introduction to three pha rmer. CHRONOUS MACHINES ation, type - EMF Equation and Ph hods, Torque V- Curves, inverted – E PHASE INDUCTION MOTORS principle of operation, Types - Tor on motors. LE PHASE INDUCTION MOTORS hase induction motors –Double field or – Repulsion type motor – Universe motorStepper motor. A.E, Kingsley C., Umans, S. and U B.L., "A Text book of Electrical Techn akrabarti and Sudipta Debnath, "Ele le M. V., "Electrical Machines" PHI I and H.R.Hiziroglu, "Electric Machine	- EMF se tran asor dia - V curv que-slip AND S d revolv sal moto sal sal sal sal sal sal sal sal sal sal sal sal sal sal sal sal sal sal sal	or - : equision agra ves. p ch SPEC bor - I S.D., Vol S.D., Vol Mac g Pv I Tra Prei	Starti uatior mer ( ims - laract Hyste "Elec I.II, S hines t. Lto nsfor ntice	ing, Spe n - Pha Connect Synchro eristics MACHII y- Capac eresis mo ctric Mac ctric Mac ctric Mac cresis mo ctric Mac areasis mo ctric Mac cresis mo ctric Mac ctric Mac	ed control of sor diagram ion. Applicat onous motor - Starting n NES citor start ca otor - Switch chinery", Mc d and Co., N aw- Hill Edu Delhi,2011 xford univers ndia, New D	f D.C. Motor. is - Regulations of Curre - Rotating Market - Rotating - Rotating Market - Rotating - Rotating Market - Ro	Various Various 9 on and ent and 9 agnetic 9 Speed 9 sotors – 9 102. 107.

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Chairman - BoS Dept. of EIE - ESEC

Department	ELECTRONICS AND INSTRUMEN	TATION	I EN	GINE	ERING	R 2019	SemesterIII	ES
Course Code	Course Name		Hours /Week			Total	Maximum M	arks
	A State of the second	L	Т	P	С	Hours		_
19EC303	SIGNALS AND SYSTEMS	3	3 1	0	4	60	100	
	ctive (s): The purpose of learning this		is to					
	tand the basic properties of signal &sy	ystems						
	and the continuous tine signals							
	ne methods of characterization of LTI					1		
	continuous time signals and system							
	e discrete time signals and system in t					m domain.	كالم ويحمد المتحد الم	
	omes: At the end of this course, learn				<b>D</b> :			
	to determine if a given system is line	ar/caus	al/sta	ble				
<ul> <li>Explain</li> </ul>	about the continuous tine signals						-	
Capable	e of determining the frequency compo	pnents p	rese	nt in	a determ	inistic sign	al	
Capable	of characterizing LTI systems in the	time do	main	and	frequence	cy domain		
	to compute the output of an LTI syste			e and	a frequer	icy domain	15	
	SSIFICATION OF SIGNALS AND S ls- Step, Ramp, Pulse, Impulse, Real					1.0		9
Nonlinear, Til	als, Energy& Power signals - Classifi me-variant & Time-invariant, Causal & LYSIS OF CONTINUOUS TIME SIG	& Non-c	ausa	I, Sta	able & Ur	istable.		
	or periodic signals - Fourier Transform		ortio	e   c		aneforme	and properties	
	EAR TIME INVARIANT CONTINUOU						and properties	1 9
	se - convolution integrals- Differentia					nlace tran	sforms in Analys	
	ystems connected in series / parallel.		011 1	ound		place train		
	LYSIS OF DISCRETE TIME SIGNAL					đ.		9
	al Sampling - Fourier Transform of		e tim	e sid	nals (DT	FT) – Pro	perties of DTFT	- Z
ransform & Pr	operties							
Unit V LINE	AR TIME INVARIANT-DISCRETE T	IME SY	STE	MS		N DOM:		9
npulse respor	nse - Difference equations-Convolut	ion sun	n- Di	scret	e Fourie	er Transfor	m and Z Trans	form
	ursive & Non-Recursive systems-DT	system	s cor	nect	ed in ser	ies and pa	rallel.	
EXT BOOK(S								
	ppenheim, S.Wilsky and S.H.Nawab,	—Sign	als a	nd S	ystemsll,	Pearson,	2015.(Unit 1-V)	
EFERENCE(S								
1. B. P. La	thi, —Principles of Linear Systems an	nd Signa	alsi,	Seco	nd Editio	n, Oxford,	2009.	
2. R.E.Zeir 2007.	mer, W.H.Tranter and R.D.Fannin, –	-Signals	8 & 5	syste	ms - Col	ntinuous a	nd Discretell, Pe	earsc
3. John Ala	an Stuller, —An Introduction to Signal	s and S	vster	nsl	Thomson	2007		

John Alan Stuller, —An Introduction to Signals and Systemsll, Thomson, 2007

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Chairman - BoS Jept of ElC - ESG

Course Code	ELECTRONICS AND INSTRUMENT					R2019	SemesterIII	and the second se
course code	Course Name	Ηοι	irs/W	leek	Credit	Total	Maximum M	larks
Les I	and the second part of the	L	T	P	С	Hours	0	
19TPS03	QUANTITATIVE APTITUDE AND LOGICAL REASONING - I	2	0	0	0	30	100	
Course Object	ive (s): The objective of this course is to	0			1 1 2		1.1.1	
	itude assessment by using speed math		ots.					
	blems using fast track method by learni			ation	and num	nbers.		
	basic of ratio and proportion and mixtur							
	different ways of solving problems on a				5.			
	logical skills by analyzing the objects.	U		Ű				
	nes: At the end of this course, learners	will be	able	to:				
	question with speed and accuracy.			Accesses				1
	quantitative aptitude questions by using	g simpl	ificat	ion a	nd numb	ers syste	em.	
	st of the aptitude topics by knowing ratio							
	problems on average and ages by usin							
	heir logical thinking.	0 0						
	D MATHS AND NUMBER SYSTEMS		11-1-1	1		1.1.1.1.1.1.1.1		6
OI LL	: Square and square roots – Square for	r numb	ers fr	om	81 to 50	Finding	squares of nu	
	00. Cubes and cubes roots.	manno	013 11	onic	/1 10 00.	i inding .	squares of hu	mber
	EMS: Numbers and types of Numbers -	- Prope	rties	ofN	umbers	-Face va	lue and place	value
	s – Concept on unit digit and remainder			0111	umbere	1 400 14	nuo una piaco	value
		NI ST THE STORE					*	1 -
		REDC						6
and the second	LIFICATIONS & PROBLEMS ON NUM		form		Simpli	fication o	f decimal frac	6 tion 8
IMPLIFICATIO	NS: BODMAS rule - Application of alg	gebraic				fication o	f decimal frac	
IMPLIFICATIO	NS: BODMAS rule – Application of alg Continued fraction and its simplification	jebraic – Recu	urring	dec	imals.			
IMPLIFICATIO nixed fraction – ROBLEMS ON	NS: BODMAS rule – Application of alg Continued fraction and its simplification NUMBERS: Set of numbers – Assume	gebraic – Recu the un	urring knov	dec	imals.			tion 8
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	LECTRONICS AND INSTRUMENTATION						MC
Course Code	Course Name			Neek		Total Hours	Maximum
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19MC301	INDIAN CONSTITUTION (e (s): The purpose of learning this cour	2	0	0	0	30	100
<ul> <li>Address entitleme Indian na</li> <li>Address its impact</li> </ul>	the role of socialism in India after the co on the initial drafting of the Indian Cons nes: At the end of this course, learners v	g mode as the e ommenc stitution. will be al	rn In emerç emer	idian ir gence nt of the	ntellectua of nation e Bolshe	ls' constitution hood in the ea vik Revolution	nal role and arly years of in 1917 and
<ul> <li>in Indian</li> <li>Discuss the reforms leadership suffrage in the suf</li></ul>	he growth of the demand for civil rights in politics. he intellectual origins of the framework of eading to revolution in India. he circumstances surrounding the found p of Jawaharlal Nehru and the eventual n the Indian Constitution. he passage of the Hindu Code Bill of 199	f argume dation of failure o	ent th f the	at info	rmed the ess Socia	conceptualiza Ilist Party [CS	tion of social P] under the
	y of making of Indian Constitution	50.					5
	Constitution - Drafting Committee, (Com	position	8 W	/orkina	)		
Unit II Philos	sophy of the Indian Constitution	poontor		ioning	/	ч.	5
reamble - Salie	nt Features	12.2				A STATE OF A	
	OURS OF CONSTITUTIONAL RIGHTS	6 & DUT	IES			1. A	5
undamental Rig	hts - Right to Equality - Right to Freed al and Educational Rights - Right to Co	om - Ri	ght a				
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arliament - Com	position - Qualifications and Disqualifica cil of Ministers - Judiciary, Appointment	ations - and Tra	Powe	ers and r of Ju	l Function dges, Qu	ns Executive - alifications - F	President - Powers and
Unit V LOCA	LADMINISTRATION	1		-	19971	The second	5
istrict's Ádminis epresentative, ( nd their roles, epartments) -Vil	tration head: Role and Importance, - M CEO of Municipal Corporation - Pachaya CEO ZilaPachayat: Position and role lage level: Role of Elected and Appointe CTION COMMISSION	ti raj: Inti e- Bloc	roduo k lev	ction, P /el: Or	RI: ZilaP ganizatio	achayat - Elec nal Hierarchy	e of Elected ted officials / (Different
	sion: Role and Functioning, Chief Election	on Com	missi	ioner a	nd Electi	on Commissio	
	sion: Role and Functioning, Institute and						
<ol> <li>Dr. S. N. I</li> <li>M. P. Jain</li> </ol> EFERENCE (s)	stitution of India", 1950 (Bare Act), Gove Busi, "Dr. B. R. Ambedkar Framing of In , "Indian Constitution Law", 7th Edn., Le u , Introduction to the Constitution of Indi	idian Co xis Nex	is, 20	ution", )14.		on, 2016. Ava	Publishers

Chairman - BoS Dept. of EIE - ESEC

Course Code	ELECTRONICS AND INSTRUMENTAT			_		R 2019	SemesterIII ES
	Course Name	Hour	s/We	ek	Credit	Total	MaximumMarks
1.5 1.5 1.5		1	Т	P	С	Hours	
19ES307	ELECTRICAL MACHINES AND	0	0	4	2	60	100
.eloco.	ELECTRIC CIRCUITS LABORATORY			12.8.1		00	
Course Objec	tive (s): The purpose of learning this cour	rse is t	0				
	he no load and load characteristics of D.C						
<ul> <li>Obtain t</li> </ul>	he speed characteristics of D.C motor.						
	regulation characteristics of Transformer.						
<ul> <li>Simulat</li> </ul>	e various electric circuits using Pspice/ Ma	atlab/e	-Sim	Sc	cilab		
	actical experience on electric circuits and						
Course Outco	omes: At the end of this course, learners w	vill be	able to	):			
<ul> <li>Gain kn</li> </ul>	owledge on the proper usage of various	electro	onic e	quip	oment an	d simulat	ion tools for design an
analysis	of electronic circuits.					D.	
<ul> <li>Get han</li> </ul>	ds-on experience in studying the characte	ristics	of ser	nice	onductor	devices.	
<ul> <li>Analyze</li> </ul>	various electronic circuits such as voltage	regul	ators,	tra	nsistor a	nplifiers a	nd oscillators.
<ul> <li>Make us</li> </ul>	se of basic concepts to obtain the no load	and lo	ad cha	arad	cteristics	of D.C ma	achines.
	and draw conclusion from the characteris	tics of	tained	l by	/ conduct	ting exper	iments on machines.
IST OF EXP							
	cuit characteristics of D.C. shunt generate	r.					
	aracteristics of D.C. shunt generator.						
	st on D.C. series motor.						
	and speed control of D.C. shunt motor.						
	cuit and short circuit tests on single phase	e trans	forme	· (D	etermina)	ition of eq	uivalent circuit
paramet							
	t on single phase induction motor.						
	on and experimental solving of electrical c						
	on and experimental solving of electrical c	ircuit p	problem	ns	using Th	evenin's t	neorem and Norton's
theorem		in a suit in	nablas		uning Cu	n o vin o o iti o	n theorem and
9. Simulati	on and experimental solving of electrical c	rcuit	ropier	ns	using Su	perpositio	n theorem and
	m Dower transfor Theorem	18.			•		
Maximu	m Power transfer Theorem.						
Maximu 10. Simulati	on and Experimental validation of R-C electron	ctric ci	rcuit tr	ans	sience.		
Maximul 10. Simulati 11. Measure	on and Experimental validation of R-C electronic electron and Experimental validation of three phase power supply using the second s	ctric ci wo wa	rcuit tr tt met	ans	sience.		
Maximul 10. Simulation 11. Measure 12. Design a	on and Experimental validation of R-C electer ement of three phase power supply using the and Simulation of parallel and series reson	ctric ci wo wa ant cii	rcuit tr tt met	ans	sience.		
Maximul 10. Simulati 11. Measure 12. Design a ST OF EQUIF	on and Experimental validation of R-C electron ement of three phase power supply using the and Simulation of parallel and series reson MENT FOR A BATCH OF 30 STUDENT	ctric ci wo wa ant cii	rcuit tr tt met	ans	sience.		
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	artment	ELECTRONICS AND INSTRUMENT					R 2019	Semester III PC
Cours	se Code	Course Name	Hour	-		Credit	Total	Maximum Marks
			L	Т	P	С	Hours	
	EI304	SENSORS AND MEASUREMENTSLABORATORY	0	0	4	2	60	100
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<i>6</i> .	Muffle fu							and the second
		tor characterization and application						
		types of Thermocouple and RTD char	acteriza	ation	and	applicati	on	
9.		ment of power and energy						
		t number of power supply, Galvanome						



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Department	ELECTRONICS AND INSTRUMEN					R 2019	Semester IV BS
Course Code	Course Name		-	-	Credit	Total	Maximum Marks
10000	NUMERICAL METHODS	L	T	P 0	C 4	Hours 60	100
19BS402	tive (s): The purpose of learning this	3	1 ic to	-	4	60	100
<ul><li>function</li><li>Able to i</li><li>Able to a</li></ul>	nterpolate and predict a data analyse differentiation and integratio o find solution of initial and bou	n numer	ically	÷.			
<ul> <li>Develop</li> </ul>	enough confidence to identify and ate solutions, using the skills learne						
Course Outco	mes: At the end of this course, lear	ners will	be a	ble to	o:		1
	the equations into Algebraic, Transo om numerically.	cendenta	l or s	imult	aneous a	and apply	the techniques to
	trate and implement an appropriate	numerica	al me	thod	for inter	polation.	
<ul> <li>Apply nu</li> </ul>	merical computational techniques to	o obtain t	he di	ffere	ntiation a	and Integr	ation of functions.
	ne solutions of first order ordinary di						
	the partial differential equations an	id able to	o get	the	solutions	s of those	equations using
	al methods.					and the second	110
	TIONOF SYSTEM OF EQUATIO						12
	on method- Method of False Positio Gauss Seidal method.	on – Gra	ites r	root	square m	nethod – (	Crout's Method -
Unit II INTER		1.1.1.5		101	75		12
	ewton's forward and backward diffe	erence fo	rmul	ae, L	agrange	's and N	
ifference interp	olation formulae				5 5		
Unit III NUME	RICALDIFFERENTIATIONANDINT	EGRATI	ON	6.81			12
	entiation: Newton's forward and ba npson's 1/3 rule – Two point Ga ula						
	RICAL SOLUTION OF ORDINARY	DIFFER	ENTI	ALE	QUATIO	N	12
nitial value Pro lunge - Kutta m redictor and co	blem: Single step methods: Taylor ethod for solving first order equation rrector methods for solving first orde	's series is - Multi er equatio	met step ons.	hod metl	,Euler's hods: Mil	method a	nd Fourth order ams – Bashforth
	RICAL TECHNIQUES FOR THE SO RENTIALEQUATIONS	DLUTION	1 OF	PA	RTIAL		12
inite difference f simple harmo	solution of parabolic equation by C nic motions and its solutions numeri		holso	on m	ethod-Sc	olution of e	elliptic equations
REFERENCE(	hapra, Numerical Methods for Eng						dition, 2015. Cengage Learning

Chairman - BoS Dept. of Maths - ESEC

Chairman - BoS Dept. of EIE - ESEC

	ELECTRONICS AND INSTRUMENTA					R 2019	Semester IV	
Course Code	Course Name	Hou	-	and the second second	Credit	Total	Maximum N	larks
		L	T	P	C	Hours	100	_
19ES403	OBJECT ORIENTED PROGRAMMING ctive (s): The purpose of learning this co		0	0	3	45	100	-
concep Unders objects Unders Unders Know h Course Outo Write J Demon	nowledge about basic Java language syn ats such as variables, conditional and itera- tand the fundamentals of object-oriented , invoking methods etc and exception han tand the principles of inheritance, package tand the basics of Exception Handling & now to handle events omes: At the end of this course, learners ava application programs using OOP prin strate the concepts of Packages and inheritance ava programs to implement error handling	ative d pro ndlin ges a Multi s will nciple eritar	exec gram g me nd in threa be a be a an ace	cutior ming chan iterfa ading ble to d pro	n method j in Java isms. ces. o: oper prog	ls etc. , includin gram struc	g defining clas	
<ul> <li>Develo</li> </ul>	p application using multi threading event based java program	9 .00	innq		ioning one	iopaon no		
	RODUCTION TO JAVA	-	31					9
Basics of Jav	a programming, Data types, Variables, methods, Overloading, Math class, Array			s, Co	ntrol stru	uctures in	cluding select	tion,
	JECT AND CLASSES			-	1		and the second	9
	ects and classes in java, Constructors, F like String, Character, String Buffer, File,					fiers, Met	hods and obje	ects,
	IERITANCE AND PACKAGES				Conce.			9
eneric progra va, Util packa	java, Super and sub class, Overriding amming, Casting objects, Instance of ope age READS AND EXCEPTION HANDLING							
hread - Threa	ad life cycle and methods, Runnable int dling with try-catch-finally – Nested try-ca						d synchronizat	tion,
	ENT AND GUI PROGRAMMING						State State	9
	g in java, Event types, Mouse and ke w Layout, Border Layout, Grid Layout, G s, Text Fields, Text Areas, Combo Box	UI co	ompo	nent	s like Bu	ttons, Ch	eck Boxes, Ra	adio

Ver

Department	ELECTRONICS AND INSTRUMENTATI				1	R 2019	Semester IV	PC
Course Code	Course Name		ours Vee		Credit	Total Hours	Maximum M	larks
and an and a second		L	Т	Ρ	С			
19EI401	LINEAR INTEGRATED CIRCUITS AND APPLICATIONS	3	0	0	3	45	100	
	ctive (s): The purpose of learning this cou	rse i	s to					
	ne IC fabrication procedure.							
	analysis using Op-amp based circuits.							
	p-amp for industrial purpose.				-	1000		
	nal blocks and the applications of special I						gulator Circuits.	£.0.
	bout the linear integrated circuits fabricati					on.		_
	omes: At the end of this course, learners w	MIII D	e al	Jie t	0:			
	knowledge in IC fabrication procedure							
	the characteristics of Op-Amp			nn k	acad aire	nuite		
	and the importance of Signal analysis usir nal blocks and the applications of special l						gulator Circuite	
	and and acquire knowledge on the Applications					incuits, re	gulator circuits.	1
		alion	15 01	Op	-amp			9
	, fundamental of monolithic IC technology	eni	taxi	al ar	owth ma	sking and	etching diffusi	
purities. Rea	lisation of monolithic ICs and packaging. F	abric	catio	on of	f diodes, d	capacitan	ce, resistance, F	ETs
nd PV Cell.							R State L State	
	ARACTERISTICS OF OPAMP							9
eal OP-AMP	characteristics, DC characteristics, AC	ch Ch	arad	cteri	stics diff	ferential a	amplifier: frequ	encv
					Live, and	i i i i i i i i i i i i i i i i i i i		,
sponse of O	P-AMP; Basic applications of op-amp -	Inve	ertir	g a	nd Non-i	nverting /	Amplifiers, sum	imer,
sponse of O fferentiator ar	nd integrator-V/I & I/V converters.	Inve	ertir	ig a	nd Non-i	nverting	Amplifiers, sum	imer,
sponse of O fferentiator ar Jnit III AP	nd integrator-V/I & I/V converters.	Inve	ertir	ig a	nd Non-i	nverting /	Amplifiers, sum	nmer, 9
sponse of O fferentiator ar Jnit III AP strumentatior	nd integrator-V/I & I/V converters. PLICATIONS OF OPAMP amplifier and its applications for transc	Inve	ertir r Br	idge	nd Non-i e, Log ar	nverting /	Amplifiers, sum	nmer, 9 nalog
sponse of O fferentiator ar Jnit III AP strumentation ultiplier & Div	nd integrator-V/I & I/V converters. PLICATIONS OF OPAMP amplifier and its applications for transc ider, first and second order active filters,	lnve	r Br	idge	nd Non-i e, Log ar s, multivib	nverting and Antilog	Amplifiers, sum Amplifiers- Ar aveform genera	9 nalog ators,
sponse of O fferentiator ar Jnit III AP strumentatior ultiplier & Div ippers, clamp onverters usin	nd integrator-V/I & I/V converters. <b>PLICATIONS OF OPAMP</b> amplifier and its applications for transc ider, first and second order active filters, ers, peak detector, S/H circuit, D/A conver g op amps.	lnve	r Br	idge	nd Non-i e, Log ar s, multivib	nverting and Antilog	Amplifiers, sum Amplifiers- Ar aveform genera	9 nalog ators,
sponse of O fferentiator ar Jnit III AP strumentatior ultiplier & Div ippers, clamp onverters usin Jnit IV SPE	nd integrator-V/I & I/V converters. PLICATIONS OF OPAMP a amplifier and its applications for transc ider, first and second order active filters, ers, peak detector, S/H circuit, D/A conver g op amps. CIAL ICs	lnve duce com ter (l	ertir r Br para R- 2	idge ators R la	nd Non-i e, Log ar s, multivib adder and	nverting / nd Antilog prators, wa weighted	Amplifiers, sum Amplifiers- Ar aveform genera I resistor types)	9 nalog ators, , A/D 9
sponse of O fferentiator ar Jnit III AP strumentatior ultiplier & Div ippers, clamp onverters usin Jnit IV SPE unctional bloc	nd integrator-V/I & I/V converters. PLICATIONS OF OPAMP amplifier and its applications for transc ider, first and second order active filters, ers, peak detector, S/H circuit, D/A conver g op amps. CIAL ICs k, characteristics of 555 Timer and its PW	Inve duce com ter (l	ertir r Br para R- 2	idge ators R la	nd Non-i e, Log ar s, multivib adder and	nverting / nd Antilog prators, wa weighted	Amplifiers, sum Amplifiers- Ar aveform genera I resistor types)	9 nalog ators, , A/D 9
sponse of O fferentiator ar Jnit III AP strumentatior ultiplier & Div ppers, clamp onverters usin Jnit IV SPE unctional bloc ;565-phase k	nd integrator-V/I & I/V converters. PLICATIONS OF OPAMP amplifier and its applications for transc ider, first and second order active filters, ers, peak detector, S/H circuit, D/A conver g op amps. CIAL ICs k, characteristics of 555 Timer and its PW bocked loop IC, AD633 Analog multiplier ICs	Inve duce com ter (l	ertir r Br para R- 2	idge ators R la	nd Non-i e, Log ar s, multivib adder and	nverting / nd Antilog prators, wa weighted	Amplifiers, sum Amplifiers- Ar aveform genera I resistor types)	9 nalog ators, , A/D 9 Ilator
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sponse of O fferentiator ar Jnit III AP strumentatior ultiplier & Div ppers, clamp onverters usin Jnit IV SPE unctional bloc 565-phase k Jnit V AP D623 Instrum	nd integrator-V/I & I/V converters. PLICATIONS OF OPAMP amplifier and its applications for transc ider, first and second order active filters, ers, peak detector, S/H circuit, D/A conver g op amps. CIAL ICs k, characteristics of 555 Timer and its PW bocked loop IC, AD633 Analog multiplier ICs PLICATION ICs entation Amplifier and its application as loa	Inve duce com ter (I /M a s ad ce	ertir r Br para R- 2 pplic	idge ators R la catic	nd Non-i e, Log ar s, multivib adder and on - IC-56	nverting / nd Antilog prators, wa weighted 6 voltage rement - I	Amplifiers, sum Amplifiers- Ar aveform genera I resistor types) controlled osci	9 nalog ators, , A/D 9 Ilator 9 ators
sponse of O fferentiator ar Jnit III AP strumentatior ultiplier & Div ppers, clamp onverters usin Jnit IV SPE unctional bloc ;565-phase k Jnit V AP D623 Instrum LM78XX, LM	nd integrator-V/I & I/V converters. PLICATIONS OF OPAMP a amplifier and its applications for transc ider, first and second order active filters, ers, peak detector, S/H circuit, D/A conver g op amps. CIAL ICs k, characteristics of 555 Timer and its PW ocked loop IC, AD633 Analog multiplier ICs PLICATION ICs entation Amplifier and its application as loa 79XX; Fixed voltage regulators its application	Inve duce com ter (I /M a s ad ce tion a	ertir para R- 2 pplic ell w	idge ators R la catic	nd Non-i e, Log ar s, multivib adder and on - IC-56 nt measur ar power	nverting / nd Antilog prators, wa weighted 66 voltage rement - le supply - L	Amplifiers, sum Amplifiers- Ar aveform genera I resistor types) controlled osci	9 nalog ators, , A/D 9 Ilator 9 ators
sponse of O fferentiator ar Jnit III AP strumentatior ultiplier & Div ippers, clamp onverters usin Jnit IV SPE unctional bloc 565-phase k Jnit V AP D623 Instrum LM78XX, LM bitage regulato	nd integrator-V/I & I/V converters. PLICATIONS OF OPAMP a amplifier and its applications for transc ider, first and second order active filters, ers, peak detector, S/H circuit, D/A conver g op amps. CIAL ICs k, characteristics of 555 Timer and its PW ocked loop IC, AD633 Analog multiplier ICs PLICATION ICs entation Amplifier and its application as load 79XX; Fixed voltage regulators its application ors, switching regulator- SMPS - ICL 8038	Inve duce com ter (I /M a s ad ce tion a	ertir para R- 2 pplic ell w	idge ators R la catic	nd Non-i e, Log ar s, multivib adder and on - IC-56 nt measur ar power	nverting / nd Antilog prators, wa weighted 66 voltage rement - le supply - L	Amplifiers, sum Amplifiers- Ar aveform genera I resistor types) controlled osci	9 nalog ators, , A/D 9 Ilator 9 ators
sponse of O fferentiator ar Jnit III AP strumentatior ultiplier & Div ppers, clamp onverters usin Jnit IV SPE unctional bloc 565-phase k Jnit V AP D623 Instrum LM78XX, LM bitage regulato <b>XT BOOK(S</b>	nd integrator-V/I & I/V converters. PLICATIONS OF OPAMP a amplifier and its applications for transc ider, first and second order active filters, ers, peak detector, S/H circuit, D/A conver g op amps. CIAL ICs k, characteristics of 555 Timer and its PW bocked loop IC, AD633 Analog multiplier ICs PLICATION ICs entation Amplifier and its application as loa 79XX; Fixed voltage regulators its application ors, switching regulator- SMPS - ICL 8038 ):	Inve duce com ter (I /M a s ad ce tion a func	ertir para R- 2 pplic ell w	idge ators R la catic	nd Non-i e, Log ar s, multivib adder and on - IC-56 nt measur ar power	nverting / nd Antilog prators, wa weighted 66 voltage rement - le supply - L	Amplifiers, sum Amplifiers- Ar aveform genera I resistor types) controlled osci	9 nalog ators, , A/D 9 Ilator 9 ators
sponse of O fferentiator ar Jnit III AP strumentatior ultiplier & Div ppers, clamp onverters usin Jnit IV SPE unctional bloc 565-phase k Jnit V AP D623 Instrum LM78XX, LM ottage regulato <b>XT BOOK(S</b> 1. David A 2. D. Roy (	nd integrator-V/I & I/V converters. PLICATIONS OF OPAMP a amplifier and its applications for transc ider, first and second order active filters, ers, peak detector, S/H circuit, D/A conver g op amps. CIAL ICS k, characteristics of 555 Timer and its PW ocked loop IC, AD633 Analog multiplier ICs PLICATION ICS entation Amplifier and its application as loa 79XX; Fixed voltage regulators its application ors, switching regulator- SMPS - ICL 8038 ): Bell, 'Op-amp & Linear ICs', Oxford, 2013 Choudhary, Sheil B. Jani, 'Linear Integrate	//M a s ad ce function a function	r Br para R- 2 pplid ell w as L tion	idge ators R la catic veigh inea i ger	nd Non-i e, Log ar s, multivik adder and on - IC-56 nt measur ar power nerator IC	nverting / nd Antilog prators, wa weighted 6 voltage rement - It supply - L	Amplifiers, sum Amplifiers- Ar aveform genera resistor types) controlled osci C voltage regula .M317, 723 Var	9 nalog ators, , A/D 9 Ilator ators iable
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sponse of O fferentiator ar Init III AP strumentatior ultiplier & Div ppers, clamp onverters usin Init IV SPE unctional bloc ;565-phase k Init V AP D623 Instrum LM78XX, LM dtage regulato EXT BOOK(S 1. David A 2. D. Roy ( 3. Ramaka / PHI. 20 EFERENCE(S 1. Fiore, "O	Ad integrator-V/I & I/V converters. PLICATIONS OF OPAMP a amplifier and its applications for transci ider, first and second order active filters, ers, peak detector, S/H circuit, D/A conver g op amps. CIAL ICS k, characteristics of 555 Timer and its PW ocked loop IC, AD633 Analog multiplier ICs PLICATION ICS entation Amplifier and its application as loa 79XX; Fixed voltage regulators its application ors, switching regulator- SMPS - ICL 8038 ): . Bell, 'Op-amp & Linear ICs', Oxford, 2013 Choudhary, Sheil B. Jani, 'Linear Integrated and A.Gayakward, 'Op-amps and Linear Integrated 00. B): pamps& Linear Integrated Circuits Concept	Invo duced com ter (I //M a s ad ce tion a func 3. cd Cili egra	ertir r Br para R- 2 pplid ell w as L ttion rcuit ted	idge ators R la catic ger i ger ts', I Circ	nd Non-i e, Log ar s, multivik adder and on - IC-56 nt measur ar power : nerator IC I edition, uits', IV e ations", C	nverting / nd Antilog prators, wa weighted 6 voltage rement - It supply - L 2.	Amplifiers, sum Amplifiers, sum Amplifiers- Ar aveform genera I resistor types), controlled osci C voltage regula .M317, 723 Var , 2003. arson Education	9 nalog ators, , A/D 9 Ilator ators iable
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	ELECTRONICS AND INSTRUMEN					R 2019	Semester IV F
Course Code	Course Name	Hou	Irs/ W	/eek P	Credit	Total Hours	Maximum Marks
19EI402	DIGITAL PRINCIPLES AND SYSTEM DESIGN	2	T 1	0	C 3	45	100
<ul> <li>Study van</li> <li>Study con</li> <li>Design van</li> <li>Introduce</li> <li>Introduce</li> <li>Course Outcor</li> <li>Design con</li> <li>Study van</li> </ul>	ive (s): The purpose of learning this rious number systems and simplify to mbinational circuits arious synchronous and asynchronous asynchronous sequential circuits an digital simulation for development nes: At the end of this course, learn ombinational, sequential Circuits an rious number systems and simplify to arious synchronous and asynchronous	he log ous circ nd PLI of appl ners wi d simu he log	ical e cuits. Ds icatio ill be a late ι ical e	xpres n orie able te	ented logi o: software	ccircuits. package.	
<ul> <li>Introduce</li> </ul>	asynchronous sequential circuits a digital simulation for development	nd PL[	Ds	n orie	anted logi	ccircuits	
	BER SYSTEMS AND DIGITAL LOC				inted logi	concuns.	
	er systems, binary codes, error dete nilies -comparison of RTL, DTL, TT v						
	BINATIONAL CIRCUITS						
inimization usir	ogic - representation of logic func ng K maps - simplification and imple de converters, adders, subtractors,	ementa	ation	of cor	mbination		
	HRONOUS SEQUENTIAL CIRCU						
nd synchronous ad Melay mode Init IV ASYN	SR, JK, D and T flip flops - level tr type - Modulo counters - Shift regis ls- Counters, state diagram; state re ICHRONOUS SEQUENTIAL CIRC	ters - d ductio UITS A	desigi n; sta AND I	n of site as	ynchrono signment	us sequer	ntial circuits – Moore
gital circuits; a evices: PROM ·	equential logic circuits-Transition st nalysis of asynchronous sequenti – PLA –PAL, CPLD-FPGA.	ability, al logi	flow ic cire	stabil cuits-i	lity-race of introducti	conditions, on to Pro	grammability Logic
Jnit V VHDL		0		- 1-	traduatio	n to Dooko	non Cubaroaroa
Test bench. (Si XT BOOK(S):	nbinational logic – Sequential circuit mulation /Tutorial Examples: adder	s, cour	nters,	flip flo	ops, Mult	iplexers &	
2. M. Morris	Bignel, Digital Electronics, Cengag Mano, 'Digital Design with an introc igital Logic & State Machine Design	luction	to th	e VHI			ation, 2013.
<ol> <li>Mandal, "D</li> <li>William Ke</li> <li>ThomasL.</li> </ol>	igitalElectronicsPrinciples&Application itz, Digital Electronics-A Practical App Floyd,'DigitalFundamentals',11theditio Roth,Jr,LizyLizyKurianJohn,'DigitalSys	roach v n,Pear	with V sonEc	HDL, ducatio	Pearson,2 on,2015.		

V Chairman - BoS Dept. of EIE - ESEG

Department	ELECTRONICS AND INSTRUMENTAT	ION	ENC	SINE	ERING	R 2019	Semester IV	PC
Course Code	Course Name		lour: Wee		Credit	Total Hours	Maximum Ma	rks
		L	Т	P	С			
19EI403	INDUSTRIAL INTERNET OF THINGS ctive (s): The purpose of learning this cou	2	0	2	3	60	100	
<ul> <li>Impart</li> <li>Unders</li> <li>Illustrat</li> <li>Aware (</li> <li>Know a</li> </ul>	knowledge in Internet of Things(IoT) tand the concept of interfacing smart sens e the various protocol standards deployed of security concerns and challenges in IoT bout DIY kits and other apps. omes: At the end of this course, learners	sors, 1 in I F.	/actu nterr	ators net o	f Things			
<ul> <li>Compa models</li> <li>Examin</li> <li>Analyze</li> </ul>	re the IoT with M2M by analyzing the c	ces a ces d	acter and t evice	istics echr es us	s, functio nologies u ed in loT	used for lo		ra
- Apply lo	T design principles in various domain and	d inf	er th	e cha	allenges	in real tim	e implementatio	n
UNITI INT	RODUCTION AND ELEMENTS OF IoT						100000000000000000000000000000000000000	12
IoT Communi NIT II COM Ioud Computi omputing –U	hitecture of an IoT Application Sensors & cation Model – WPAN & LPWA <b>IMUNICATION AND CONNECTIVITY TE</b> ing in IoT - Introduction to Cloud Compu nderlying Principles of Parallel and Dis	E <b>CH</b> uting	NOL g – [ uted	OGII Defin Cor	ES ition of C	Cloud – E – Cloud	volution of Clou	12 Id
	ud – On-demand Provisioning. IoT Comm A ANALYTICS AND IoT PLATFORMS	nuni	catio	n Mo	del – Clo	oud Conne		12
	tics - Evolution of Big data - Best Practice	on fo	r Dia	date	Analytic	Pia de		
Validating- Th pplications - verview of Hig NIT IV CON	ne Promotion of the Value of Big Data - E Perception and Quantification of Value gh-Performance Architecture - Data Visua ICERNS AND FUTURE TRENDS	Big I -Un Ilizat	Data derst tion -	Use tandi IoT	Cases- ing Big I Platform	Character Data Stor s	ristics of Big Dat age – A Gener	a
	s of IoT - Security Concerns and Challeng	ges	- Fut	ure	Trends –	Standard		
	IDS-ON PROJECTS							12
	T and other apps					1.1.1.1		
	Greengard, The Internet of Things (Esser AcEwen and HakimCassimally, Designing	the	Inte	rnet	of Things	s, 2015	1. C.	

la

Chairman - BoS Dept. of EIE - ESEC

BoB - distante d'Ol

Department	ELECTRONICS AND INSTRUMENT				the second s	a state of the sta	Semester IV	
Course Code	Course Name		1		Credit	Total	Maximum I	Marks
19ES405	THERMODYNAMICS ANDFLUID MECHANICS	L 3	T 0	P 0	C 3	Hours 45	100	-
Course Objecti	ve(s): The purpose of learning this co			U	5	45	100	
	fundamental laws of thermodynamics							
	various cycles used in thermodynamic		sis					
	out the applications of thermodynamics			nical	systems	a little en u		
	principles of Fluid mechanics in fluid f			10.00.000	<b>,</b>			
	applications of fluid flow in hydraulic s		3					
Course Outcon	ne(s): At the end of this course, learne	ers will	be a	ble t	0:	Charles I.		
	blems on Flow and non-flow systems,							
	e expression and determine the therma	al effici	encv	of v	arious th	nermodvr	amic cvcles	
	thermodynamic concepts to find the se							orking
	of Compressors, Boilers and Turbines		0 101	10 2	inginoo t	and got t		
	the pressure of the fluids, losses in p		nd o	deter	mine the	dischar	ae through o	rifice
venturi etc		hpco d	ind v	actor	mile and	, algoria	go inough o	mee
	e the design parameters of pumps and	turbin	es					
	MODYNAMICS LAWS	(anoni)			1217	24		9
	stem and its types, properties, thermo	dynam	ic er	milih	rium sta	ate proce	ese - auasi-s	
	eversible, zeroth law, work and heat							
	econd law – heat engines, heat pur							
	laries of Second law, Entropy, Change							
	RMODYNAMIC CYCLES							9
	o, Diesel, Dual cycles –Efficiency and	d Mear	n Eff	fectiv	e Press	ure. Sim	ple and Impro	
	nkine Cycle with reheat and regenera		. –				Fiel and a surprise	
	ICATIONS OF THERMODYNAMICS		1141	1.1	the other	a thu the		9
	ion Engines – Two and Four strokes		orma	ance	Calculat	tion. Stea	am Power Pla	ant -
	ng of Components, Boilers and Turbin							
	Closed cycle - Layout and Working. R							
eatment only).			1			-		
	DAMENTALS OF FLUID MECHANICS							9
	pes, properties of fluids, Newton's law							
fferential manor	meter, Conservation of mass, mome	ntum a	and	ener	ду. Туре	es of flui	d flow - lam	inar,
	Significance of Reynolds number. Fl	low thr	ougl	h pip	es, loss	es in pip	es, Flow thro	bugh
and the second se	turimeter, Notches.		1		1000		1 99978 A	1
Unit V HYDF	RAULIC PUMPS AND TURBINES	10						9
	cation and their working principle. Sp							
	s – impulse and reaction, working		on,	Frar	icis and	Kaplan	turbines, De	sign
	out and Working of Hydel Power Plant	l	121/1	1	-		The second second	Sec.
EXT BOOK(S):	'Engineering Thermodynamics', Tata I	MaGray				2007		
	al, A Textbook of Fluid Mechanics and						(P) Itd New	Dell
	inth edition, 2014.	mach	inci	у, ца		lications	(1) Ltd., New	Dell
	it, Engineering Thermodynamics, Laxi	mi Pub	licat	ions	Pvt.I.td	NewDel	hi.2011.	
EFERENCE(S):			noon					
	and Boles, Thermodynamics - An E	nginee	ring	App	roach, 7	Tata McC	Graw Hill Pub	lishir
	Pvt. Ltd, New Delhi,2003.		3		100-00-00-00-00 			
2. J.P.Holma	n, Thermodynamics, Tata McGraw Hil							)2.
	ni, Steam table with Psychometric char							
	gel and John Cimbala, Fluid Mechani	cs Fun	dam	nenta	Is and A	pplicatio	n, Tata McGr	aw H
Publishing	Company Pvt. Ltd., New Delhi 2009							
	d W Fox, Introduction to Fluid Machi	ines, J	ohn	Wile	y Easte	rn Pvt. L	td., New Del	hi, 6

Chairman - BoS Dept. of Mech Engg. - ESEC

Un Chairman - BoS Dept. of EIE - ESEC

Department	ELECTRONICS AND INSTRUMENTAT		and the second division of the second divisio			R 2019	Semester IV	EEC
Course Code	Course Name	Ho	urs/ ek		Credit	TotalHour s	Maximum Ma	rks
		L	Т	P	С			
19TPS04	QUANTITATIVE APTITUDE AND LOGICAL REASONING - II	2	0	0	0	30	100	
Course Obje	ctive (s): The objective of this course is	to						
• Learn the	e basic of partnership and chain rule in s	impli	fied	way		1.5.9 1.5.0		
	oblems using fast track method by learni					percentage.		
<ul> <li>Teach t</li> </ul>	he angle of elevation and depression.							
	e relationship, direction concepts in eas	v way	1.					
	bout coding and decoding through logica						a contraction of the second se	
	omes: At the end of this course, learners			able	to:	A PLUE S		
	roblems by using shortcut in partnership							
	e tips and tricks of profit and loss with p					t track metho	ods.	
	and the concepts of angles.	010011	lage		oughtido			
	e critically the real life situations by reso	tina a	and	anal	lvzing an	alvtical reaso	ning of kevissue	s and
factors.	e childrany the rear me situations by resol	ung e	and	unu	iyzing an	aly loar rouse	ining of hoyloodo	and
	e the logical way of thinking by solving p	roble	ms o	code	es and ra	nkinas conce	epts.	
the second s	TNERSHIP & CHAIN RULE	10010			<u>e una re</u>			6
	P: Ratio of division of gains: Simple Part	tners	hin -	- Co	mpound	Partnership	- Working and	
leeping partne		inero	mp	00	mpound	in animoromp	violiting and	
HAIN RULE	Definition – Direct proportion and Indirect	t pro	norti	ion				
	Definition – Direct proportion and Indirec	ct pro	porti	ion.	1. A		14	6
JNIT 2 PRO	FIT &LOSS, PERCENTAGE				Concent	of discount a	and marked price	6
JNIT 2 PRO PROFIT AND L	FIT &LOSS, PERCENTAGE OSS: Basic definition and types of prof	it and	l los	s – (			and marked price	10000
JNIT 2 PRO PROFIT AND L Concept of true	FIT &LOSS, PERCENTAGE OSS: Basic definition and types of prof v/s false value – Application in data int	it and erpre	l los	s – (			and marked price	10000
JNIT 2 PRO PROFIT AND L Concept of true PERCENTAGE	FIT &LOSS, PERCENTAGE OSS: Basic definition and types of prof v/s false value – Application in data int Percentage – Percentage using shortc	it and erpre	l los	s – (			and marked price	-
JNIT 2 PRO PROFIT AND L Concept of true PERCENTAGE JNIT 3 HEIC	FIT &LOSS, PERCENTAGE OSS: Basic definition and types of prof v/s false value – Application in data int Percentage – Percentage using shortc GHT AND DISTANCE	it and erpre	d los etatio	s – ( on p	roblems		and marked price	10000
JNIT 2 PRO PROFIT AND L Concept of true PERCENTAGE JNIT 3 HEIO HEIGHT AND I	FIT &LOSS, PERCENTAGE OSS: Basic definition and types of prof v/s false value – Application in data int Percentage – Percentage using shortc BHT AND DISTANCE DISTANCES: Line of sight – Angle of ele	it and erpre uts. evatio	t los etatio	s – o on p Angl	roblems		and marked price	6
UNIT 2 PRO PROFIT AND L Concept of true PERCENTAGE JNIT 3 HEIC HEIGHT AND I JNIT 4 BLO	FIT &LOSS, PERCENTAGE OSS: Basic definition and types of prof v/s false value – Application in data int Percentage – Percentage using shortc GHT AND DISTANCE DISTANCES: Line of sight – Angle of ele OD RELATIONSHIP & DIRECTION SE	it and erpre- suts. evatio <b>NSE</b>	l los etatio n – / TES	s – ( on p Angl	roblems le of dep	ression.		-
UNIT 2 PRO PROFIT AND L Concept of true PERCENTAGE UNIT 3 HEIC HEIGHT AND I UNIT 4 BLO BLOOD RELA	FIT &LOSS, PERCENTAGE OSS: Basic definition and types of prof v/s false value – Application in data int Percentage – Percentage using shortc GHT AND DISTANCE DISTANCES: Line of sight – Angle of ele OD RELATIONSHIP & DIRECTION SE FIONSHIP: Analysis the gender relation	it and erpre- suts. evatio <b>NSE</b> ship	l los etatio n – / TES –Re	s – ( on p Angl ST latio	roblems le of dep nship di	ression. agram - Fam	ily tree.	6
UNIT 2 PRO PROFIT AND L Concept of true PERCENTAGE JNIT 3 HEIO HEIGHT AND I JNIT 4 BLO BLOOD RELA DIRECTION SE	FIT &LOSS, PERCENTAGE OSS: Basic definition and types of prof v/s false value – Application in data int Percentage – Percentage using shortco GHT AND DISTANCE DISTANCES: Line of sight – Angle of ele OD RELATIONSHIP & DIRECTION SE FIONSHIP: Analysis the gender relation ENSE TEST: Distance between the start	it and erpre- suts. evatio <b>NSE</b> ship - ing an	n – A TES –Re	s – C on p Angl ST Iatio ndin	roblems le of dep nship di	ression. agram - Fam - Sense the c	ily tree. direction correctly	6
JNIT 2 PRO PROFIT AND L Concept of true PERCENTAGE JNIT 3 HEIO HEIGHT AND I JNIT 4 BLO BLOOD RELA DIRECTION SE JNIT 5 LOG	FIT &LOSS, PERCENTAGE OSS: Basic definition and types of prof v/s false value – Application in data int Percentage – Percentage using shortc HT AND DISTANCE DISTANCES: Line of sight – Angle of ele OD RELATIONSHIP & DIRECTION SE FIONSHIP: Analysis the gender relation ENSE TEST: Distance between the start ICAL SEQUENCE OF WORD, CODING	it and erpre- suts. evatio <b>NSE</b> ship - ing an	n – A TES –Re	s – C on p Angl ST Iatio ndin	roblems le of dep nship di	ression. agram - Fam - Sense the c	ily tree. direction correctly	6
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Department	ELECTRONICS AND INSTRUMENTA					R 2019	Semester IV ES
Course Code	Course Name	Hou			Credit	Total	Maximum Marks
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19ES404	OBJECT ORIENTED PROGRAMMING LABORATORY	0	0	4	2	60	100
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2. Kathy Si	ierra, Bert Bates, OCA/OCP Java SE 7 P on, 2014.						First edition, McGraw H

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	e students in effective listening activ		5 10					
			or					
	he oral communication skills in prop							
	effective reading of general and tec	innical te	ext.					
	and comprehend the written text.							
	SRW skills.	م النبية مع		. 1				
	nes: At the end of this course, learne	ers will b	e able	e to:				
	d the technical talks.							
	cate to his peer group properly.							
	end the general and technical text.							
	reports and job application in clear n	nanner.						
	SRW skills.		-			_		-
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	y skill- its importance - Listen to a p							
xplanation - Beir	ng an active listener: giving verbal a	ind non-	Jorha	Ifood	hook to	I dia a la alu	iro notos prov	oring
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Chairman - BoS Dept. of English - ESEC

Department	ELECTRONICS AND INSTRUMENT				R 2019	Semester V F
Course Code	Course Name	Hours			Total	Maximum Marks
		L	T P	C	Hours	100
19EI501	AUTOMATIC CONTROL SYSTEM tive (s): The purpose of learning this	3	1 0	4	60	100
<ul> <li>system</li> <li>Provide</li> <li>Accord</li> <li>Introduction</li> <li>Introduction</li> </ul>	and the use of transfer function model components. adequate knowledge in the time response basic knowledge in obtaining the oper se stability analysis and design of com se state variable representation of physic	onse of s loop an pensator sical sys	systems d close s tems	s and stea ed–loop fre	ndy state e	rror analysis.
<ul> <li>Develop Engines</li> <li>Do time use of P</li> <li>Interpret</li> </ul>	omes: At the end of this course, learned o various representations of system learning fundamentals. domain and frequency domain analys PID controller in closed loop system t characteristics of the system to deve appropriate compensator for the given	based or is of vari lop math	n the k ous mo ematic	nowledge		
	ut with solution for complex control pro		15.13	100	1 Latting	
	EMS AND THEIR REPRESENTATIO					
	in control systems: – Open and close s – Transfer function – AC and DC serv RESPONSE					
odes of feedb Jnit III FREC requency resp	<ul> <li>Time domain specifications – Type ieneralized error series – Steady state ack control –Time response analysis.</li> <li>UENCY RESPONSE ponse: – Bode plot – Polar plot – De</li> </ul>	e error – etermina	Root tion of	locus cons	struction- I	Effects of P, PI, PI
	elation between frequency domain an		omain	specificati	ons	
	ILITY AND COMPENSATOR DESIG		1		<b>-</b>	Staria Effect
ag, lead and la sing bode plots						g-lead compensato
	E VARIABLE ANALYSIS					
	e variables – State models for linear ar					n of state and outpu
EXT BOOK(S)	rollable canonical form – Concepts of	controlla	ability a	ind observ	ability.	
1. Nagarat	h, I.J. and Gopal, M., "Control System" n C. Kuo, "Automatic Control Systems"	s Engine , Wiley, 2	ering", 2014.	New Age	Internatio	nal Publishers, 201
<ol> <li>Katsuhik</li> <li>Richard</li> <li>John J.E</li> <li>Design v</li> </ol>	o Ogata, "Modern Control Engineering C.Dorf and Bishop, R.H., "Modern Co D., Azzo Constantine, H. and Houpiss vith MATLAB", CRC Taylor& Francis F C.Panda and T. Thyagarajan, "An Intro rs", Narosa Publishing House, 2017.	ntrol Sys Sttuart, N Reprint 2	tems", Shek 009.	Pearson l don, "Line	ar Control	System Analysis a

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		NT OF ACCELERATION						8
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Chairman - BoS Dept. of EIE - ESEC

- Alok Barua, "Lecture Notes on Industrial Instrumentation", NPTEL, E-Learning Course, IIT Kharagpur.
   Jayashankar, V., "Lecture Notes on Industrial Instrumentation", NPTEL, E-Learning Course, IIT Madras.
- 6. A.K. Sawhney, "A Course in Electronic Measurements and Instrumentation ", Dhanpat Rai & Co. (P) Limited, 2015

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Department	ELECTRONICS AND INSTRUMENTA			the second s	the second se	R 2019	Semester V P
Course Code	Course Name	Ho	ur/W T	P	Credit C	Total Hours	Maximum Mark
19EI503	INDUSTRIAL INSTRUMENTATION -		0	0	3	45	100
<ul> <li>Introduct</li> <li>Introduct</li> <li>Educate</li> <li>Educate</li> <li>Educate</li> <li>Educate</li> </ul>	tive (s): The purpose of learning this co e variable head type flow meters e quantity meters, air flow meters and m on electrical type flow meters on the level measurement techniques on Viscosity, Humidity and Moisture co	nass fle	ow m				
<ul> <li>Underst</li> <li>Underst</li> <li>flow me</li> <li>Underst</li> <li>Gain kn</li> </ul>	mes: At the end of this course, learners and the construction, installation and wo and the construction, working and calib ers, mass flow meters, and the construction, working of differer owledge about the construction, work appropriate flow meters or level sensor	rking o ration nt elec ing ar	of dif of di trical nd ca	fferer iffere I type alibra	nt variable nt quanti e, open cl tion of c	ty flow me	eters, variable are d solid flow meters
	ABLE HEAD TYPE FLOWMETERS		appi	louid	/1.		9
xpression for pes of orifice be: combined	flow rate through restriction(compressib plates – Cd variation – pressure tappin pitot tube, averaging pitot tube – Installa	gs – \ ation a	/entu ind a	uri tu ipplic	be – Flov ations of	w nozzle head flow	– Dall tube – Pito v meters
	ANTITYMETERS, AREAFLOWMETERS						9
neters – Calibra Unit III ELE rinciple and co nemometer – pen channel f Unit IV LEV	applications – Mass flow meter :– Ang ation of flow meters: – Dynamic weighing CTRICALTYPEFLOW METERS nstructional details of Electromagnetic f Vortex shedding flow meter – Target flo ow measurement – Solid flow rate meas ELMEASUREMENT	g meth flow m ow me sureme	eter eter - eter - ent.	– Ult - Gui	rasonic f delines f	low meter or selection	9 rs – Laser Doppler on of flow meter – 9
pes – Conduc easurement :- trasonic level	nent: Float gauges - Displacer type – E ivity sensors – Capacitive sensors – Nu Differential pressure method and Hydra neasurements. ISMITTERS	cleonid	c gau	uge -	Ultrason	ic gauge -	<ul> <li>Boiler drum level</li> </ul>
	mitter: Operation - Electronic transmitter	: Stud	y of	2 wire	e and 4 w	vire transn	
f Electronics a ansmitters – Ir	nd Smart transmitters – Principle of c stallation and Calibration of smart and c	perati	ion c	of flo	w, level,	temperat	ture and pressure
McGraw 2. Patranal	n, E.O. and Manik D.N., "Measurement Hill Education Pvt. Ltd., 2007. his, D., "Principles of Industrial Instrun ( Ltd., New Delhi, 2010.						
EFERENCE(S 1. Liptak, B 2. Singh,S. 2009.		rol, Ta	ata M	1cGra	awHill Ec	lucation F	Pvt. Ltd., New Del
	ikar, V., "Lecture Notes on Industrial Inst						

Department						R 2019	Semeste	
Course Code	Course Name	Hou			Credit	Total	Maximu	m Marks
		L	T	Ρ	С	Hours		
19EI504	MICROPROCESSORS AND MICROCONTROLLERS	3	0	0	3	45	10	00
<ul> <li>Archited</li> <li>Address</li> <li>Need &amp;</li> <li>Know al</li> <li>Simple a</li> <li>Course Outco</li> <li>Acquire</li> <li>Need &amp;</li> <li>Underst</li> </ul>	etive (s): The purpose of learning this sture of $\mu$ P8085 & $\mu$ C 8051 sing modes & instruction set of 8085 & use of Interrupt structure 8085 & 805 bout the peripheral interfacing with 80 applications development with progra <b>omes:</b> At the end of this course, learn knowledge in Addressing modes & in use of Interrupt structure 8085 & 805 and the importance of Interfacing the architecture of Microprocessor an	& 8051. 1. 985 & 86 mming ers will ers will structio 1.	051 8085 be ab on set	ole to of 8	o: 085 & 80	051.		
<ul> <li>Develop</li> </ul>	the Microprocessor and Microcontro	ller bas	ed ap	plica	ations			
	PROCESSOR		-	14.00	and soll of	and the second second	ويحمدهم	9
ardware Archi	tecture, pinouts - Functional Building	Blocks	of Pro	oces	sor – Me	emory orga	anization - I	/O ports
nd data transfe	er concepts- Timing Diagram - Interr	upts.	(200) 2016-04		Calco Mi Contora			
	GRAMMING OF 8085 PROCESSOR							9
struction -form	nat and addressing modes – Assemb	ly langu	lage fo	orma	at – Data	a transfer,	data manip	ulation&
	ons – Programming: Loop structure v	with cou	inting	& In	dexing -	- Look up	tability - Su	broutine
structions - st				1				the start
	MICROCONTROLLER							9
	tecture, pinouts - Functional Building							
	er concepts- Timing Diagram - Interr				fer, Mani	pulation, 0	Control Algo	orithms&
	Comparison to Programming concept	ots with	8085.	2		111	12 19 19	
	IPHERAL INTERFACING			1				9
	Architecture, configuration and interfa	acing, v	vith IC	s: 8	255, 825	9, 8254, 8	279, - A/D	and D/A
	erfacing with 8085& 8051.	Centry .		- 1			Sec. 19	
	ROCONTROLLER PROGRAMMING						A	9
	nming exercises - key board and dis	splay ir	nterfac	:e -	Closed	loop cont	rol of servo	motor-
epper motor c	ontrol –Washing Machine Control.				•			
EXT BOOK(S	):							
<ol> <li>R.S. Ga Ltd., Nev</li> <li>Muhamr</li> </ol>	athur &Jeebananda Panda, "Micropro- onkar, 'Microprocessor Architecture I w Delhi, 2013. nad Ali Mazidi& Janice GilliMazidi, s', PHI Pearson Education, 5th Indian	Prograr R.D.Kii	nming nely 'T	and The	d Applica	ation', with	8085, Wile	ey Easte
EFERENCE(S		iepint,	2003	•				
1. Krishna	Non- Kant, "Microprocessor and Microcont Ihi, 2007.	rollers"	, East	ern	Compan	y Edition,	Prentice Ha	all of Indi
2. B.RAM,"	Computer Fundamentals Architec Fifth edition, 2017.	ture ar	nd Org	gani	zation"	New age	Internation	al Priva
<ol> <li>Soumitra using 80</li> </ol>	a Kumar Mandal, Microprocessor & l 85,8086,8051,McGraw Hill Edu,2013							Interfacir
	eshmukh, 'Microcontroller Theory & A V.Hall, 'Microprocessor and Interfaci							

5. Douglas V.Hall, 'Microprocessor and Interfacing', McGraw Hill Edu, 2016.



	partment	ELECTRONICS AND INSTRUMENT	a second s		and the state of the			Semester V HS
and the second s	urse Code	Course Name	Hours	T		Credit	A State of the second sec	Maximum Marks
1	9HS505	<b>UNIVERSAL HUMAN VALUES 2</b>	L	T	Ρ	С	Hours	
-		UNDERSTANDING HARMONY	2	1	0	3	60	100
		): The purpose of learning this course						
		idents appreciate the essential comple						
		piness and prosperity which are the co						
		e development of a Holistic perspective						
		opiness and prosperity based on a com						
		Such a holistic perspective forms the based living in a natural way.	Dasis	01 0	Unive	ersai Hu	man vai	ues andmovement
		ausible implications of such a Holistic	undor	etar	ding	in torm	e of othi	al humanconduct
		tually fulfilling human behavior and mu						
		the Course: The salient features this of				Interact		ature
		niversal approach to value education b				e riaht u	nderstan	ding of reality(i e a
		e reality "as it is") through the process					nucistan	ang of reality(i.e. a
1.1		rse is presented in the form of a dialogu					osals abo	out various aspects
		re presented and the students are end						
		sis of their natural acceptance within o						
		us throughout the course is toward af						
		than just a transfer of information.		930 N.				
• V	While introduci	ng the holistic worldview and its implica	ations,	a cr	itical	appraisa	al of the p	prevailingnotions is
a	lso made to e	nable the students discern the differen	ce on t				and a south a start start.	
Course	Methodolog	y: The methodology of this course is :						
		al and thus universally adaptable. It inv	olves a	asys	stema	atic and	rational s	tudy of the human
	-	the rest of existence.						
		n the form of 28 lectures (discussions)	and 14	pra	ctice	session	IS.	
		ny dogma or value prescriptions.						
		of self-investigation and self-exploration						
		s stated as a proposal and the student						
		Acceptance and subsequent Experier	ntial Va	alida	tion -	- the wh	ole existe	ence is the lab and
		a source of reflection.						a students to be sta
		self-exploration takes the form of a dial o continue within the student in every a						
This se	f-exploration a	also enables them to critically evaluate	their p	re-c	ondit	ioninas a	and prese	entbeliefs.
		tion to Value Education	then p		onun	ioninge (		6+3
		ding Value Education - Self-exploration	as the	e Pr	oces	s for Va	lue Educ	
		erity - the Basic Human Aspirations -						
Facility -	Happiness a	nd Prosperity - Current Scenario - Me	thod to	Ful	fill th	e Basic	Human A	spirations
Tutorial	s [Practice Se	ssion] - Sharing about Oneself - Ex	oloring	Hu	man	Conscio	ousness -	Exploring Natura
Acceptar								
		in the Human Being						6+3
		ling Human being as the Co-existence						
		nd the Body – The Body as an Instrum						armony in the Self
		vith the Body - Programme to ensure s	•					
		ssion] - Exploring the difference of		of	Self	and Bo	dy - E	xploring Sources o
		- Exploring Harmony of Self with the	Body	-			1	0.0
		in the Family and Society		1			anda M	6+3
Lectures		/ in the Family – the Basic Unit of H						
		- the Foundational Value in Relati					as the F	light Evaluation -
		iv in the Society - Vision for the Universision] - Exploring the Feeling of Trus					ling of Pa	spect - Exploring
	to fulfil Humai		- L	xpic	inny	life i eei	ing of he	speci - Exploring
		in the Nature/Existence		_				4+2
		nding Harmony in the Nature - Interco	nnecte	dne	SS S	elf-regul	ation and	the Color and the Color
		s ofNature –Realizing Existence as Co						
	ny in Existence							
		ssion] - Exploring the Four Orders of	Nature	-	Exc	loring C	o-exister	ice in Existence

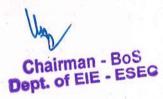


Modu	Ile 5 – Implications of the Holistic Understanding 6+3
<i>Lectur</i> Human Ethics-	res - Natural Acceptance of Human Values - Definitiveness of (Ethical) Human Conduct – A Basis for histic Education, Humanistic Constitution and Universal HumanOrder - Competence in Professional Holistic Technologies, Production Systems and Management Models-Typical CaseStudies - Strategies Insition towards Value-based Life and Profession
Tutoria	als [Practice Session] - Exploring Ethical Human Conduct - Exploring Humanistic Models in Education pring Steps of Transition towards Universal Human Order
	se Outcomes: At the end of this course, learners will be able to:
1	Students are expected to become more aware of themselves, and their surroundings(family, society, nature)
	Students would become more responsible in life, and in handling problems with sustainable solutions. Students become sensitive to their commitment towards what they have understood (human values,
1	human relationship and human society).
	Students would be able to apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction .
	nts would have better critical ability .
TEXTE	300K(S):
1:	A Foundation Course in Human Values and Professional Ethics, R R Gaur, R Asthana, G P Bagaria, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1
2.	Teachers' Manual for A Foundation Course in Human Values and Professional Ethics, R R Gaur, R Asthana, G P Bagaria, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-53-2
the second se	RENCE(S):
1.	Jeevan Vidya: EkParichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999
2.	Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004
3.	The Story of Stuff (Book)
4.	The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi Small is Beautiful - E. F Schumacher
5.	Shall is Beautiful - E. F. Schumacher Slow is Beautiful - Cecile Andrews
6. 7.	Economy of Permanence - J C Kumarappa
8.	Bharat Mein Angreji Raj –PanditSunderlal
9.	Rediscovering India - by Dharampal
10.	Hind Swaraj or Indian Home Rule - by Mohandas K. Gandhi
	ESTED ASSESSMENT:
	s a compulsory credit course. The assessment is to provide a fair state of development of the student, so
partici Exam	ipation in classroom discussions, self-assessment, peer assessment etc. will be used in evaluation.
	ssment by faculty mentor. 10 marks
	assessment: 10 marks & Assessment by peers: 10 marks
Social	Ily relevant project/Group Activities/Assignments: 20 marks
	and near near tens is 10% in sees the student fails be/abs must report the source

The overall pass percentage is 40%. In case the student fails, he/she must repeat the course

Department	ELECTRONICS AND INSTRUMENTA					R2019	and the second se	EEC
Course Code	Course Name	Hou	1	-	Credit	a state water and the	MaximumMa	arks
19TPS05	QUANTITATIVE APTITUDE AND	2	T 0	P 0	C 0	Hours 30	100	
	LOGICAL REASONING - III							
Design to h     Calculate th     Understand     Know the p	<b>tive (s):</b> The objective of this course is to nelp people make sense of numerical dat he calendars and series in simplified way d the concept of the interest amount in S procedure to deal with a situation and sub eating arrangements in rows or in small g	y. I and 0 fficient	to de	eterm	nine the	answer.		
	omes: At the end of this course, learners	-		to:	11-17-1-			
time take Solve the Calculate Induce the	trate various principles involved in solvin en to solve Aptitude Questions. e question based on calendar, odd man e the interest by using shortcut methods neir critical thinking by solving the syllogi	out and instead	d ser d of t	ies b raditi	y using ional me	shortcut ethods.		the
Analyze     UNIT 1 D	the conditions and do interpretation. ATA INTERPRETATION & CLOCKS			_				
	<b>RETATION:</b> Tabulation – Bar graphs – P	lie eher	rto	Line	aronho		here here and here	6
lock. UNIT 2	ition – important points – Angular differen <b>CALENDARS, ODDMAN OUT &amp; SERIE</b> Odd days – Leap year – Ordinary year -	S		1				6
	& SERIES: Odd man out – Power series							
UNIT 3 S	IMPLE & COMPOUND INTEREST							6
OMPOUND IN compounded ar	EST: Principal – Rate of interest – Numb TEREST: Compounded Annually – Con nnually – Rates are different for differen TATEMENT & COURSE OF ACTION, S	npoun t years	ded H s.	Half-				
Alexandream and the second	ND COURSE OF ACTION: Courses of a	and the second se	104 0 0 0 0 0		taken -	Improve	ment Follow-u	-
urther action in YLLOGISM/ Lo ropositions – In	regard to the given statement. OGICAL VENN DIAGRAMS: Relationsh nmediate deductive inference – Immedia	hip bet ate ded	ween luctiv	the e infe	two thin			
	EATING ARRANGEMENTS & DATA S		Concernance -					6
EATING ARRA	ANGEMENTS: Persons seating in the ci	rcular -	- Red	ctang	jular – S	quare.		
EFERENCES:	ENCY: Reasoning ability using a set of o	airectic	ons.					
<ol> <li>Abhijit Ge Publishin</li> <li>Arun Sha</li> </ol>	uha, Quantitative Aptitude for Competiti g Company Ltd, 2012 arma, How to prepare for Data Interpre							
3. R.V.Prav	g Company Ltd, 2012.							
4. Dr.R S Ag Ltd, 2017	een,"Quantitative Aptitude and Reasonir ggarwal, Quantitative Aptitude, Revised a '.	and En	large	ed Ed	nuon, S.	Chang P	rublishing Comp	bany

Department Course Code	ELECTRONICS AND INSTRUMENTA Course Name		ENC		ERING Credit	R 2019 Total	SemesterV PC Maximum Marks
			Veel			Hours	
and the second		L	Т	P	С	1.1.2-5.	
19EI506	INDUSTRIAL INSTRUMENTATION LABORATORY	0	0	4	2	60	100
<ul> <li>Impart a</li> <li>Make th</li> <li>Make th</li> <li>Instrume</li> <li>Identify,</li> <li>Known a</li> </ul>	formulate, and analyze problems regard about the physiological parameters such omes: At the end of this course, learners	hand eters, rking ding s as B s will b	lle ed sen and enso <u>P, E</u> oe al	quipi sors ope ors a <u>CG a</u> ble to	and tran eration of and transi and pulse o:	asmitters. of differen mitter e rate.	
<ul> <li>Experim</li> <li>Measure</li> <li>Measure</li> </ul>	entally measure industrial process paral entally measure industrial process paral e and analyze pH, conductivity. e and analyze UV absorbance and trans e and analyze physiological parameters	meter mittar	rs su nce.	ch a	s temper	ature, pre	
<ol> <li>Calibrati</li> <li>Measure</li> <li>Measure</li> <li>Discharg</li> <li>Calibrati</li> <li>Design a</li> <li>Measure</li> <li>Measure</li> <li>Measure</li> <li>Measure</li> <li>Measure</li> <li>Standard</li> <li>Measure</li> <li>Measure</li> </ol>	on of ammeter, voltmeter and wattmeter on of pressure gauge using dead weigh ement of level using d/p transmitter and t ement of flow using ge coefficient of orifice plate on of Rotameter. and Testing of Electromagnetic Flow me ement of temperature using IR thermome ement of Absorbance and Transmittance ement of Conductivity, Moisture and Viso dization and measurement of pH values ement and analysis of ECG and pulse ra	t teste fibre of ters. eter a of Te cosity of diff te.	nd IC	s sys C sei olutio	stem. nsor ons using olutions.		ctrometer.
provide and a state of the stat	MENT FOR A BATCH OF 30 STUDEN					Certification of the second	Colored States
SI.No.				1	Quantity	y required	
1.	Orifice plate	10110-040E-1			and the second	1	2746-1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
2.	Dead weight tester with pressure ga	auge				1	
3.	Torque trainer					1	
4.	Saybolt Viscometer	1 inte				1	
5.	Vacuum gauge		_	_		1	
6.	DP transmitter	1014				1	
7.	UV – Visible spectrophotometer			4		1	
8.	pH meter				3	1	
9.	Conductivity meter	15.5				1	2 4 4 4
5.						1200	and the second se
10.	ECG trainer					1	14
	ECG trainer Pulse rate trainer	2	-	2 -	3	1	



Chaiman BoS.

Departmen		and the second se	and the second se	and the second se		R 2019	SemesterV PC
Course Cod	e Course Name	Hou	1		Credit	Total	Maximum Marks
4051507			T	P	C .	Hours	400
19EI507	MICROPROCESSORS AND	0	0	4	2	60	100
Course Ohi	MICROCONTROLLERS LABORATOR		to		/		
	ective (s): The purpose of learning this co le training on programming of microproces			loret	and the i	ntorfaco r	oquiromonto
	le training on programming of microproces						
	ate various microprocessors and microcon						
	about the basics of serial communication	lioners	using	I NEI	L OI L'QU	Ivalent Si	nulator.
	about the basics of software simulators.						
	comes: At the end of this course, learners	will bo	abla	to:	-		
	stand and apply computing platform and se				ooring pr	oblems	
	amming logics for code conversion.	Jitware	101 6	irgine	eening pi	obierna.	
	e knowledge on A/D and D/A.						
	stand basics of serial communication.						
	stand and impart knowledge in DC and AC	motor	interf	acin			
	ERIMENTS	motor	interi	aoni	9.		
	e arithmetic operations: addition / subtraction	n / mu	Itiplic	ation	/ divisio	n	
	amming with control instructions:	Ju / mu	inplic	auon	7 0171510		
	cending / Descending order, Maximum / M	inimum	ofn	imbe	ore		
	ograms using Rotate instructions.	minum	i oi iii	unioc			
	x / ASCII / BCD code conversions.						
	ce Experiments: with 8085 A/D Interfacing	. & D/	A Inte	erfac	ina.		
	light controller.						
	rt / Serial communication						
	mming Practices with Simulators/Emulator	rs/open	sour	се			
	a key ,interface display						
	nstration of basic instructions with 8051 Mi	cro con	trolle	r exe	cution, in	ncluding:	
i.	Conditional jumps & looping						
ii.	Calling subroutines.						
9. Progra	mming I/O Port and timer of 8051						6.7
	dy on interface with A/D & D/A						
	idy on interface with DC & AC motors						
	ation hardware development using embedo	led pro	cesso	ors.			
	eed control of DC motor 8051			11	1		
	IPMENT FOR A BATCH OF 30 STUDEN						
SI.No.				Q		required	
1.	8085 Microprocessor Trainer with Powe	r Suppl	у		15		C -
2.	8051 Micro Controller Trainer Kit with po	ower su	pply	)	15		
3.	8255 Interface boards				5		1
4.	8251 Interface boards	- h			5	1.	
5.	8259 Interface boards	_			5		
6.	8279 Keyboard / Display Interface board	s	15		5	T. S. Salar	
7.	8254 timer/ counters				5		
8.	ADC and DAC cards	_			5		
0	AC & DC motor with Controller s		+.		5	10000	
9.	no a be motor with controller s		_		•		

1 1d June

Department	ELECTRONICS AND INSTRUMEN	ITATI	ON E	NGI	NEERING	R 2019	SemesterV EEC	
<b>Course Code</b>	Course Name	Hours/ Week Credit				Total	MaximumMarks	
		L	S T	P	С	Hours		
19EI508	INTERNSHIP / INDUSTRIAL TRAINING	0	0	2	1	30	100	
<ul> <li>Get an in</li> <li>Gain valu</li> <li>Make pro</li> <li>Get expension</li> </ul>	and one or more practical application iside view of an industry and organiz uable skills and knowledge ofessional connections and enhance prience in a field to allow the student mes: At the end of this course, learn	ation/ netwo to ma	comp orking ke a	oany ) caree	ertransition		n work experier	nce
in an Industry/ (	Company/ Organization							
Guidelines	1-4 f				-			
2. Every stu	datory for every student to undergo the adent is expected to spend a minimities e vacation.				in an Indu	stry/ Com	pany/ Organiza	ation,
3. The stude Organization for making	ent must submit the "Training Compleon as well as a technical report not exe a presentation before the committee mittee assesses the student perform	ceedir cons	ng 15 titute	page d by t	es, within th	e stipulate nent.	ed time to be el	igible

Department	ELECTRONICS AND INSTRUMENT					R 2019	Semester VI	-
Course Code	Course Name	Hou	rs/W	leek	Credit	Total Hours	Maximum N	larks
la sul a la sul a su		L	Т	Ρ	С			
19EI601	INDUSTRIAL AUTOMATION	3	0	0	3	45	100	
	ve (s): The purpose of learning this cou							
	erviewofthe automation technologies su							
	fundamental understanding of the different							
	ut the PLC program in different language					al application	S.	
	ut automation technologies such as DCS							
	sight into some of the advancedprinciple				vingforp	resent and fu	ture automatic	on
	es: At the end of this course, learners w							
<ul> <li>Understan</li> </ul>	d all the important components such as	PLC, S	CAD	A, D	CS,			
<ul> <li>Understan</li> </ul>	d the concepts of I/O modules and field	devices	ofa	an ind	dustrial a	automation sy	stem.	
	LC program in different languages for in							
<ul> <li>Select and</li> </ul>	l use most appropriate automation techn	ologies	for	a giv	en applie	cation.		1
<ul> <li>Gain know</li> </ul>	ledge on the recent developments in inc	lustrial a	auto	matic	on.		La strate a	
	CTION TO PLC&SCADA					and the second		9
	of PLCs – Programmable Controllers							y of
	CADA: Remote terminal units- Master s	tation -	Con	nmun	ication a	architectures.		
	OFPLC PROGRAMMING(LADDER)							9
	ogramming – Ladder Logic – Relay typ						ctions – Prog	ram
	s – Data manipulation and math instruct	ions – F	rog	ramn	ning Exa	imples.		
	OGRAMMING(OTHER LANGUAGES)							9
	programming - Sequential function chart	– Instru	Ictio	n list	- Struc	tured text pro	gramming – F	LC
	tial Process Examples.				1			0
	UTED CONTROL SYSTEM	o o natrol	atati	-	Interfee	ing of conver	ntional and an	9
	types – Hardware architecture – Field T and FF enabled) with DCS Controller							
	stations – Study of any one DCS availab				mouur	es – Operator	and Engineer	ning
	EDTOPICS INAUTOMATION		inter	•	1		The second second	9
	tworked Control systems - Plant wide	control	- C	loud	based A	utomation -	OLE for Proc	
	LC – Case studies: PLC - SCADA - DC		0	ouu	buoou /	atomation		000
EXT BOOK(S):						1 I S		
	ella, Programmable Logic Controllers, T	ata Mc-	Gra	w Hil	l, Third e	edition, 2010		
	Lukas, Distributed Control Systems:	Their E	Evalu	uation	and	Design, Van	Nostrand Rei	inhol
Co., 1986			32	3 3				
Newyork,1	c andV.P.Bhatkar,' Distributed comput 990.	er cont	rol f	or in	dustrial	Automation'	Marcel Dekke	er,Inc
EFERENCE(S):		1929 - 1929	anam	202200200				
Systems",	Reynders, D. and Wright, E., "Practical I Newnes, 1st Edition, 2004.							
Edition, IS/	.A., "Programmable Logic Controllers: A Press, 2004.							
New York,								lbool
4. NPTEL No	tes on, "ProgrammableLogicControlSyst	em"hv	)epa	ntme	ntofElec	tricalEnga II	T Kharagpur	

Course Coole		ITATION EI	and the second s			R 2019	Semester	
Course Code	Course Name	Hours	-		and a second second second	Total	Maximum	Marks
1051000		L	T	P	С	Hours	100	_
19EI602	PROCESS CONTROL e (s): The purpose of learning this co	2	2	0	4	60	100	
<ul> <li>Familiariz</li> <li>Provide ar</li> <li>Make the s</li> <li>Elaborate</li> </ul>	echnical termsand nomenclature asso e the students with characteristics, se overview of the features associated students understand the various PID different types of control schemes su trol schemes.	election, siz with Indust tuning meth	ing of o rial typ nods.	cont e Pl	rol va D co	alves. ntroller.		Mode
		a will be abl	la ta:					
	es: At the end of this course, learner		and a second					
<ul> <li>Build mode</li> <li>Design, tui</li> <li>Analyze System</li> </ul>	I technical terms and nomenclature as els using first principles approach as ne and implement PID Controllers to ystems and design & implement cont mulate and solve problems in the Pro-	well as ana achieve des trol Scheme	lyze m sired p s for va	odel erfo ariou	s. rman	ce for var		es
Init   PROCE	SS MODELLING AND DYNAMICS		10401				10 S	6+
Continuous and	ontrol – Mathematical Modeling of Pro batch processes – Self regulation eter models – Heat exchanger – CST	n – Servo	and re	gula	atory	operation	ns - Lumpeo	
	CONTROL ELEMENTS						1.	6+
Control Valve se Init III CONTR	OL ACTIONS	tions for siz	ing Co	ntrol	Valv	es – Cavi		shing
Control Valve se Init III CONTR haracteristic of C haracteristic of C haracteristi	lection OL ACTIONS N-OFF, Proportional, Single speed for I modes – Practical forms of PID transfer, Anti-reset windup Technique NTROLLER TUNING sign Specifications: Criteria based ontroller Tuning: Z-N and Cohen-Co	floating, Inte Controller ues – Direct on Time oon methods	egral a – PID t/revers Respo	ntrol nd [ Imp se a nse inuc	Valv Derivation ction and ous c	es – Cavi ative cont entation li Criteria ycling me	tation and fla rollers – P+I, ssues: Bump based Frequ thod and Dar	shing 6+ P+D bless, 6+ lency
Control Valve se Init III CONTR haracteristic of C haracteristic of C haracteristi	lection OL ACTIONS N-OFF, Proportional, Single speed for I modes – Practical forms of PID transfer, Anti-reset windup Technique NTROLLER TUNING sign Specifications: Criteria based ontroller Tuning: Z-N and Cohen-Co- optimization methods, Auto tuning –	floating, Inte Controller ues – Direct on Time oon methods	egral a – PID t/revers Respo	ntrol nd [ Imp se a nse inuc	Valv Derivation ction and ous c	es – Cavi ative cont entation li Criteria ycling me	tation and fla rollers – P+I, ssues: Bump based Frequ thod and Dar	shing P+D pless, 6+( lency nped
Control Valve se Init III CONTR naracteristic of C ad P+I+D contro ito/manual Mode Init IV PID CO D Controller De esponse - PID C cillation method Init V MODEL nith Predictor Co vel control - Intro &ID diagram- Re	lection OL ACTIONS N-OFF, Proportional, Single speed for I modes – Practical forms of PID transfer, Anti-reset windup Technique NTROLLER TUNING sign Specifications: Criteria based ontroller Tuning: Z-N and Cohen-Co	floating, Inte Controller ues – Direct on Time on methods - Cascade c	egral a – PID t/revers Respo s, Cont control	ntrol Imp se a inuc – Fe	Derivation Derivation Coleme ction and bus c eed-fe	res – Cavi ative cont entation l Criteria ycling me orward co	tation and fla rollers – P+I, ssues: Bump based Frequ thod and Dar ntrol ement Boiler	shing P+D pless, 6+ lency nped 6+ drum
Control Valve se Init III CONTR haracteristic of C haracteristic of C haracteristic of C haracteristic of C haracteristic of C haracteristic of C haracteristic of C PID CO D Controller De besponse - PID C cillation method nit V MODEL nith Predictor Co vel control - Intro &ID diagram- Re XT BOOK(S): 1. Seborg, D. 2. Bequette,	lection OL ACTIONS ON-OFF, Proportional, Single speed for I modes – Practical forms of PID transfer, Anti-reset windup Technique NTROLLER TUNING sign Specifications: Criteria based ontroller Tuning: Z-N and Cohen-Co- optimization methods, Auto tuning – BASED CONTROL SCHEMES ntrol Scheme - Internal Model Control duction to Multi-loop Control Scheme edundant controller. E., Edgar, T.F. and Mellichamp, D.A., 2003. B.W., "Process Control Modeling, I pulos, G., "Chemical Process Cont	floating, Inte Controller ues – Direct on Time on methods - Cascade o oller – IMC F es – Contro , "Process I Design and	ing Co egral a – PID t/reven Respo s, Cont control PID con I Sche Dynam	ntrol Ind [ Imp se a nse inucc – Fe ntrol mes ics a Ilatic	Derivation Derivation and us contraction and Con", 1	criteria Criteria ycling me orward co Chree-ele CSTR, and Control", W	tation and fla rollers – P+I, ssues: Bump based Frequ thod and Dar ntrol ement Boiler d Heat Excha Viley John an Hall of India,	shing 6+ P+D pless, 6+ ency mped 6+ drum anger d Son 2004.

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Department	ELECTRONICS AND INSTRUMEN					R 2019	SemesterVI P
Course Code	Course Name	Hou	-	-	Credit	Total	Maximum Mark
		L	T	Ρ	С	Hours	
19EI603	ANALYTICAL INSTRUMENTS ve (s): The purpose of learning this co	3	0	0	3	45	100
<ul> <li>Understar quantitativ</li> <li>Impart fur</li> <li>Integrate specific in</li> <li>Impart kn handling I</li> <li>Understar</li> <li>Understar quality as</li> <li>Assess ar</li> </ul>	nd the theory and operational princi- ve analysis of chemical substances by indamental knowledge on gas chromat a fundamental understanding of the istrumentation used for gas analyzers owledge on the important measurer iquids or solutions. Ind the working principle, types and ap <b>nes:</b> At the end of this course, learner ind the fundamental principles of select surance & control and research studie ind suggest a suitable analytical meth sources of interferences and errors,	iples of y differe tography a underl and po ment in <u>pplication</u> rs will be tive ana es. nod for a	instr nt ty and ining llution mar <u>ns of</u> able ytica	pes of l liqui prino ny ch <u>NMF</u> e to: l inst	of spectro d chrom ciples of nitoring i emical p <u>R and Ma</u> truments purpose	oscopy. atography physics nstrumen processes <u>ass spectr</u> used in n e, and ev	v. as they relate to ts. and laboratories oscopy. nedical diagnosis, aluate sensitivity,
Artistically     Develop o     Understar Unit I SPEC Spectral methods pectrophotometer	v evaluate the strengths and limitations critical thinking for interpreting analytic and the working principle, types and ap <b>TROPHOTOMETRY</b> of analysis – Beer-Lambert law – UV- ry – Atomic absorption spectrophol	al data. plication Visible : tometry	ns of spect	NMR trosco	and Ma opy – IR emissio	ss spectrop Spectrop	oscopy 9 hotometry - FTIR
	struction, working principle, sources of	detector	s an	d app	olications	3. <u> </u>	
	MATOGRAPHY s – classification – chromatographic	hohavi	or of	solut	00 - 01	antitativa	allow and all and a second
Sas chromatogra	aphy – Liquid chromatography – Hi	igh-pres	SUITE	liqui	d chrom	atograph	- Applications
	STRIALGASANALYZERSANDPOLLU	UTION	MON	ITOF	RING INS	STRUME	NTS 9
as analyzers – ( n ionization of ga	Dxygen, NO2 and H2S types, IR analy ases. Air pollution due to carbon mono: and smoke measurements.	zers, th	erma	l con	ductivity	detectors	, analysis based
	TERS AND DISSOLVED COMPONE	NTANA	LYZ	ERS			9
elective ion ele	ctrodes - Principle of pH and condu	ctivity r			ents - d	issolved	oxygen analyzer
Sodium analyze	er – Silica analyzer – Water quality An	alyzer.					
Unit V 🛛 NUCL	EAR MAGNETIC RESONANCE AND	D MASS	SPE	ECTR	OMETR	Y	9
	rinciples – Continuous and Pulsed						
and the second sec	ample system – Ionization methods –	· Mass a	naly	zers -	- Types	of mass s	spectrometry.
& distribut 2. Braun, R.I 3. Robert E.	H., Merritt, L.L., Dean, J.A., Settle, F.A ion, 7th Edition, 2012. D., "Introduction to Instrumental Analy Sherman., "Analytical Instrumentation	sis", Ph	arma	a Boo	k Syndic	ate, Sing	apore, 2006.
	R.S., "Handbook of Analytical Instr	ruments	з", Та	ata M	lcGraw-	Hill publis	shing Co. Ltd.,2n
	W., "Instrumental Methods of Chemic	cal Ana	lysis'	', Mc	Graw-Hi	ll, 5th Eo	dition reprint 198
(Digitized	0 2007)						

	ELECTRONICS AND INSTRUMENTATION					R 2019	Semester VI	and the second se
Course Code	Course Name	Hou		Vee	Credit		Maximum M	Marks
and a spectrum of	No	-	k		-	Hours	1.24	
19TPS06	QUANTITATIVE APTITUDE AND LOGICAL REASONING - IV	2	T 0	P 0	C 0	30	100	
Course Obie	ctive (s): The objective of this course is to	1.00						
	ains the occurrence of an event on the basis of a	alrea	dy n	rese	nt infor	mation		
	ea models to represent the distributive property							
	te the work capacity by chocolate based metho		auto	mau	ourrout	Jonnig.		
	ith time, speed and distance by relative speed of		ents					
	rmine how various phenomena are related.	00110	opto.					
	omes: At the end of this course, learners will be	e abl	e to					
	outcome of an event developed the concept of			v.				
	the area and surface volume in real time application	the second second	CONTRACTOR OF A DECK					
	d the concepts of Times and Work and Pipes a			n an	d Corre	lating the	Concepts of bo	th.
	concepts of Time, Speed and Distance and con							
	the cause and effect of problems by using critic							
	ABILITY, PERMUTATIONS & COMBINATION					teriliter.		6
ROBABILITY	: Rolling an unbiased dice – Tossing a fair coi	n – C	Draw	ing a	a card fr	om a pac	k of well shuffle	d card
- Picking up b	alls of certain color from a bag containing balls	of d	liffere	ent c	olors.			
	NS: Numbers with digits - Words with letters -	Arra	ange	men	ts of pe	erson in a	row - Arrangen	nents o
ooks on a sh								
	NS: Formation of committee – Selection of que	estior	ns fro	om c	uestior	n papers.	and and and and	
NIT 2 AREA	& VOLUME							6
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Dep	artment	ELECTRONICS AND INSTRUMENTATIO	N EN	GIN	EER	ING	R 2019	SemesterVI PC
	rse Code	Course Name	and the second se		and the second states in the s	Credit	Total	Maximum Marks
			L	T	P	C	Hours	
	EI604	PROCESS CONTROL LABORATORY	0	0	4	2	60	100
Cours		e (s): The purpose of learning this course is to		4			100000	
•		ntally verify the process control concepts on the						
•		oretical and practical skills in process identificat			Dcc	ontroller t	uning.	
•		students aware of basic and advanced control s						
•		ut the simulation tools such as MATLAB/LABVIE						
•		ut the simple adaptive and model based control		mes.				
Cours		es: At the end of this course, learners will be abl						Mr. B. C.
•		d and analyze process control engineering prob						
•		amic models using input – output data of a proc						
•		vith real time control loops(flow/level/temperatur	e/pres	ssur	e).			
•		n tools such as MATLAB/LABVIEW/ASPEN.						
•		t simple adaptive and model based control sche	emes.		<u>.</u>	_		
	OF EXPER							
		d Experiments						
		of lumped /distributed parameter system ical model of a typical industrial process using n	onnar	ame	tric i	dentifica	tion meth	ods
		PID Controller for mathematically described pro-				uentinea	uon meun	003
		cements (Cascade and Feed-forward Control S						
		d Implementation of Multi-loop PID Controller or			lated	model c	of a typica	l industrial
	process.						- 11	
6.	Study of b	urner management system.						
Hardw	are based	experiments						
		stics of Pneumatically Actuated Control Valve (v	with an	nd w	ithou	ut Positio	ner).	
		control of flow process using Compact Flow Co			199.5			
3.	Control of	Level and Pressure using Process Control Train	ning P	lant.	- <u>-</u>			
		d implementation of ON/OFF Controller for the 1				rocess.		
		d implementation of Interacting and non-interact d implementation of adaptive or model predictive				nee		
		ENT FOR A BATCH OF 30 STUDENTS:	e com	1013	chei	1103		
S.No	and the second	Description of Equipment	-		1			
1.		ocess station with all accessories				_		
2.		/ Digital PID controller	1		1			
3.		valve setup (with position for varying $\Delta P$ across	the v	alve	)	5 2		
4.	Flow m				,	ar - 1978	<u>(a</u>	
5.		rocess station with all accessories						
6.		ature process station with all accessories	2-1			100		
7.		e process station with all accessories				1.00		
8.		al computer-15 nos		-	-			
9.		B software				a l'és		
10.		k system with following accessories.						

Department	ELECTRONICS AND INSTRUMENTATIO	N EN	GIN	ERI	NG	R 2019	SemesterVI PC
Course Code	Course Name					Total Hours	
23.4876	0 9 9 7 9 1 9 1 9 1 9 1 9 1 9 1 9 1 9 1 9	L	T	P	С		Marks
19EI605	INDUSTRIAL AUTOMATION LABORATORY	0	0	4	2	60	100
<ul> <li>Program</li> <li>Sensor</li> <li>Interface</li> <li>Learn a</li> <li>Know a</li> </ul> Course Outce <ul> <li>Ability t</li> <li>Be ablee</li> <li>Ability t</li> <li>Be ablee</li> <li>Ability t</li> <li>Unders</li> </ul> IST OF EXPE <ul> <li>Study o</li> <li>Program</li> <li>Implem</li> <li>Program</li> <li>PLC Ex</li> <li>PLC bas</li> <li>On-line</li> <li>PLC bas</li> <li>Study o</li> </ul>	ctive (s): The purpose of learning this course is mming of PLCand DCS. data acquisition, data processing and visualiza- ting the various field devices with PLC about designing and implementing control scheme bout the Fieldbus /IOT/Wireless HART Enable omes: At the end of this course, learners will be o understand and Programming of PLC, SCAD o working with industrial automation system to design and implement control schemes in F o interface field devices with PLC& DCS tand the Fieldbus /IOT/Wireless HART Enabled <b>RIMENTS</b> f PLC field device interface modules (AI,AO,DI nming Logic Gates Function in PLC enting Mathematical Operations in PLC nming Jump-to-subroutine & return operations ercises:- 1. Traffic Light Control and Filling/Dra ercise: 1. Reversal of DC Motor Direction 2. Of ed control of Level Process Monitoring and Control of a Pilot plant using Do sed Control of Flow Process f Foundation Fieldbus /IOT/WirelessHART Ena PMENT FOR A BATCH OF 30 STUDENTS:	ation mes in <u>d Tra</u> e able A and PLC & d Trar DO n in PL0 aining V/OFF	nsmi e to: I DC DC nsmit nodu	tter S tter les) trol (	Operatio ler for T	on hermal Proce	SS
SI.No.	Description of Equipment	616	noli	3	Qui	antity Requir	red
1.	Programmable Logic controller		low	100	5 No		
2.	Programmable Logic controller Software	-2.8	116 5	100	100	Jser License	1.0
3.	DAQ card				2 No		

1 No.

2 Nos

5 Nos

1 set

1 No.

10 Nos

1 set each

Filling /Draining System

DCS along with Interface modules

Thermal Process, Level Process & Flow Process stations

Traffic Light Controller

Personal computer

Smart Transmitter

DC Motor

4.

5.

6.

7.

8.

9.

10.

Department	ELECTRONICS AND INSTRUMENTATIO				0	R 2019	Maximum
Course Code	Course Name	Hou	-	P	Credit	<b>Total Hours</b>	Marks
- ACOLOGIE		0	T	4	2	60	100
19EI605	INDUSTRIAL AUTOMATION LABORATORY ctive (s): The purpose of learning this course is	-	10	-	-		Develo da oc
<ul> <li>Sensor</li> <li>Interface</li> <li>Learn a</li> <li>Know a</li> </ul>	mming of PLCand DCS. data acquisition, data processing and visualiza cing the various field devices with PLC about designing and implementing control sche about the Fieldbus /IOT/Wireless HART Enable	mes i ed Tra	nsmi	C & I tter	ocs	a socializaria Porviolizaria A resigione de porriegione	
Course Outo	omes: At the end of this course, learners will b	e abl	e to:	-			
Ability	to understand and Programming of PLC, SCAE	DA an	d DC	S			
Ability	to working with industrial automation system			S			
Be abl	e to design and implement control schemes in l to interface field devices with PLC& DCS	FLOC	x DO	0			
Ability	stand the Fieldbus /IOT/Wireless HART Enable	d Tra	nsmi	tter	12/2	a this Taut o	ingerabell in
IST OF EXP							manci Tonik
3. Implen	mming Logic Gates Function in PLC nenting Mathematical Operations in PLC mming Jump-to-subroutine & return operations	s in Pl	C				
<ol> <li>Implen</li> <li>Progra</li> <li>PLC E</li> <li>PLC E</li> <li>PLC Ba</li> <li>On-line</li> <li>PLC ba</li> <li>OLC ba</li> <li>Study</li> </ol>	Imming Logic Gates Function in PLC Inenting Mathematical Operations in PLC Imming Jump-to-subroutine & return operations xercises:- 1. Traffic Light Control and Filling/Dr xercise: 1. Reversal of DC Motor Direction 2. C sed control of Level Process Monitoring and Control of a Pilot plant using Dr ased Control of Flow Process of Foundation Fieldbus /IOT/WirelessHART En INPMENT FOR A BATCH OF 30 STUDENTS:	s in Pl rainin DN/OF DCS	_C g Co F Co	ntrol ontro	Operat ller for	ion Thermal Proc	cess
<ol> <li>Implen</li> <li>Progra</li> <li>PLC E</li> <li>PLC E</li> <li>PLC Ba</li> <li>On-line</li> <li>PLC ba</li> <li>On-line</li> <li>PLC ba</li> <li>Study</li> </ol>	nenting Mathematical Operations in PLC imming Jump-to-subroutine & return operations xercises:- 1. Traffic Light Control and Filling/Di xercise: 1. Reversal of DC Motor Direction 2. C sed control of Level Process e Monitoring and Control of a Pilot plant using I ased Control of Flow Process of Foundation Fieldbus /IOT/WirelessHART En IPMENT FOR A BATCH OF 30 STUDENTS:	s in Pl rainin DN/OF DCS nable	_C g Co F Co	ntrol ontro	Operat ller for tter	ion Thermal Proc	
3. Implen 4. Progra 5. PLC E 6. PLC E 7. PC ba 8. On-lin 9. PLC b 10. Study IST OF EQU	nenting Mathematical Operations in PLC imming Jump-to-subroutine & return operations xercises: 1. Traffic Light Control and Filling/Di xercise: 1. Reversal of DC Motor Direction 2. C sed control of Level Process e Monitoring and Control of a Pilot plant using D ased Control of Flow Process of Foundation Fieldbus /IOT/WirelessHART En IPMENT FOR A BATCH OF 30 STUDENTS:	s in Pl rainin DN/OF DCS nable	_C g Co F Co	ntrol ontro	Operat ller for tter Q		
<ol> <li>Implen</li> <li>Progra</li> <li>PLC E</li> <li>PLC E</li> <li>PLC Ba</li> <li>On-line</li> <li>PLC ba</li> <li>On-line</li> <li>PLC b</li> <li>Study</li> </ol>	nenting Mathematical Operations in PLC imming Jump-to-subroutine & return operations xercises:- 1. Traffic Light Control and Filling/Di xercise: 1. Reversal of DC Motor Direction 2. C sed control of Level Process e Monitoring and Control of a Pilot plant using I ased Control of Flow Process of Foundation Fieldbus /IOT/WirelessHART En IPMENT FOR A BATCH OF 30 STUDENTS:	s in Pl rainin DN/OF DCS nable	_C g Co F Co	ntrol ontro	Operat ller for tter Q 5 t	uantity Requ	iired
3. Implen 4. Progra 5. PLC E 6. PLC E 7. PC ba 8. On-lin 9. PLC b 10. Study IST OF EQU	nenting Mathematical Operations in PLC mming Jump-to-subroutine & return operations xercises:- 1. Traffic Light Control and Filling/Di xercise: 1. Reversal of DC Motor Direction 2. C sed control of Level Process e Monitoring and Control of a Pilot plant using I ased Control of Flow Process of Foundation Fieldbus /IOT/WirelessHART En IPMENT FOR A BATCH OF 30 STUDENTS: Description of Equipment Programmable Logic controller	s in Pl rainin DN/OF DCS nable	_C g Co F Co	ntrol ontro	Operat ller for tter Q 5 N 10	uantity Requises.	iired
3. Implen 4. Progra 5. PLC E 6. PLC E 7. PC ba 8. On-lin 9. PLC b 10. Study IST OF EQU SI.No 1. 2.	nenting Mathematical Operations in PLC mming Jump-to-subroutine & return operations xercises: 1. Traffic Light Control and Filling/Di xercise: 1. Reversal of DC Motor Direction 2. C sed control of Level Process e Monitoring and Control of a Pilot plant using D ased Control of Flow Process of Foundation Fieldbus /IOT/WirelessHART Er IPMENT FOR A BATCH OF 30 STUDENTS: Description of Equipment Programmable Logic controller	s in Pl rainin DN/OF DCS nable	_C g Co F Co	ntrol ontro	Operat ller for tter 5 f 10 2 f 1 f	uantity Requised in the second	iired
3. Implen 4. Progra 5. PLC E 6. PLC E 7. PC ba 8. On-line 9. PLC b 10. Study IST OF EQU SI.No 1. 2. 3.	Anenting Mathematical Operations in PLC amming Jump-to-subroutine & return operations xercises:- 1. Traffic Light Control and Filling/Di xercise: 1. Reversal of DC Motor Direction 2. C sed control of Level Process e Monitoring and Control of a Pilot plant using I ased Control of Flow Process of Foundation Fieldbus /IOT/WirelessHART En IPMENT FOR A BATCH OF 30 STUDENTS: Description of Equipment Programmable Logic controller DAQ card	s in Pl rainin DN/OF DCS nable	_C g Co F Co	ntrol ontro	Operat ller for tter 5 f 10 2 f 1 f	uantity Requises Nos.	iired
3. Implen 4. Progra 5. PLC E 6. PLC E 7. PC ba 8. On-lin 9. PLC b 10. Study IST OF EQU SI.No 1. 2. 3. 4.	nenting Mathematical Operations in PLC mming Jump-to-subroutine & return operations xercises: 1. Traffic Light Control and Filling/Di xercise: 1. Reversal of DC Motor Direction 2. C sed control of Level Process e Monitoring and Control of a Pilot plant using D ased Control of Flow Process of Foundation Fieldbus /IOT/WirelessHART Er IPMENT FOR A BATCH OF 30 STUDENTS: Description of Equipment Programmable Logic controller Programmable Logic controller DAQ card Filling /Draining System	s in Pl rainin DN/OF DCS nable	_C g Co F Co	ntrol ontro	Operat ller for tter 2 1 1 1 2 1	uantity Requised in the second	iired
3. Implen 4. Progra 5. PLC E 6. PLC E 7. PC ba 8. On-line 9. PLC b 10. Study _IST OF EQU SI.No 1. 2. 3. 4. 5.	nenting Mathematical Operations in PLC mming Jump-to-subroutine & return operations xercises:- 1. Traffic Light Control and Filling/Di xercise: 1. Reversal of DC Motor Direction 2. C sed control of Level Process e Monitoring and Control of a Pilot plant using I ased Control of Flow Process of Foundation Fieldbus /IOT/WirelessHART En IPMENT FOR A BATCH OF 30 STUDENTS: Description of Equipment Programmable Logic controller Programmable Logic controller DAQ card Filling /Draining System Traffic Light Controller	s in Pl rainin DN/OF DCS nable	_C g Co F Co	ntrol ontro	Operat ller for tter 5 r 10 2 r 1 r 2 r 5 r	uantity Requised and the second secon	iired
3. Implen 4. Progra 5. PLC E 6. PLC E 7. PC ba 8. On-lin 9. PLC b 10. Study IST OF EQU SI.No 1. 2. 3. 4. 5. 6.	nenting Mathematical Operations in PLC mming Jump-to-subroutine & return operations xercises:- 1. Traffic Light Control and Filling/Di xercise: 1. Reversal of DC Motor Direction 2. C sed control of Level Process e Monitoring and Control of a Pilot plant using D ased Control of Flow Process of Foundation Fieldbus /IOT/WirelessHART En IPMENT FOR A BATCH OF 30 STUDENTS: Description of Equipment Programmable Logic controller Programmable Logic controller DAQ card Filling /Draining System Traffic Light Controller DC Motor	s in Pl rainin DN/OF DCS nable	_C g Co F Co	ntrol ontro	Operat ller for tter 2 1 1 1 2 1 5 1 1 0 2 1 1 1 1 1 2 1 1 0	uantity Requised in the second	iired
3. Implen 4. Progra 5. PLC E 6. PLC E 7. PC ba 8. On-line 9. PLC b 10. Study LIST OF EQU SI.No 1. 2. 3. 4. 5. 6. 7.	nenting Mathematical Operations in PLC mming Jump-to-subroutine & return operations xercises:- 1. Traffic Light Control and Filling/Di xercise: 1. Reversal of DC Motor Direction 2. C sed control of Level Process e Monitoring and Control of a Pilot plant using D ased Control of Flow Process of Foundation Fieldbus /IOT/WirelessHART En IPMENT FOR A BATCH OF 30 STUDENTS: Description of Equipment Programmable Logic controller Programmable Logic controller DAQ card Filling /Draining System Traffic Light Controller DC Motor Personal computer	s in Pl rainin DN/OF DCS nable t	_C g Co F Co	nsmi	Operat ller for tter 2 1 2 1 2 1 5 1 1 1 2 1 1 1 1 1 1 1	uantity Requised in the second	iired

Department	ELECTRONICS AND INSTRUMENTA					R 2019	Semester VII PC
Course Code	Course Name	Hou	irs / \	Week	Credit	<b>Total Hours</b>	Maximum Marks
Constant and		L	Т	P	C		
	COMPUTER CONTROL OF PROCESSES tive (s): The purpose of learning this course is		0	0	3	45	100
<ul> <li>Analyze</li> <li>Estimate</li> <li>Design E</li> <li>Design N</li> </ul>	ent the linear time invariant System in discrete s the controllability, observability and stability of e model parameters from input/output measure Digital Controllers Multi-loop and Multivariable Controllers for multi mes: At the end of this course, learners will be	a Dis ment tivaria	s s able s	e time S		1.1	
<ul> <li>Explain a</li> <li>Analyze</li> <li>Build mo</li> <li>Design a</li> <li>Design n</li> </ul>	about the linear time invariant System in discre the discrete time systems odels from input-output data a digital controller nulti-loop controller and multivariable controller	ete Sta	ate S			S.	
Unit I DIS	CRETE STATE-VARIABLE TECHNIQUE						9
entification of N	STEM IDENTIFICATION Non Parametric Input-Output Models:-Transier ication of Parametric Input-Output Models:- Lea						
	GITAL CONTROLLER DESIGN			Die			9
	sform – Modified of z-transform – Pulse trans er – IMC - Smith Predictor.	ter tu	nctioi	n – Dig	jital PID	controller – D	ead-beat controller an
the survey of the state of the survey of the	LTI-LOOP REGULATORY CONTROL	_	*			17	9
	ol - Introduction – Process Interaction – Pairi pplication of RGA - Multi-loop PID Controller –						
Unit V MU	LTIVARIABLE REGULATORY CONTROL						9
	ultivariable control –Multivariable PID Controller Distillation Column, CSTR and Four-tank syste		ivaria	able Dy	namic Ma	atrix Controller	–Fuzzy Logic Controlle
<ol> <li>Stephan India, 20</li> <li>SigurdSl Sons, 20</li> <li>EFERENCE(S):</li> <li>Gopal, M</li> <li>Dale E.</li> </ol>	nopoulos, G., "Chemical Process Control 005 kogestad, Ian Postlethwaite, "Multivariable 005	Fee nods" F. Edg	dbac , Tat gar, '	k Con a Mc ( 'Proce	trol: An Graw Hil ss Dyna	alysis and De	esign", John Wiley ar ontrol", Wiley John ar

20B - marnina 18B - Trans

Department	ELECTRONICS AND INSTRUMENT	the second s	the second se			R 2019	Semester VII PC
Course Code	Course Name				Credit	Total	Maximum Marks
1051702		L		P	C	Hours	100
<ul> <li>Educate of Introduce</li> <li>Provide de Educate of Introduce</li> <li>Ability to of Ability to e communic</li> <li>Ability to il communic</li> <li>Ability to si Ability to se communic</li> </ul>	INDUSTRIAL DATA NETWORKS e (s): The purpose of learning this course on the basic concepts of data networks the basics of internetworking and serial of etails on HART and Field buses on MODBUS, PROFIBUS and other comm industrial Ethernet and wireless commun lefine basic concepts of data communication explain the various internetworking devices ations used in process industries. Iustrate, compare & explain the working of ation. ummarize the operation of MODBUS, PR explain and adopt the different Industrial E ation in process applications. ETWORK FUNDAMENTALS	communic munication lication tion and i es involve of HART a	n proto ts imp d in in and Fi proto	ocol orta idus ield col	nce. trial netv bus use & its app	d in proc	ess digital
		onnoction	mod		f ISO	Doto link	
	hy and switching – Open System Interce tocol - Command / response - Token pas					Data IIIK	control protocol
	ET WORKING and RS 232, RS485	Joing 00		<u>,</u> ,,			9
	s - Gateways - Standard ETHERNET	and ARC	CNET	cor	nfiguratio	on specia	
etworks used for	control - RS 232, RS 485 configuration A						evicenet
nit III HART AI			1.0		11.1		9
	lution of signal standard - HART commun						
	ns - Fieldbus - Introduction - General F						
	s topology - Interoperability - Interchange S AND PROFIBUS PA/DP/FMS AND FF		urodu	CLIO	TIOULE		
ODBUS protoco rofibus commun	ol structure - function codes – troublesho ication model - communication objects s - Data Highway	ooting Pro					
	AL ETHERNET AND WIRELESS COMM		ION			TO DAME	9
	t, Introduction, 10 Mbps Ethernet, 100 I			- R	adio an	d wireles	
	ponents of radio link - radio spectrum and						
EXT BOOK(S):							
Installation 2. William Bu	kay, Edwin Wrijut, Deon Reynders, Joh and Troubleshooting' Newnes Publicatic chanan, Computer Buses, CRC Press, 2 prouzan ,Data Communications & Networ	on, Elsevi 000.	er Firs	st Eo	dition, 20	004	
EFERENCE(S):							
	Tanenbaum, David J. Wetherall, Comp	outer Net	works	, Pr	entice H	all of Inc	dia Pvt. Ltd., 5th
Edition. 20	11.						
2. Theodore Edition, 20	S Rappaport, Wireless Communication: 01.	Principle	s and	Pra	actice, F	rentice I	all of India 2nd
3. William Sta	allings, Wireless Communication & Netwo	orks. Pren	ntice H	all o	of India.	2nd Editi	ion, 2005.

3. William Stallings, Wireless Communication & Networks, Prentice Hall of India, 2nd Edition, 2005.

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Department	ELECTRONICS AND INSTRUMENT					R 2019	Semester VII	PC	
Course Code	Course Name	Hour	-	_	Credit	Total	Maximum M	Marks	
		L	T	Ρ	С	Hours			
19EI707	ROBOTICS AND AUTOMATION tive (s): The purpose of learning this	3	0	0	3	45	100		
robots. Study th Study th Educate Introduc Course Outco	ne various parts of robots, fields of ro ne Euler, Lagrangian formulation of Ro ne control of robots for some specific a e on various path planning techniques the dynamics and control of manipu <b>omes:</b> At the end of this course, learner and the evolution of robot technology	obot dyr applicat ilators ers will	namio ions. be al	ole to	nd the tra	jectory pla	anning for robot		
<ul> <li>Get exp</li> <li>Familiar</li> <li>Underst</li> <li>Gain kn</li> </ul>	osed to the case studies and design o ize various control schemes of Roboti and the various path planning techniq owledge about the dynamics and cont	of robot cs cont ues.	maci rol.	nine	interface				
	CONCEPTS							9	
	origin of robotics – different types of								
	ot classifications and specifications- As ER SOURCES, SENSORS AND ACT			0110	boucs -	dynamic	stabilization of r	9	
	matic and electric drives: Design and o			b-a	etermina	tion of HE	of motor and a		
tio - variable	speed arrangements – path determir – acoustic – magnetic, fiber optic and	nation -	– mic	ro m					
	PULATORS AND GRIPPERS DIFFE				ON	· · · ·		9	
	manipulators – manipulator dynamics - end effectors – U various types of gr						neumatic manip	oulator	
	ATICS AND PATH PLANNING		50				water and a fi	9	
ngularity - Sta nguages.	gular velocities-Manipulator Jacobia atic analysis - Force and moment Bal	anceSo	olutio						
	chanics-2DOF Manipulator-Lagrange			Ilatio	n-Dynan	nic model	-Manipulator	-	
roblem-Linear	control schemes-PID control scheme ce – robots in manufacturing and non- i	e-Force	e con	trol	of roboti	c manipu	lator.Mutiple rol	oots -	
TEXT BOOK(S	5):								
2. Saeed B REFERENCE		sis, Sys	stems	s, Ap	plication	s Prentice			
<ol> <li>Asfahl C</li> <li>Klafter R</li> </ol>	., Robotics technology and flexible Au .R., Robots and manufacturing Autom R.D., Chimielewski T.A., Negin M., Ro	nation,	John	Wile	y, USA 1	992.	approach, Pren	tice Ha	
4. R.K.Mitta 5. JohnJ.C	New Delhi, 1994. al and I.J.Nagrath, Robotics and Contr raig ,Introduction to Robotics Mechani imov I Robot, Ballantine Books, New `	ics and	Con						

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Departmen				and the second second		R 2019	Semester VII PC
Course Co	e Course Name	Hou	1	-	Credit	Total	Maximum Marks
19EI703	COMPUTER CONTROL OF PROCESS LABORATORY	0	Т 0	P 4	C 2	Hours 60	100
<ul> <li>Obta syste</li> <li>Gair</li> <li>Impa</li> <li>Acqu</li> <li>Lear</li> <li>Course Ou</li> <li>Unde</li> <li>using</li> <li>Expla</li> <li>Desi</li> <li>Expla</li> </ul>	jective (s): The purpose of learning this co n adequateknowledgeindesignofDiscrete m using MATLAB. knowledge about control of Bottle filling sy t design knowledge of PI,PIDcontrollers. ire the knowledge of various algorithms about the Multivariable control system usi tcomes: At the end of this course, learners rstand design of design ofDiscrete P+I+D MATLAB. in about control of Bottle filling system usin in PI, PID controllers. in about various algorithms.	e P+I+E estem u ng MAT will be control g PLC.	) con sing [LAB able ler fo	PLC to: r a fi			2-14
	in about the Multivariable control system us PERIMENTS	sing MA	ATLA	В.			
1. Simu	ation of first order system and second or od and Runge – Kutta method.	der wit	h an	d wit	hout dea	ad time u	using discretization
2. Desi	n of Discrete P+I+D controller for a first or	ler and	seco	ond o	rder syst	tem usin	g MATLAB.
3. Cont	ol of Bottle filling system using PLC.						
4. Simu pack	ation of feedback, feed forward, ratio an ige.	d caso	ade	com	plex con	trol syst	ems using matla
5. Desig	n of PI controller for computerized liquid lev	vel syst	em.				
6. Desig	n of PID controller for computerized therma	al syste	m.				
7. Desig	n of dead beat / Dahlin/ Kalman's Algorithn	ns.					
8. Study	of Human machine interface using SCADA	A packa	ige.				
33	n of Multivariable control system using MA	7.)					
	n of pole placement controller for discrete s						
	JIPMENT FOR A BATCH OF 30 STUDEN						- 10 C
Expt.No	List	of equ	ipme	ents			
	Matlab Software Package						

Course	nent			ENG			T	Semester VII PC
	Code	Course Name	Hou	T	P	Credit C	Total Hours	Maximum Marks
19EI7	04	INSTRUMENTATION SYSTEM DESIGN LABORATORY	0	0	4	2	60	100
Course	Obje	tive (s): The purpose of learning this co	ourse	is to				
• 0	btain a	adequate knowledge indesignofvariouss	ignal	cond	itionir	ngcircuit	S.	
		owledge about instrumentation systems						
• In	npart c	lesign knowledge of controller, control va	lve a	nd tr	ansm	itter.		
		the knowledge of piping diagram of indu						
		e students aware of industry project, pla						
		omes: At the end of this course, learners		be a	ble to	):		
		and design of signal conditioning circuits	S.					
		about instrumentation systems.						
		controller, control valve and transmitter.						
		and draw the piping diagram for industri						
		the multi-channel data acquisition system	n and	a trar	ismit	ter.		
		RIMENTS	_	_	-			
		ofInstrumentationamplifier. ofactivefilters–LPF,HPFandBPF.						
		ofregulatedpower supplyanddesignofV/la	ndIA	(conv	orter	'e		
		oflinearizingcircuitsandcold-junctioncom					mocoupl	es
		ofsignal conditioningcircuitfor straingauge					moooup	
		forificeplateandrotameter.	Jana		2			
		fControl valve(sizingandflow-lift	chara	acter	istics	)	and	PIDcontrolle
		perationalamplifier and microprocessor)						
8. De	esigno	famulti-channeldataacquisitionsystem a	ndmu	ıltirar	ngeD	Ptransm	nitter.	
9. Pi	pingaı	ndInstrumentationDiagram–casestudy.						1
10. Pr	epara	tionofdocumentationofinstrumentationpr	oject	andp	rojec	tschedu	lingforth	eabove
		dy.(Processflowsheet,instrumentindexsh			strum	entspec	cifications	ssheet,
			gula	lions	_			
STOF	EQUI	duling,installationproceduresandsafetyre						
		PMENT FOR A BATCH OF 30 STUDEN	ITS	1		o he be	S. 31	
Expt.No			ITS	pme	nts		-	
Expt.No	Suffic	PMENT FOR A BATCH OF 30 STUDEN	ITS equi	24	05.0	, Opera	ationalan	nplifiers,IC7805an
	Suffic resis	PMENT FOR A BATCH OF 30 STUDEN List of ient number of Monolithic Instrumenta	ITS equi tion	ampl	lifier		11.1	
1	Suffic resis Linea Suffic kitwit	PMENT FOR A BATCH OF 30 STUDEN List of tient number of Monolithic Instrumenta tors,diodes,capacitors ar control valve,ON/OFFcontrol valve,Air tient number of IC741,CRO,Bread hADCand DACsection	equi tion regu	ampl lator d,Siç	lifier , Roti gnalg	ameter,l enerato	Pump 1N r (PID)	lo. each ) Microprocesso
1	Suffic resis Linea Suffic kitwit	PMENT FOR A BATCH OF 30 STUDEN List of tient number of Monolithic Instrumenta tors, diodes, capacitors ar control valve, ON/OFF control valve, Air tient number of IC741, CRO, Bread	ITS equi tion regu lboar h Co	ampl lator d,Siç	lifier , Roti gnalg	ameter,l enerato	Pump 1N r (PID)	lo. each ) Microprocesso
1 2 3	Suffic resis Linea Suffic kitwit AnyF Stora	PMENT FOR A BATCH OF 30 STUDEN List of tient number of Monolithic Instrumenta tors,diodes,capacitors ar control valve,ON/OFFcontrol valve,Air tient number of IC741,CRO,Bread hADCand DACsection Processstation(TemperatureorLevel) with	ITS equi tion regu lboar h Co	ampl lator d,Siç	lifier , Roti gnalg	ameter,l enerato	Pump 1N r (PID)	lo. each ) Microprocesso
1 2 3 4	Suffic resis Linea Suffic kitwit AnyF Stora	PMENT FOR A BATCH OF 30 STUDEN List of itent number of Monolithic Instrumenta tors,diodes,capacitors ar control valve,ON/OFFcontrol valve,Air itent number of IC741,CRO,Bread hADCand DACsection Processstation(TemperatureorLevel) with agedevice (microcontroller/microprocess	ITS equi tion regu lboar h Co	ampl lator d,Siç	lifier , Roti gnalg	ameter,l enerato	Pump 1N r (PID)	lo. each ) Microprocesso
1 2 3 4 5.	Suffic resis Linea Suffic kitwit AnyF Stora Flow	PMENT FOR A BATCH OF 30 STUDEN List of cient number of Monolithic Instrumenta tors,diodes,capacitors ar control valve,ON/OFFcontrol valve,Air cient number of IC741,CRO,Bread hADCand DACsection Processstation(TemperatureorLevel) with gedevice (microcontroller/microprocess processstation withDPtransmitter	ITS equi tion regu lboar h Co	ampl lator d,Siç	lifier , Roti gnalg	ameter,l enerato	Pump 1N r (PID)	lo. each ) Microprocesso
1 2 3 4 5. 6	Suffic resis Linea Suffic kitwit AnyF Stora Flow Loop	PMENT FOR A BATCH OF 30 STUDEN List of List of tient number of Monolithic Instrumenta tors,diodes,capacitors ar control valve,ON/OFFcontrol valve,Air cient number of IC741,CRO,Bread hADCand DACsection Processstation(TemperatureorLevel) with gedevice (microcontroller/microprocess processstation withDPtransmitter analyzer	ITS equi tion regu lboar h Co	ampl lator d,Siç	lifier , Roti gnalg	ameter,l enerato	Pump 1N r (PID)	lo. each ) Microprocesso

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Department	ELECTRONICS AND INSTRUMENT	ATION	ENG	GINE					
Course Code	Course Name	Hour	Hours / Week   Credit				Maximum Marks		
in My set		L	Т	Р	С	Hours	a ful o service		
19EI705	MINI PROJECT	0	0	2	1	60	100		
<ul> <li>Formula</li> <li>Identify</li> <li>Utilize t</li> <li>Test a effective</li> </ul>	ive (s): The purpose of learning this cours ate a real world problem, identify the required technical ideas, strategies and methodo he new tools, algorithms, techniques that and validate through conformance of eness. report and present oral demonstrations	uiremer logies. at contri the d	bute	to ob	otain the	solution c	of the project.		
<ul> <li>Formula</li> <li>Identify</li> <li>Utilize t</li> <li>Test and</li> </ul>	nes: At the end of this course, learners wi te a real world problem, identify the requirection technical ideas, strategies and methodo he new tools, algorithms, techniques that a validate through conformance of the de report and present oral demonstrations	uiremer ologies. at contri veloped	nt and bute	to ob	otain the s	solution c	of the project.		
product, a 3D permitted. The	ary project to be taken up by a team of model, simulation, blueprint for a la contribution of the individuals in the submitted. A presentation is to be	rger pr project	oject sho	anc uld b	l any oth be clearly	ner deve y brough	lopment work are t out. A combined		

## Learning Resources

IEEE Journal, Elsevier Journals, Springer Jour nals, and any open access journal, reference / user manuals, etc.

Department	ELECTRONICS AND INSTRUMENTA	CTRONICS AND INSTRUMENTATION ENGINEERING R 2019 Semest					
Course Code	Course Name		lour Wee	-	Credit	Total Hours	Maximum Marks
19EI706	COMPREHENSIVE REVIEW	L	T	P	C	A	
		0	0	2	1	30	100

Course Objective (s): The purpose of learning this course is to

 encourage the students to comprehend the knowledge acquired from the first Semester to seventh semester of B.E degree course through periodic exercise.

Course Outcomes: At the end of this course, learners will be able to:

Review, prepare and present technological developments

## METHOD OF EVALUATION:

The students will be assessed 100% internally through weekly test with objective type questions on all the subject related topics



Department	ELECTRONICS AND INSTRUM	<b>IENTATIO</b>	DN E	NGIN	EERING	R 2019	Semester VIII EEC
Course Code	Course Name	Hou	rs / V	Veek	Credit	Total	Maximum Marks
100000		L	T	Р	С	Hours	
19EI801	PROJECT WORK	0	0	16	8	300	100
success and viva	o the ability to solve a specific prol sful solution of the same. To train t a voce examination.						
Course Outcon	mes:						
<ul> <li>On Con</li> </ul>							

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Department	ELECTRONICS AND INSTRUMENT	<b>IOITA</b>	N EN	IGINEE	RING	R 2019	and the second se	
Course Code	Course Name	Ho	irs /	Week	Credit	Total	Maximum M	Marks
		L	Т	P	С	Hours	and the second	
19HSX201	ENGLISH FOR ENGINEERS	3	0	0	3	45	100	
<ul> <li>To develo</li> <li>To enhan</li> <li>To improv</li> <li>To help le</li> </ul> Course Outcor <ol> <li>Improve t</li> <li>Develop I</li> </ol>	e usage of grammar in Englishlanguag op listening skills which will enable to lis oce the reading skill to comprehend tech we writing skills to express thoughtsfree earners develop their speaking skills an <b>nes</b> : At the end of this course, learners heir language usage in LSRWskills. istening skills to understand sentence so the ability to understand different written	sten leo hnicalw ly. d spea will be	vriting k flu able	gs. <u>ently in</u> e to:	realcont		ent types ofte	exts.
4. Enhance 5. Communi	the writing skills to express the ideas o icate fluently in pair /team.		arner	rs.				5
	GUAGE FOCUS							9
Collocations-	<ul> <li>Articles - Conjunctions - Voice(Act Discourse markers - One word substitute ENING</li> </ul>	tive & tion - I	Pas Phra	sive) - sal vert	Reporte s	d speec	h - Condition	nals
		an atra	~~	Dhuthn	Inton	otion		9
	dentify topic, content, function - Senten DING	ce sue	55 -	Rnyunn	1 - 11101a	ation		9
Reading grag	ohs and charts - Skimming and scan Understanding the structure of a text -	ning te Error io	exts lenti	- Read	l busines	ss article	es for specific	
Unit IV WRI			-			v		9
book and mo	or a job - Recommendations - Report vie) - Transcoding	writing	(acc	cident a	and surve	ey) - Wri	ting review (	
	AKING		÷		1.51			9
LanguageFur opinions - Co TEXT BOOK(S) 1. Communi REFERENCE(S 1. Jeremy C Speaking 2. Eric H. G Purposes	cative English by KN Shoba, LourdesJ	oavani and De Cam Study y Press	Raye erek bridg Read	express enPublis Utley, S je Unive ding: A 04.	sing - Fin sed by C Speaking ersity Pre Course	ambridge Effective ess, 2002 In Read	facts, attitude e university 2 ely and Deve 2. ding for Aca	os an 017 Iopin demi
Intermedia	ate learners Of English .lved. United Ki nn. Oxford Guide to Effective Writing a	ngdom	: Ca	mbridge	e Univers	sity Press	s. 2012.	

Department	ELECTRONICS AND INSTRUMEN	ITATION E	NGIN	IEER	ING	R 2019	Seme	ester II	HS
Course Code	Course Name	Hou	rs / W	/eek	Credit	Total	Maxi	mum M	Marks
		L	T	P	C	Hours			
19HSX202	HINDI	3	0	0	3	45	-	100	81.1
Course Objectiv	ve (s): The purpose of learning this cou	urse is to	18						
<ul> <li>To help st</li> </ul>	udents to acquire the basics ofHindi								
	hem how to converse in Hindi on variou								
	arners acquire the ability to understand			ical te	ext inHind	it	10.00		
	es: At the end of this course, learners								
<ul> <li>An ability t</li> </ul>	o communicate effectively with: (a) Imp	proved flue	ncy in	h Hine	di (b) Cla	rity on th	ie basi	c soun	ds of
the Hindi I	anguage (c) Propervocabulary	and the second	10.		18 12			1	
	NDI ALPHABET						in the second		9
Genders (Mascul	ine & Feminine Nouns ending in a	,e,i,o, u,)-	Maso	culine	& Fem	inine - F	Readin	g Exe	rcise
ntroduction - Vov	els - Consonants - Plosives - Fricative	s - Nasal s	ound	s - Vo	owel Sigr	ns - Char	ndra Bi	ndu&V	isarg
able of Alphabet	-Vocabulary.	and the second se							
Unit II NO	DUNS IN HINDI				2.9	-1			9
Genders (Masculi	ne & Feminine Nouns ending in a ,e,i,c	A III) Maar	aulino	& Ec	minino	Deeller		inon	
Jondoi S (Masculi	ne a reminine nouns enuing in a ,e,i,c	), u,)- masc	Juille	Q I C	eminine -	Reading	Exerc	ises.	
	RONOUNS AND TENSES	<i>b, u,)-</i> Masc	Juine	are	eminine -	Reading	Exerc	ises.	9
Unit III PF	RONOUNS AND TENSES								
Unit III PF Categories of Pro	RONOUNS AND TENSES nouns - Personal Pronouns - Second	person (yo	u & h	onori	fic) - Def	inite & Ir	ndefinit	te pron	ouns
Unit III Pf Categories of Pro Relative pronouns	RONOUNS AND TENSES	person (yo	u & h	onori	fic) - Def	inite & Ir	ndefinit	te pron	ouns
Unit III Pf Categories of Pro Relative pronouns Sentences.	RONOUNS AND TENSES nouns - Personal Pronouns - Second   s - Present tense - Past tense - Future	person (yo	u & h	onori	fic) - Def	inite & Ir	ndefinit	te pron	ouns
Unit III Pf Categories of Pro Relative pronouns Sentences. Unit IV CI	RONOUNS AND TENSES nouns - Personal Pronouns - Second   s - Present tense - Past tense - Future	person (yo e tense - A	u & h Assert	onori ive 8	fic) - Def Negativ	ïnite & Ir ve Senter	ndefinit nces -	te pron Interro	ouns ogativ
Unit III     Pf       Categories of Pro     Relative pronouns       Centences.     CI       Unit IV     CI       Parts of body - Re	RONOUNS AND TENSES nouns - Personal Pronouns - Second   s - Present tense - Past tense - Future ASSIFIED VOCABULARY elatives - Spices- Eatables- Fruit & Veg	person (yo e tense - A	u & h Assert	onori ive 8	fic) - Def Negativ	ïnite & Ir ve Senter	ndefinit nces -	te pron Interro	ouns ogativ 9 Is.
Unit IIIPfCategories of ProRelative pronoundSentences.Unit IVParts of body - ReUnit VSFUnit VSF	RONOUNS AND TENSES nouns - Personal Pronouns - Second   s - Present tense - Past tense - Future ASSIFIED VOCABULARY elatives - Spices- Eatables- Fruit & Veg PEAKING	person (yo e tense - A jetables - C	u & h Assert	onori ive 8	fic) - Def Negativ	ïnite & Ir ve Senter	ndefinit nces -	te pron Interro	ouns ogativ
Unit IIIPfCategories of ProRelative pronoundSentences.Unit IVParts of body - ReUnit VSentences	RONOUNS AND TENSES nouns - Personal Pronouns - Second   s - Present tense - Past tense - Future ASSIFIED VOCABULARY elatives - Spices- Eatables- Fruit & Veg	person (yo e tense - A jetables - C	u & h Assert	onori ive 8	fic) - Def Negativ	ïnite & Ir ve Senter	ndefinit nces -	te pron Interro	ouns ogativ 9 Is.
Unit IIIPfCategories of ProCelative pronoundSentences.Unit IVClParts of body - ReUnit VSFModel SentencesEXT BOOK(S):	RONOUNS AND TENSES nouns - Personal Pronouns - Second   s - Present tense - Past tense - Future ASSIFIED VOCABULARY elatives - Spices- Eatables- Fruit & Veg PEAKING - Speaking practice for various occasio	person (yo e tense - A jetables - C ons.	u & h Asserf	onori ive 8 s - Di	fic) - Def Negativ	inite & Ir re Senter Seasons	ndefinit nces - s - Pro	te pron Interro	ouns ogativ 9 s. 9
Unit III     Pf       Categories of Pro       Categories of Pro <t< td=""><td>RONOUNS AND TENSES nouns - Personal Pronouns - Second p s - Present tense - Past tense - Future ASSIFIED VOCABULARY elatives - Spices- Eatables- Fruit &amp; Veg PEAKING - Speaking practice for various occasion y Hindi: Learn to Communicate in Eve</td><td>person (yo e tense - A jetables - C ons. ryday Situa</td><td>u &amp; h Assert</td><td>onori ive 8 s - Di</td><td>fic) - Def Negativ</td><td>inite &amp; Ir re Senter Seasons</td><td>ndefinit nces - s - Pro</td><td>te pron Interro</td><td>ouns ogativ 9 s. 9</td></t<>	RONOUNS AND TENSES nouns - Personal Pronouns - Second p s - Present tense - Past tense - Future ASSIFIED VOCABULARY elatives - Spices- Eatables- Fruit & Veg PEAKING - Speaking practice for various occasion y Hindi: Learn to Communicate in Eve	person (yo e tense - A jetables - C ons. ryday Situa	u & h Assert	onori ive 8 s - Di	fic) - Def Negativ	inite & Ir re Senter Seasons	ndefinit nces - s - Pro	te pron Interro	ouns ogativ 9 s. 9
Unit III     Pf       Categories of Pro     Relative pronouns       Sentences.     Unit IV       Carts of body - Re     CI       Parts of body - Re     Unit V       Model Sentences     SF       TAT BOOK(S):     1. Elementar       2. Colloquial	RONOUNS AND TENSES nouns - Personal Pronouns - Second p s - Present tense - Past tense - Future ASSIFIED VOCABULARY elatives - Spices- Eatables- Fruit & Veg PEAKING - Speaking practice for various occasion y Hindi: Learn to Communicate in Eve Hindi: The Complete Course for Begin	person (yo e tense - A jetables - C ons. ryday Situa	u & h Assert	onori ive 8 s - Di	fic) - Def Negativ	inite & Ir re Senter Seasons	ndefinit nces - s - Pro	te pron Interro	ouns ogativ 9 s. 9
Unit III     Pf       Categories of Procest     Procest       Categories of Procest     Procest       Unit IV     CI       Parts of body - Re     Ounit V       Categories of body - Re     SF       Model Sentences     SF       Table Sentences     Colloquial       Colloquial     Colloquial	RONOUNS AND TENSES nouns - Personal Pronouns - Second p s - Present tense - Past tense - Future ASSIFIED VOCABULARY elatives - Spices- Eatables- Fruit & Veg PEAKING - Speaking practice for various occasion y Hindi: Learn to Communicate in Eve Hindi: The Complete Course for Begin	person (yo e tense - A letables - C ons. ryday Situa ners by Te	u & h Asserf Clothe	onori ive 8 s - D byR atia	fic) - Def Negativ irections- ichardDe	inite & Ir e Senter Seasons	ndefinit nces - s - Pro	te pron Interro fession	ouns ogativ 9 s. 9
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Unit III PI Categories of Pro Relative pronouns Sentences. Unit IV CI Parts of body - Re Unit V SF Model Sentences EXT BOOK(S): 1. Elementar 2. Colloquial REFERENCE(S): 1. B. R. Kish Delhi, 200	RONOUNS AND TENSES nouns - Personal Pronouns - Second p s - Present tense - Past tense - Future ASSIFIED VOCABULARY elatives - Spices- Eatables- Fruit & Veg PEAKING - Speaking practice for various occasion y Hindi: Learn to Communicate in Eve Hindi: The Complete Course for Begin ore, Self Hindi Teacher for Non-Hindi	person (yo e tense - A etables - C ons. ryday Situa ners by Te Speaking	u & h Assert Clothe ations jK.Bh Peop	onori ive & s - Di s byR atia le, Ve	fic) - Def Negativ irections- ichardDe ee Kuma	inite & Ir e Senter Seasons	ndefinit nces - s - Pro	te pron Interro fession	ouns ogativ 9 s. 9 2013

Chairman - BoS Dept. of EIE - ESEC

Department	ELECTRONICS AND INSTRUME					R 2019	Semester II	
Course Code	Course Name	Hou			Credit	Total	Maximum M	/larks
	1	L	Т	P	С	Hours		
19HSX203	JAPANESE ve (s): The purpose of learning this	3	0	0	3	45	100	201
<ul> <li>help stude</li> <li>teach ther</li> <li>teach the</li> </ul>	nts acquire the basics of Japanesel n how to converse in Japanese in va students the Japanese cultural face es: At the end of this course, learne	language ariousoccas ts and socia	sions aletic	uette		ate effectiv	vely with:	
<ul><li>Improved</li><li>Clarity on</li><li>Propervoor</li></ul>	fluency inJapanese the basic sounds of the Japanesela abulary							
	oduction						D	9
of in,tsu,ga - Lett vaN2 jaarimaser semantic resembl	panese - Japanese script - Pronunc ers combined with ya,yu,yo - Daily -Ska-N1mo-N1noN2san-Kanji-Teo ances between Tamil and Japanese	Greetings a chnicalJapa	and	Expre	ssions	Numerals	. N1 waN2 de	es - N nd
	abulary & Grammar 語彙と文法						1	9
V1 - so des ka ' ko 0 - imaji-fun de ara	e - Sore - are - Kono N1 - Sono N1 oko - soko - asoko - kochira - sochira s - Introduction of verb - V mas - V n 2 / S ne Kanji-10 - Technical Japan	a - achira - nasen - V n	N1 w nash	∕a N2 itha-∨	(Place) masen	des - dho deshitha ·	ko-N1 no N2 - N1(Time) ne	- Kan
l loit III	n&Types 名詞とタイプ	1000 10000	anding	1-01			iai j congo:	9
Kanji-10 - apanese Typewr	wa go nan des ka - N1( Person ) ne iting using JWPCE Software, Techn							shitha
VOC	abulary & Grammar 語彙と文法							
adho des ka - N	jectives - N1wanaadj des. N1 waii a l wadhonnaN2 des ka - S1 ka S2 - c des - hetha des - dhonna N1 - Usa ithe,N1gaarimasu-imasuN1(Place)r	dhore - N1 g	gaari	masu	- waka			iri N
S1karaS2-dhosh masu - N1(Perso WPCE Software,	n,Place,or Thing)no N2 (Position) Technical Japanese Vocabulary (2	) - N1 ya N	asu 2, K	-iimas	u-N1wa	usan - suk N2(Place	oshi- amari - z )nearimasu-	su - N zenze usin
S1karaS2-dhosh nasu - N1(Perso WPCE Software,	Technical Japanese Vocabulary (2	) - N1 ya N	asu 2, K	-iimas	u-N1wa	usan - suk N2(Place	oshi- amari - z )nearimasu-	su - N zenze
S1karaS2-dhosh nasu - N1(Perso NPCE Software, Jnit V Roo Saying Numbers Period	Technical Japanese Vocabulary (2 Word & Vocabulary 語彙と語彙 , Counter Suffixes , Usages of Qu	) - N1 ya N 5 Numbers uantifiers -Ir	nasu- 2, K ) nterre	-iimas anji-1 ogativ	u-N1wa 0 - Japa es - Dh	usan - suk N2(Place anese Dic	oshi- amari - z )nearimasu- tionary usage - gurai - Qua	su - N zenze usir 9 ntifie
S1karaS2-dhosh masu - N1(Perso WPCE Software, Unit V Roo Saying Numbers Period nekai V - Quan ense of ii-adj sent N1 [ no naka ] de V1 mas form dh hokoka - Nanika	Technical Japanese Vocabulary (2 Word & Vocabulary 語彙と語彙	) - N1 ya N 5 Numbers uantifiers -Ir tense of Nor tho N2 tho n adj des ka form ne ikir	nasu 2, K ) nterro un se Dhoc a - ai masi	-iimas anji-1 ogativ enteno hiraga nswer u/kima	u-N1wa 0 - Jap es - Dr ces and aadj des ing -N1 asu/kay	usan - suk N2(Place anese Dic nonokurai na Adject s ka and it gahoshi c	oshi- amari - 2 )nearimasu- tionary usage - gurai - Qua ive sentences s answering n les	su - N e usir 9 ntifie - Pa netho
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Department	ELECTRONICS AND INSTRUMEN	TATION E	NGI	NEER	ING	R 2019	Semester I	II HS
Course Code	Course Name	Hou	rs / \	Neek	Credit	Total	Maximum	Marks
		L	T	P	С	Hours	Hard Land Bard	
19HSX204	FRENCH	3	0	0	3	45	100	
<b>Course Objecti</b>	ve (s): The purpose of learning this co	ourse is to			×			
	ents acquire the basics of Frenchlang							
	m how to converse in French in variou			100	1		and the second	
	nes: At the end of this course, learners							1
	nts will become familiar with the basic	s of Frenc	h lan	iguage	e and sta	rt conver	sing inFrenc	
	habet Français	1						6
	is (alphabets) - Les Accents Françai							
	ire son nom dans le français (spellingo	one -snam	e in l	Frencl	h) - Les r	noms de j	jours de la s	emain
Days of the wee					Statutes.			
Unit II Gra	ammaire							6
	s de l'année (Months) - Numéro 1 à 10	00 (Numbe	ers 1	to 10	0) GRAN	IMAIRE :	Conjugaisor	1
Unit III Mo	yens de transport		10.2			C. S. Martin		10
Nationalités (Nati et répondre PARI simples	port (Transport) - Noms de Professi onalities) ECOUTER : (Listening) Éco ER (Speaking)Présntation - même /Pr	uter I - alp	habe	et ass	ociéà des	s prénom	sfrançais - E	Ecoute hrase
Vationalités (Nati et répondre PARI simples Unit IV Pi	onalities) ECOUTER : (Listening) Éco ER (Speaking)Présntation - même /Pr	outer I - alp résentez -	habe Vous	et asso s (Intro	ociéà des oducingo	s prénom neself)Ll	nsfrançais - E RE :Lireles p	Ecoute ohrase
Nationalités (Nati et répondre PARI simples Unit IV Pu Pronoms (Prono	onalities) ECOUTER : (Listening) Éco ER (Speaking)Présntation - même /Pr ronoms uns) - Nomscommunsmasculins et o	outer I - alp résentez - de femme	habe Vous	et ass s (Intro ommoi	ociéà des oducingo n mascu	s prénom neself)Lli line and	sfrançais - E RE :Lireles p Femininenc	Ecoute ohrase
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Vationalités (Nationalités (Nationalités (Nationalités et répondre PARIsimples Unit IV Pronomes (Prono / Pronomes (Pronomes (Pronomes (Pronomes et al. 1997)) Varbescommuns dialogues LIRE et aprofession Unit V Eu Varration de son Narration de son Narration du et aprofession Ecouter les convertes convertes et al. 1997 ECOUTER BOOK(S): 1. Le Bon Us 2. Advanced REFERENCE(S): 1. Alter egot 2. Grammain	onalities) ECOUTER : (Listening) Éco ER (Speaking)Présntation - même /Pr onoms uns) - Nomscommunsmasculins et o (Common verbs)COUTER :couter et : Lire les profilsd'utilisateursd'interling <b>urope PARLER</b> nom et l'endroitoù on vit - Son âge et o es-LaFranceenEuropePARLER:Conve ersations (CD alter ego)ÉCRIRE :Écri sage by M. Grevisse Publisher- Duculo French by Monique L'Huillier, Cambri Niveaua1 e Progressive duFrançais	de femme t crier les gua (alter date de na rsationent reune cart	issa issa ego nice porto ego nice porto e port	et asse s (Intro ommoi oms - o)PAR nce - uxami stale 5 Jan	ociéà des oducingo n mascu Observe LER :Pa Numéro o s-Jouerla uary2001	s prénom neself)Ll line and er les de arler de de téléph ascèneÉC	sfrançais - E RE :Lireles p Femininenc ssins et cou saville - Pa oneet'dress	Ecoute ohrase ouns) uter le urler d
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## PROFESSIONAL ELECTIVES

Department	PROFES ELECTRONICS AND INSTRUMENT					R 2019	Semester VI	PE
Department Course Code	Course Name				Credit	Total	Maximum N	
course coue	Course Name	L	T	P	Creat	Hours		arks
19EIX01	DIGITAL SIGNAL PROCESSING	3	0	Г 0	3	45	100	
	ctive (s): The purpose of learning this	in the second se			3	40	100	-
	and systems & their mathematical rep							
	e time systems.		ation.					
	rmation techniques & their computatio	n						
	and their design for digital implementat							
	nmability digital signal processor & qua		on of	focto				
	omes: At the end of this course, learned					100		
								-
	tand the importance of Fourier transfor							
	knowledge on Signals and systems &							
	tand and analyze the discrete time sys							on.
	Understand the types of filters and the							
	knowledge on programmability digital	signal	oroce	esso	' & quant	tization ef	tects.	
	RODUCTION							9
lassification o	f systems: Continuous, discrete, linear	r, causa	il, sta	ability	, dynam	ic, recurs	ive, time varial	nce;
iassification o	f signals: continuous and discrete, e	energy	and	pow	er; matr	Nyquietre	representation	1 OF
	al density; sampling techniques, quantiz CRETE TIME SYSTEM ANALYSIS	cation, c	uani	Izau	on enor,	Nyquistra	ate, anasing en	
	id its properties, inverse z-transform	o diffe	rono	0.00	untion	Colution	n by z transfe	3
	discrete systems - Stability analysis, f							
ourier transfor	m, magnitude and phase representati	ion	Cy IC	spo	130 - 01	onvolution	I Discrete I	inte
	CRETE FOURIER TRANSFORM & C		TAT	ION		1		9
	r Transform- properties, magnitude an				ntation -	Computa	ation of DFT us	
	- DIT &DIF using radix 2 FFT - Butterf							
	IGN OF DIGITAL FILTERS			1.5		A		9
	realization - Parallel & cascade form							
	ows - Linear phase characteristics.							
	; IIR Filters, digital design using impuls	se invar	iant a	and	bilinear t	ransforma	ation Warping,	pre
arping.		1 Summer				Surger Street		-
	ITAL SIGNAL PROCESSORS							9
	Architecture of TMS320C54XX – Fea	tures -	- Add	dress	ing Forr	nats – Fu	unctional mode	<del>3</del> S -
Contraction of the second s	Commercial DS Processors.					MI STATIST		5
EXT BOOK(S		1.5						
	pakis and D.G. Manolakis, 'Digital Sign	al Proc	essir	ng Pr	inciples,	Algorithm	is and Applica	tions
	i Education, New Delhi, PHI. 2003 ra, 'Digital Signal Processing – A Com	nutor P	anad	Ann	roach'	AcCrow L		
	C.Ludeman ,"Fundamentals of Digital S						iii Euu, 2013.	
EFERENCE(S		Jighan	1000	3311	g , whey,	2010		
	Chandra S, Sasikala. B ,Digital Signal	Proces	sina	Viia	v Nicole/	TMH 201	3	
	Schilling & Sandra L.Harris, Introductio							naaa
Learning							J	3-3
	i, 'Principles of Signal Processing and	Linear 8	Syste	ems',	Oxford L	Jniversity	Press, 2010 3.	. Taa
S. EIAli,	Discrete Systems and Digital Signal P	rocessi	ng w	ith N	lat Lab',	CRC Pre	ss, 2009	
	uo, woonsengs.gan, "Digital Sig	nal Pr	oces	sors	, Archit	tecture,	Implementatio	ns d
	ions, Pearson,2013		12					
5. Dimitris	G.Manolakis, Vinay K. Ingle, applied D	Digital S	ignal	Pro	cessing,(	Cambridg	e,2012	

5. Dimitris G.Manolakis, Vinay K. Ingle, applied Digital Signal Processing, Cambridge, 2012

	ELECTRONICS AND INSTRUMENT	1			and the second se	R 2019		and the second se
Course Code	Course Name	Hour	-	-	and the second se	Total	sition matr nique. inalog com hold - first ion - relatio ibility of dis	n Marks
		L	T	P	C	Hours	10	
19EIX02	DIGITAL CONTROL SYSTEM ctive (s): The purpose of learning this	3	0	0	3	45	10	0
<ul> <li>Impart i</li> <li>Model s</li> <li>Provide</li> </ul>	sic knowledge in digital control system necessary knowledge in stability analysis systems in state space representation a solution to state equations and to stability bout the compensators in digital control	sis for o tudy va				al algorith	ims	
Course Outco	omes: At the end of this course, learned	ers will					1	
	the components and concepts related ate the stability of the discrete time system		digita	al cor	ntrol syst	em		_
<ul> <li>Compute Cayley</li> <li>Design</li> </ul>	ate the discrete time system in state sp te the solutions of discrete time state Hamilton theorem. a digital compensator for the given sys GITAL CONTROL SYSTEM	e space	equ					rix and
igital control uantizing and	system - sample and hold - analog quantizing error - sampling process -	to dig freque	ital c ncy r	conve espo	erter - di nse of ze	gital to a ero order	analog cor hold - first	verter order
	ontrollers - digital PID SPONSE OF DISCRETE SYSTEM	13-10-14			With the start of	ALC: NO		9
	unction of cascaded elements, closed l	loon sv	stom	s - ch	aracterie	stic equat	ion - relatio	
etween s-plan	e and z-plane poles - unit step response stability test - Root locus technique fo	onse of	digit	al co	ontrol sys	stem - sta	ability of di	screte
	ATE SPACE REPRESENTATION	U			1. C	I BAILUI		9
ecomposition	formulation of discrete system - dec - cascade decomposition and parall od - state transition matrix and its prop	el deco	sition ompo	of o sitio	discrete n - solut	transfer ion of st	function - ate equati	direct on by
	UTION OF STATE EQUATION	Cruco	125					9
	crete time state equation - evaluation	of state	e trar	nsitio	n matrix	- transfe	r function	
	of continuous time system - Solution of							
Unit V CO	MPENSATION TECHNIQUES				5.11			9
	by continuous network - compensatior	n by dig	ital c	omp	uter - free	quency d	omain tech	nique
compensation f designing D(	2)					L. Louise	and the second	
f designing D( EXT BOOK(S 1. M. Gopa New De 2. K. Ogata EFERENCE(S 1. I.J. Nag 2011	): al, Digital Control and State Variable M lhi, 2012 a, Discrete time control system, Pearse	on Edu Enginee	catio ering,	n Asi Nev	ia, New [ v age Int	Delhi 201 ernationa	1 al P.Ltd, Ne	any Ltd, ew Delh

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Department	ELECTRONICS AND INSTRUMEN	A CONTRACTOR OF A CONTRACTOR	A CONTRACTOR	1.1.4 J 2 1 1 2 1 1 2 1	And the second second second second	R 2019	Semester VI	PE
Course Code	Course Name	Hour				Total Hours	Maximum M	arks
		L	Т	P	С			
19EIX03	FIELD INSTRUMENTS AND PROCESS AUTOMATION	3	0	0	3	45	100	
Course Obied	tive (s): The purpose of learning this	s course	is to			1111-12-2	The V Colored State	
	the procedure to configure and calib				ers type	field instrum	ents	
	two types of classical controller for di							
	appropriate valve (Pneumatic or Ele					protocol for	different indus	strial
applicat		ounoj ai			moution	protocorrier	unioroni indu	oundi
	PLC and SCADA configuration for H	lonevwa		200	and 20(	R		
	ent hardware interface and communic						dustrial applier	otion
						SCADA III III	uusinai applica	ation
	omes: At the end of this course, learn					field in staring		
	the procedure to configure and calib					tield instrum	ents	
	two types of classical controller for di							
	appropriate valve (Pneumatic or Elec	ctric) ar	id coi	mmu	nication	protocol for	different indus	strial
applicat			en service a construir a const	1.000	1000			
	PLC and SCADA configuration for H						14 MAG KEN 1440	192
	ent hardware interface and communic	ation pr	otoco	ol of F	PLC and	SCADA in in	dustrial applica	
	D INSTRUMENTS							9
	ng for configuration - commissioning							er -
	ansmitter - Level transmitter - Flow tra	ansmitte	er - ph	-l me	asureme	ent - Humidit	y-Vibration	•
	TROL SCHEMES					(	Multi	9
	position - PID - Tuning of PID - Proc				Single ca	apacity proce	ss - Multi capa	city
	back - Feed forward - Cascade - Rat L CONTROL ELEMENT AND INDU				NICATI			9
	- Solenoid valve - Motor operated						Electric) Se	
	- Device net - Field bus - MOD bus -							inai
Unit IV PLC		1 101 00	10 L	unen		It Tolerant L		9
	PLCs - ladder logic programming - P	I C syst	em co	onfig	uration -	PI C hardwa	are configuration	177511
dentify Honey	vell ML 200 PLC CPU, I/O Module	s. Com	muni	catio	n modul	es - Plan th	e ML 200R P	LC
ncluding the se	lection of appropriate I/O, redundanc	y and c	ommu	unica	tions - N	IL 200R con	figuration and u	use
	rogramming tool						0	
	HARDWARE INTERFACING							9
Building a pro	ect, implementing redundancy fund	ctions a	and c	down	loading	to PLC - N	Monitoring bas	sics
Start/Pause/Re	sume/Stop monitoring), online editing	g, and f	orce I	/0 -	Debugg	ing basics, u	se of breakpoir	nts,
	PLC - Identify function blocks in libra			PID fu	unction b	olock Commu	unicate via SNI	ET,
	us - DP modules -Overview of SCAD	A syster	n	1.1	and the second	1000		
EXT BOOK(S				-	_			
	Johnson, Process Control Instrumer	ntation to	echno	ology	, Pearso	on new intern	ational edition,	2013
REFERENCE(S		100						
	Stephanopoulos, Chemical Process							÷.
2 John Do	rk, Steve Mackay, Edwin Wright, Prac	ctical da	ta co	mmu	inication	s for instrume	entation and co	ontrol
	Elsevier, 2013				In law soft		ine 1001	
Newnes	Diakolook "Automotic control of size	au and	I DISCI	100	JOHN WI	ev and sons	110 1991	
Newnes 3. John.H.	Blakelock, "Automatic control of aircr							
Newnes 3. John.H. 4. Lin.C.F,	Blakelock, "Automatic control of aircr "Modern guidance, navigation and co /l and Walker.R, Fried,"Avionics navi	ontrol pr	oces	sing"	, Prentic	ehall, 1991.		

Department	ELECTRONICS AND INSTRUME					the second se	Semester VI	
Course Code	Course Name	Hour				Total Hours	Maximum I	Mark
4051204				P	C	45	100	
19EIX04	APPLIED SOFT COMPUTING tive (s): The purpose of learning th		0	0	3	45	100	-
<ul> <li>Expose</li> <li>Provide</li> <li>Provide</li> <li>Provide</li> <li>Provide</li> <li>Course Outco</li> <li>Underst</li> </ul>	the students to the concepts of feed adequate knowledge about feedbac adequate knowledge about fuzzy an comprehensive knowledge of fuzzy adequate knowledge of genetic alg nent problems. <b>omes:</b> At the end of this course, lear and the concepts of feed forward ne knowledge about feedback neural n	d forward n ck neural n nd neuro-fi logic conti gorithms a rners will b eural netw	eural etwor uuzy s rol to r nd its e able	ks syste real ap	ems time sys olication		c dispatch an	d un
Analyze     Known a     Gained     problem  Jnit I ARC troduction – E	the fuzzy and neuro-fuuzy systems about the comprehensive knowledge knowledge of genetic algorithms an s. CHITECTURES – ANN Biological neuron – Artificial neuron	s e of fuzzy I d its applic – Neuron	ation model	to e	conomic Supervis	ed and unsu	d unit commi pervised lear	9
	lulti layer feed forward network – Le		orithm	I- Ba	ack prop	agation netw	vork.	17
	JRAL NETWORKS FOR CONTRO orks – Discrete time Hopfield netw							9
pplications of a	artificial neural network - Process ide							
	ZZY SYSTEMS							9
nction – Know /stem.	- Fuzzy sets – Fuzzy relations – Fu vledge base – Decision-making log	gic – Intro						
	LICATION OF FUZZY LOGIC SYS					alis sa		9
uzzy logic cont	trol: Home heating system - liquid lev	vel control	- aircr	aft I	anding-	inverted pen	dulum – fuzzy	PID
	ased motor control. NETIC ALGORITHMS		16.1	-				9
	of Genetic algorithm and detail algo	orithmic of	000 0	diuo	tmont o	f froo Dorom	otore Solutio	
pical control p	roblems using genetic algorithm- C search techniques for solving optimi	Concept on	some	oth				
EXT BOOK(S)					14 mg	States and		-
1. Laurance 2. Timothy 3. S.N.Siva	eFausett, Englewood Cliffs, N.J., 'Fu J. Ross, 'Fuzzy Logic with Engineer mandam and S.N.Deepa, Principles	ring Applic	ations	', Ta	ata McG	raw Hill, 3rd	Edition,2010	
EFERENCE(S	): aykin, 'Neural Networks', Pearson E	Education	2003					
2. John Ye Delhi, 20	n & Reza Langari, 'Fuzzy Logic – I	Intelligence	e Cont	trol	& Inforn	nation', Pear	son Educatio	n, Ne
3. M.Gen a	and R,Cheng, Genetic algorithms a ion, 2000	and optim	izatior	ı, V	Viley Se	ries in Engir	neering Desig	gn ai
4. Hagan, [	Demuth, Beale, " Neural Network De							
5. N.P.Padl 6. WilliamS	hy, " Artificial Intelligence and Intellig Levine, "Control System Advanced	gent Syste Methods,	ms", C " The (	Dxfc Con	ord, 2013 itrol Han	3 Idbook CRC	Press 2011	
	Chaiunos						U.	

Department	ELECTRONICS AND INSTRUMEN					R 2019	Semester VI	PE
Course Code	Course Name	Hour			Credit	Total	Maximum I	Marks
		L		P	C	Hours		_
19EIX05	SMART AND WIRELESS INSTRUMENTATION	3		0	3	45	100	
<ul> <li>Introduct</li> <li>Learn a</li> <li>Underst</li> <li>Give a c</li> <li>Underst</li> <li>Ourse Outco</li> <li>Interpres</li> <li>Identify</li> <li>Implem</li> </ul>	ctive (s): The purpose of learning this be the measurement system and sense bout the sensor for measurement of s and the manufacturing techniques and comprehensive knowledge on smart s and the recent trends in the sensor tec omes: At the end of this course, learn et the static and dynamic characteristi the sensor for measurement of spatia ent the signal conditioning circuit and and fabrication of Micro sensors and	sors for spatial, o ad differe sensor E echnolog ners will ics of the al, chem I commu	various chemic ent type Design, gies (R be able e meas ical an unicatic	al a De F-I e to sure d o	and optic of Micro evelopme Ds - Sen o: ement sy optical va porotocol f	al variable sensors a ent and Ch sor arrays stem riables for smart s	nd actuators. nallenges. s - Sensor netw sensors	orks)
eneral conce measurement rors,Dynamic easurements Jnit II SEN patial varial splacementtra mpositionme	nsducer. Optical variables measur asurement - Environmental measu	t syster solution, systen OPTIC/ feromete rement urement	ms, Se Preci ns, Ze AL VAF er Di - Che : Mete	sio ero RIA spl mic	n and order BLES, C acement cal varia ological	sensitivity first-orde CHEMICA sensor bles mea	etc., Estimat r and second L VARIABLES r-synchro /Re asurement - T	ion of I-order <b>10</b> esolver hermal
	Water quality measurement - Satellite RT SENSORS	e imagin	g and s	ser	nsing.		Section 1	9
rimary and Se	econdary sensors - Amplification - Fi bata communication, standards for						- Informationco	
						- Smart t		ding /
mmunicator -	Smart sensor for flow and temperatu RO SENSORS AND ACTUATORS					- Smart t		ding /
mmunicator - Init IV MICI cro system de	Smart sensor for flow and temperatu RO SENSORS AND ACTUATORS esign and fabrication - Micro pressure	sensors	sureme s (piezo	nt. re	sistive ar	nd capacit	ive) Resonants	bding / HART
ommunicator - Jnit IV MICE icro system de Acoustic wave	Smart sensor for flow and temperatu RO SENSORS AND ACTUATORS esign and fabrication - Micro pressure sensors - Bio micro sensors - Micro	sensors actuato	sureme s (piezo rs - Mic	nt. re	sistive ar	nd capacit	ive) Resonants	oding / HART
Difference of the sensor of the sensor of the sensors of the sense	Smart sensor for flow and temperatu RO SENSORS AND ACTUATORS esign and fabrication - Micro pressure	sensors actuato DLOGIE age sen	sureme s (piezo rs - Mic <b>S</b> isors - I	re ro Bio	sistive ar mechani	nd capacit cal motor	ive) Resonants s andpumps.	bding / HART 8 ensors 8

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	ELECTRONICS AND INSTRUMEN					R 2019	Sem VII	PE
Course Code	Course Name		T	-	Credit	Total	Maximum	Marks
		L	T	P	C	Hours		
19EIX06	THERMAL POWER PLANT INSTRUMENTATION	3	0	0	3	45	100	
Course Object	ive (s): The purpose of learning this co	urse is to	0					
<ul> <li>Make the</li> </ul>	e students familiarize about various pov	ver gene	ration	n met	hods.			
<ul> <li>Identify v</li> </ul>	arious parameters in thermal power pla	ant						
	out the furnace control							
	nowledge about the different types of co							a second
	ze the student with the methods of mor	nitoring d	liffere	nt pa	rameters	like speed, v	ibration of turb	ines and
their con					1		11	
	nes: At the end of this course, learners		able to	0:				
	inding various power generation proces			nlon				
	mportant parameter to be monitoredin t bout the furnace control	inernar p	ower	plan				
	bout the different types of controls and	control	loone					
	wledge about various building blocks a				olved in th	ermal powe	r plant and its	controllir
process	wiedge about various bailding blooks e		incri			ionnai pono	plant and no	oorna onna
	R GENERATION METHODS	Maril an	1000	118.1				9
rief survey of	methods of power generation: hydr	o. thern	nal. r	nuclea	ar. solar	and wind	ower - impo	ortance
	n power generation - thermal power p							
oiler – cogenera							the second	
	UREMENTS IN POWER PLANTS						3	9
	ements: current, voltage, power, freque							
	ressure and steam temperature – smo	oke dens	ity me	easur	rement – I	Flue gas oxy	gen analyzer -	<ul> <li>pollution</li> </ul>
onitoring instru					Maria		And the second	
Sectors (State 1997) Sectors	ACE CONTROL	a selection of	_		4		a di Cashara	9
aught systems	<ul> <li>Iverizers - Furnace Draught: natural c</li> <li>Combustion control: Fuel/Air ratio</li> </ul>							
Unit IV BOILE	ol- soot-blowing operation.		-		41.00-1		North State	9
vel measureme	perature measurement, pressure meas nt methods - steam temperature contro	ol: main s	team	and	reheat ste	am tempera	ture control, su	rol - drui perheate
	control – distributed control system ir	n power	plant	s – ir	nterlocks i	n boiler oper	ation.	
Unit V TURB				-				9
	nent, rotor and casing movement- vibra oil temperature - cooling system	ation - sl	nell te	emper	rature moi	nitoring and	control - steam	n pressur
EXT BOOK(S):		100				and the second	a de la com	
1. Sam G.	Dukelow, The control of Boilers, ins	strument	t Soc	ciety of	of Americ	a, 1991		
2. Modern	Power Station Practice, Vol.6, I	nstrume	entatio	on, (	Controls	and Testir	ng, Pergamo	n Pres
	1971							
Oxford,								
and the second second second second								
EFERENCE(S):	wamy KM, Bala P, Bala MP, "Pow	er Plant	t Inst	rume	ntation,"	Prentice Ha	all, 2013	
EFERENCE(S): 1. Krishnas								



Department	ELECTRONICS AND INSTRUMENTA	TION	I EN	GINE	ERING	R 2019	Sem VII	PE
Course Code	Course Name	Hou	rs / V	Neek	Credit	Total	Maximum	Marks
		L	T	Ρ	С	Hours		
19EIX07	INSTRUMENTATION IN PETROCHEMICAL INDUSTRIES	3	0	0	3	45	100	
Course Object	tive (s): The purpose of learning this course	is to				1.1		
	e the students the method of oil recovery an							S.
	e students understand the process behavior		me o	f the i	mportant	unit opera	tions in	
	emical industry through mathematical model.							
	ize the students to apply knowledge to selec	ct the a	appro	priate	e control s	strategy to	the selectiv	е
<ul> <li>process.</li> <li>Provide</li> </ul>	information about the most important derivat	tives	obtair	ned fr	om netrol	eum produ	rte	
	students in understanding selection and ma							strv.
	mes: At the end of this course, learners will				damonto	mpouroon	onnour maae	
Concernence and and and the concernence and the second	owledge on oil gas production process and in				erations i	n a refiner	,	
	gained the process knowledge, ability to dev							/e
processe		10		10				
<ul> <li>Able to c</li> </ul>	levelop, analyze and select appropriate cont	trol str	rateg	y for s	selective u	unit operat	ions in a ref	inery.
	owledge on the most important chemical der				d from pet	roleum pro	oducts.	
And and a second s	and safety instrumentation followed in proce		ustrie	es.	a sector	interi	the loss of the	1 -
	EXTRACTION AND OIL GAS PRODUCTION	2000						9
	d for oil discovery – Oil recovery methods –				Overview	of oil gas	production -	- oil gas
	s treatment and compression – Control and s PORTANT UNIT OPERATIONS IN REFINE		syst	ems				9
	nn – Thermal cracking – Catalytic Crackin		otal	itic ro	forming	mathom	atical Model	- 203
	opriate control strategy – Alkylation – Isome					- maulema	alical would	ing and
	RIVATIVES FROM PETROLEUM	The other		1999				9
Sector and the sector and the sector as a sector as	methane - Methanol Production - Acetylen	e prod	ductio	n - D	erivatives	from acet	vlene —Der	ivatives
	Derivatives from propylene.							
Unit IV	IMPORTANT PETROLEUM PRODUCTS	S & M	EAS	URE	MENTS	1.1		9
	nate – Styrene – Ethylene oxide/Ethylene gl							
	e measured in refinery and petrochemical	l indu	stry ·	- Sel	ection an	d mainten	ance of me	asuring
nstruments.	CTV IN INCTRUMENTATION OVOTEMO	- Julio	4			-		9
	FETY IN INSTRUMENTATION SYSTEMS	E				and Dalies		
	classification – Electrical and Intrinsic safety etectors – leak detectors – Guidelines and st							
	ment – Failure modes – Operation and Main			Gene		esign com	igurations –	Tazaru
TEXT BOOK(S):		itoriai				11.29	1	
	ns, A.L., "Chemicals from Petroleum", W	Viley,	1973	3. (dig	gitized in	2007)		
2. Balchen	, J.G., and Mumme K.I., "Proces	s Co	ontro	I St	ructures	and A	oplications"	, Von
Nostran	dReinhold Company, New York, 1988							
REFERENCE(S)								
1. Liptak, E 2008.)	B.G., "Instrumentation in Process Indus	stries"	, Ch	ilton	Book Co	mpany, 2	2005. (Digit	ized in
	G.T. and Shreeves, A.G.T., "Chemical P	roces	s ind	dustri	es", Mc	Graw-Hill.	2012	
	Devold, "Oil and Gas Production Handbo							
	uhn and Harry Cheddie, "Safety Instrume					Analysis,	and Justific	ation",
2nd Edit	ion, ISA Press, 2006					a and a management of the		



Department	ELECTRONICS AND INSTRUMENTA	TION	ENG	GINE	ERING	R 2019	Semester VI	_
Course Code	Course Name	Hou	-	Veek	and the second se	Total	Maximum M	arks
	N 2000 3 1 1 1	L	Т	P	С	Hours		_
19EIX08	INSTRUMENTATION AND CONTROL IN IRON AND STEEL INDUSTRIES	3	0	0	3	45	100	
	ive (s): The purpose of learning this course							
	e parts of instrumentation and their working			ustry				
	bout the basic properties of steel and its mea			14 11 12 12 14 12 12				
	e consistency measurement and control in s e concepts of manufacturing steel in industry		nausi	iry				
	e different control technique involved i	5		anuf	acturing	nrocess		
	<b>mes:</b> At the end of this course, learners will			anun	accurring	process		
	e parts of instrumentation and their working			luctry		1		
	the basic properties of steel and its measure			Justiy				
	the consistency measurement and control in			strv				
	e the concepts of manufacturing steel in indu							
	nt the different control technique involved in		man	ufactu	iring proc	ess	1.1.1.1.1	
Unit I INT	RODUCTION TO FURNACES		100		100	14.02		9
rocess descript	tion in diagrammatic and functional block o	details	- ra	w ma	terials pr	eparation	- operation of	bla
Irnace (BF) and	auxiliary units, including stoves - Basic oxyg	en Fu	rnace	e (Boł	F) - Electr	ic Furnac	e (EF) - Open H	leart
urnace (OHF) -	relative merits of various steel making furna	ices.						
Unit II CA	STING AND ROLLING				11	1000		9
	impurities present and allowed limits for usab							batc
asting of steel -	primary and secondary rolling - features of o	cold ro	olling	- stee	el finishing	g operatio	ons.	15
Unit III ME	ASUREMENTS IN IRON AND STEEL INDU	ISTRI	ES					9
	various process parameters in the industr							
	ssure, level, flow, weighing and proportionin						ent of thicknes	s an
hape - Control r	oom layout for mill operations - graphic disp CONTROL APPLICATION	lays -	alarn	n mar	nagement	1	the second second	9
			the second		1		water central a	· · · ·
	ons for controls - Blast Furnace (BF) Stove co						water control sy	ster
	Furnace (BoF) - Mould Level control system	i in St	and	Castil	ng operat	ions.		9
	MPUTER APPLICATIONS			1		550	1 D 0 0	1.2
	puter applications in the industry - Review							
	g and data logging - steel rolling mill control	I - ani	nealir	ig pro	cess cor	troi utilitie	es managemen	t wit
omputer system			-				Survey of the second	
EXT BOOK(S):	Pala O. Jastana tatian in the Baseronia			~	L:H D.		4070	
	Bela G, Instrumentation in the Processing	g ina	ustrie	es, C	niiton Pl	iblishers.	, 1973	
EFERENCE(S)			-	4	landhar	k MaCa		litic
2. Considir 1999	ne D. M., Process/Industrial Instruments	s and	con	troi f	andboo	K, MCGR	aw Hill, 5th eo	
3. Seropek Educatio	Kalpakjian, Steven R. Schmid, Manufa on, 2013	acturi	ing E	Engin	eering	and Teo	hnology, Pea	arso
4 Dehead		-		10107-005		distantia in		2

4. Robert H. Perry, D.W. Green and J.O. Maloney, Perry's Chemical Engineers, Handbook, McGraw Hill Inc, New York, 7th ed, 1998



Department	ELECTRONICS AND INSTRUMENTA	1	_			R 2019	Semester V	
Course Code	Course Name		1	Veek		Total	Maximum N	larks
19EIX09	INSTRUMENTATION AND CONTROL IN PAPER INDUSTRIES	L 3	Т 0	P 0	<u>С</u> 3	Hours 45	100	-
Course Object	ive (s): The purpose of learning this course	is to					1	11
	and the various unit operations in the paper i		rv					
	alternative sensors and transducers for vari			ireme	nts			
	ne appropriate controls and schematics for s							
	e world-class paper mills employing IT-enab							
<ul> <li>Infer the</li> </ul>	different control technique in paper industry							
Course Outcor	nes: At the end of this course, learners will I	be ab	le to:			1.011		
Recall th	e parts of instrumentation and their working	in pa	per in	dustr	y			
Analyze	the basic paper properties and its measuren	nent						
<ul> <li>Analyzet</li> </ul>	the consistency measurement and control in	n pape	er ind	ustry				
	the concepts of making paper in industry							
	nt the different control technique in paper in		<u></u>	100	and a	100	1.1E+1.5.1	+
VIS DEPENDENTS	OVERVIEW OF PAPER MAKING PROCES				1			9
	rocess-Raw materials -Pulp separation-scr							
	s-H factor and Kappa factors-Stock prepar	ration	-Instr	umen	tation ne	eds Ener	gy conservatio	n an
aper quality con	trol							
	trol PER PROPERTIES AND ITS MEASUREME	INT	10	30		n e hr	1112	9
Unit II PAF hysical, electrica oftness, hardne esistance, foldin	PER PROPERTIES AND ITS MEASUREME al, optical and chemical properties of paper- ess and compressibility-stress -strain rela g endurance, stiffness and impact strength	Basic ations	hip-T ectric	ensile cons	e strengt stant, die	h, burstir lectric str	ng strength, t ength, dielectri	nness earin ic los
Unit II PAF hysical, electrica oftness, hardne esistance, foldin nd Properties of easurement teo Unit III COM	PER PROPERTIES AND ITS MEASUREME al, optical and chemical properties of paper- ess and compressibility-stress -strain rela g endurance, stiffness and impact strength electrical insulating paper - Brightness, colo chniques. NSISTENCY MEASUREMENT	Basic ations -Diel our, g	hip-T ectric loss a	ensile c cons and c	e strengt stant, die apacity S	h, burstir lectric stro tarch con	ng strength, t ength, dielectri stant acidity ar	nness earin ic los nd pH
Unit II PAF hysical, electrica oftness, hardne esistance, foldin nd Properties of easurement teo Unit III COM efinition of cons	PER PROPERTIES AND ITS MEASUREME al, optical and chemical properties of paper- ess and compressibility-stress -strain rela g endurance, stiffness and impact strength electrical insulating paper - Brightness, col- chniques.	Basic ations -Diel our, g	hip-T ectric loss a	ensile c cons and c	e strengt stant, die apacity S	h, burstir lectric stro tarch con	ng strength, t ength, dielectri stant acidity ar	nness earing ic los nd pH
Unit II PAF hysical, electrica oftness, hardne esistance, foldin nd Properties of easurement teo Unit III COM efinition of cons ontrol	PER PROPERTIES AND ITS MEASUREME al, optical and chemical properties of paper- ess and compressibility-stress -strain rela g endurance, stiffness and impact strength electrical insulating paper - Brightness, colu- chniques. NSISTENCY MEASUREMENT istency-Techniques for head box consistence	Basic ations -Diel our, g	hip-T ectric loss a	ensile c cons and c	e strengt stant, die apacity S	h, burstir lectric stro tarch con	ng strength, t ength, dielectri stant acidity ar	nness earing ic los nd pH
Unit IIPAFhysical, electricaoftness, hardneesistance, foldinnd Properties ofeasurement teoJnit IIICONefinition of consontrolJnit IVPAF	PER PROPERTIES AND ITS MEASUREME al, optical and chemical properties of paper- ess and compressibility-stress -strain rela g endurance, stiffness and impact strength electrical insulating paper - Brightness, colo chniques. NSISTENCY MEASUREMENT istency-Techniques for head box consistence PER MAKING MACHINE	Basic ations -Diel our, g cy me	hip-T lectric loss a asure	ensile cons and ca	e strengt stant, die apacity S - Stock (	h, burstir lectric str itarch con	ng strength, t ength, dielectri stant acidity ar cy measureme	nness earing ic loss nd pH 9 nt and 9
Unit IIPAFhysical, electricaoftness, hardneesistance, foldinnd Properties ofeasurement teoJnit IIICONefinition of consontrolJnit IVPAFunctioning of Pa	PER PROPERTIES AND ITS MEASUREME al, optical and chemical properties of paper- ess and compressibility-stress -strain rela g endurance, stiffness and impact strength electrical insulating paper - Brightness, colo- chniques. NSISTENCY MEASUREMENT istency-Techniques for head box consistence PER MAKING MACHINE aper making machine-Quality parameters-m	Basic ations -Diel our, g cy me	hip-T lectric loss a asure	ensile c cons and ca ement asic v	e strengt stant, die apacity S - Stock o weight, c	h, burstir lectric str itarch con	ng strength, t ength, dielectri stant acidity ar cy measureme	nness earing ic loss nd pH 9 nt and 9
Unit IIPAFhysical, electricaoftness, hardnesistance, foldinnd Properties ofeasurement teoJnit IIICONefinition of consontrolJnit IVPAFunctioning of Paontent, strength,	PER PROPERTIES AND ITS MEASUREME al, optical and chemical properties of paper- ess and compressibility-stress -strain rela g endurance, stiffness and impact strength electrical insulating paper - Brightness, colo chniques. NSISTENCY MEASUREMENT istency-Techniques for head box consistence PER MAKING MACHINE	Basic ations -Diel our, g cy me	hip-T lectric loss a asure	ensile c cons and ca ement asic v	e strengt stant, die apacity S - Stock o weight, c	h, burstir lectric str itarch con	ng strength, t ength, dielectri stant acidity ar cy measureme	nness earing ic loss nd pH 9 nt and 9
Unit IIPAFhysical, electricaoffness, hardnesistance, foldinnd Properties ofeasurement tecJnit IIICONontrolJnit IVPAFunctioning of Papontent, strength,Jnit VCON	PER PROPERTIES AND ITS MEASUREME al, optical and chemical properties of paper- ess and compressibility-stress -strain rela g endurance, stiffness and impact strength electrical insulating paper - Brightness, colu- chniques. NSISTENCY MEASUREMENT istency-Techniques for head box consistence PER MAKING MACHINE aper making machine-Quality parameters-m gloss and tensile strength - Parameters mo NTROL ASPECTS	Basic ations - Diel our, g cy me cy me moistu	hip-T lectric loss a asure nre, b ng Ins	ensile cons and ca ement asic v strum	e strengt stant, die apacity S - Stock o weight, c entation.	h, burstir lectric stru- itarch con consistenc aliper, bri	ng strength, t ength, dielectri stant acidity ar cy measureme ghtness, colou	nness earing ic los: nd pH 9 nt and 9 ir, asl
Unit IIPAFhysical, electricaoffness, hardneesistance, foldinnd Properties ofeasurement tecJnit IIICONontrolJnit IVPAFunctioning of Paontent, strength,Jnit VCONachine and croore	PER PROPERTIES AND ITS MEASUREME al, optical and chemical properties of paper- ess and compressibility-stress -strain rela g endurance, stiffness and impact strength electrical insulating paper - Brightness, colo chniques. VSISTENCY MEASUREMENT istency-Techniques for head box consistence PER MAKING MACHINE aper making machine-Quality parameters-m gloss and tensile strength - Parameters mod	Basic ations - Diel our, g cy me cy me moistu	hip-T lectric loss a asure nre, b ng Ins	ensile cons and ca ement asic v strum	e strengt stant, die apacity S - Stock o weight, c entation.	h, burstir lectric stru- itarch con consistenc aliper, bri	ng strength, t ength, dielectri stant acidity ar cy measureme ghtness, colou	nness earing ic los: nd pH 9 nt and 9 ir, asl
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Unit II       PAF         hysical, electrica       potness, hardne         potness, hardne       potness, hardne         pontrol       Joit IV       PAF         pontent, strength,       Joit V       PAF         pontent, strength,       Joit V       CON         achine and croopmputer based of       potnessed of         EXT BOOK(S):       1. Sankara	PER PROPERTIES AND ITS MEASUREME al, optical and chemical properties of paper- ess and compressibility-stress -strain rela g endurance, stiffness and impact strength electrical insulating paper - Brightness, colu- chniques. NSISTENCY MEASUREMENT istency-Techniques for head box consistence PER MAKING MACHINE aper making machine-Quality parameters- gloss and tensile strength - Parameters mon NTROL ASPECTS ess direction control technique -consistence control systems Mill wide control marayanan, P.E., Pulp and Paper Indu	Basic ations -Diel our, g cy me moistu pnitorii	hip-T lectric loss a asure ng Ins bisture	ensile cons and c ement asic v strum e -an	e strengt stant, die apacity S - Stock o weight, c entation. d basic	h, burstir lectric stru- itarch con consistenc aliper, bri weight co	ng strength, t ength, dielectri stant acidity ar cy measureme ghtness, colou ontrol -dryer co	nness earing ic los ind pH 9 nt and 9 nr, asl 9 ontrol
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Characan - Bob Dept. of PhF - BSBC

Course Co	nt EL	ECTRO	NICS AN	<b>ID INSTR</b>	RUMENTA					R 2019		
000130 00	de		Course	e Name					Credit	Total	Maximum	Marks
						L	T	P	C	Hours	100	
19EIX10					ICULTURE		0	0	3	45	100	
					this course		and		roquiro	monto in	ogriculturo	
					of instrument					ments in	agriculture	
					il sensor rec							
<ul> <li>Lear</li> </ul>	n about t	he flow o	liagrams	and instru	umentation for	or vari	ous t	ood p	rocess II	ndustries		
<ul> <li>Have</li> </ul>	a know	ledge ab	out syste	ms/instrur	ments for ag	ricultu	re us	sing S	CADA.			
					ontrol circuits			for aut	omotive	s used in	agriculture	
Course Ou	tcomes:	At the e	nd of this	course, le	earners will I	be abl	e to:					
- Inter	pret the	necessity	of instru	mentation	and sensor	requi	reme	ents in	agricult	ure		
					e soil sensor							
					ation for var					ries		
					s for agricult							
					ntrol circuits					used in a	griculture	
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19EIX11	EMBEDDED SYSTEM ive (s): The purpose of learning this cou	-	U	0	3	45	100	-
<ul> <li>Building</li> <li>Various</li> <li>Bus Con</li> <li>Various</li> </ul>	Blocks of Embedded System Embedded Development Strategies munication in processors, Input/output i processor scheduling algorithms. f Real time operating system and examp	nterfacing		liscus	ss on one	e real time	e operating system	1
1.113.200.000	nes: At the end of this course, learners	vill be abl	e to:			C 2		
	and and analyze embedded systems.							
	an embedded system for a given applica	ation.						
	various Embedded Development Strateg							
and the second	out the bus Communication in processo							
	knowledge on various processor-schedu		ithms					
	RODUCTION TO EMBEDDED SYSTEM	124						9
devices- DMA – n circuit emulato	mbedded Systems –Structural units in Memory management methods- Timer a r, Target Hardware Debugging.							
COSCIDENTIALS DE DIDITALS Z	BEDDED NETWORKING							9
	orking: Introduction, I/O Device Ports & B							
	85 - CAN Bus -Serial Peripheral Interfa	ce (SPI)	– Inte	er Int	egrated (	Circuits (I	<sup>2</sup> C) –need for dev	/ice
drivers. Unit III EMI				17	1.			-
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Embedded Produ Hardware-softwa Model, object orie	uct Development Life Cycle- objectives, re Co-design, Data Flow Graph, state	different p machine i	ohase	es of			of EDLC; issues ir Model, concurren	n
Embedded Produ Hardware-softwa Model, object orig Unit IV RTC ntroduction to ba Multitasking, Pre- nter process Co- priority inheritanc	uct Development Life Cycle- objectives, re Co-design, Data Flow Graph, state ented Model. <b>DS BASED EMBEDDED SYSTEM DESI</b> asic concepts of RTOS- Task, process & emptive and non-preemptive scheduling mmunication – synchronization between e.	different p machine i GN k threads, Task cor processe	inter mode	es of I, Se rrupt nication	quential routines on share	Program in RTOS, d memory	of EDLC; issues ir Model, concurren Multiprocessing a y, message passin es, priority inversio	n it 9 anc ng- on
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Course Code	Course Name		rs / V	-	Credit	Total	Maximum Ma	irks
		L	T	P	C	Hours	400	
19EIX12	SYSTEM IDENTIFICATION tive (s): The purpose of learning this cours	3	0	0	3	45	100	-
Observe     Observe     Data's     Estimate     Perform Course Outcoo     Familiar     estimatic     Perform	parameter estimation using different ident	ric Ident métric and rec rocess c ill be ab rization, tification	Identi ursive ontro le to: ident	ficatio e estir l syste ifiabili	on Metho nation m ems ty, struct	ds using ethods	Online and Offlir	ne.
Set up a	plants online using recursive estimation m in experiment, identify a nominal model, as choices to arrive at a validated model.		e acc	uracy	and pre	cision of	this model,	
	NPARAMETRIC IDENTIFICATION		-	-				9
Steps in identific ARX, ARMAX, I	RAMETRIC INDENTIFICATION cation process, determining model structu Box-Jenkins, FIR, Output Error models), li xcitation, Residual analysis for determining	nput sig	nals:	comn	nonly use	ed signals	s, spectral prope	
	RAMETRIC ESTIMATION	<u>,</u>					1 1 1 1 1 1 1	9
dentifiability, bia	on, least square estimation, statistical s, Least squares, relation between minimi , asymptotic distribution of parameter estin	zing the	predi	ction	error and	the MLE	E, MAP, Converg	
	URSIVE ESTIMATION							9
	r method, Kalman Filter interpretation Iden er estimation, robustness considerations, n				e: Aliasin	g due to :	sampling, closed	d loo
Unit V CA	SE STUDIES			100				9
Electro Mechanio	cal Systems, Process Control Systems usi	ing Matl	ab/Ec	uival	ent Syste	em Identif	ication Toolbox	
TEXT BOOK(S):					tice-Hall			

4. ArunK.Tangirala, Principles of System Identification: Theory and Practice, CRC Press, 2014

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Department Course Code	ELECTRONICS AND INSTRUM Course Name		s/W			Total	Maximum N	the second s
course coue	Course Name	L	T	P	C	Hours	Maximum IV	ains
19EIX13	ADAPTIVE CONTROL	3	0	0	3	45	100	5
<ul> <li>Study th</li> <li>Study th</li> <li>Study th</li> <li>Study th</li> <li>Study th</li> <li>Study th</li> <li>Course Outco</li> <li>Underst</li> <li>Distingu</li> </ul>	tive (s): The purpose of learning this of the definition of adaptive control and me the parameter identification of systems. The self-tuning of PID controllers based the model reference adaptive control. The practical application through case st mes: At the end of this course, learne and the effect of parameter variation a tish different parametric identification n and Deterministic and Stochastic Self	ethods of ada on paramete tudies. ers will be abl and principle methods.	er ider e to: of ada	aptive		scheme	s.	
Design	of model reference adaptive controller	nte la la						
	gain scheduling controller and apply a	daptive contr	ol sch	neme	s for ind	ustrial pr	ocesses.	1.0
102220	RODUCTION daptive control – Effects of process var							9
	c identification – Step response methor	od – Impulse	respo	nse	method -	- Freque	ncy response n	nethod.
near in param	neter models - ARX - ARMAX - AR							square
near in param stimation – Ext	neter models - ARX – ARMAX – AR ended least square estimation – Maxir							square
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Course Code	ELECTRONICS AND INSTRUMENT	and the second se			the second s		Semester VIII	-
	Course Name	Hou		leek	Credit	Total	Maximum Mark	ks
19EIX14	OPTIMAL CONTROL	3	T 0	P 0	C 3	Hours 45	100	-
	ive (s): The purpose of learning this cours					10		
<ul> <li>Understa</li> <li>Study th control</li> <li>Introduca</li> <li>Help the</li> <li>Study, a</li> <li>Study, a</li> <li>Ourse Outcor</li> <li>Problem</li> <li>Solving</li> <li>Designi</li> <li>Predict problem</li> </ul>	and the optimal control concepts and its in e important optimal control methods existi- e the concept of optimal control in various learners in the design and the implement nalyze and implement discrete-Time optim nes: At the end of this course, learners w n formulation, forms of optimal control the algebraic equations to design the ng optimal controllers using a class of the system dynamic behavior through	nportanc ng in the system ation of <u>nal contr</u> ill be ab and its controll proced h solutio	e indu the co ol system le to: nece ler ar ures on of	essar oncep essar nd to	ot of optir y conditi study al Es-and	nal contro ions. pout vari	ous problems n of optimal con	ntr
variatio	is in physical systems through numeri					J		9
and the second se	RODUCTION ptimal control – Comparison between th							-
d point probler	Performance Index - Basic Concept of ca n - Free end point problem - Variational A NTROL STRATEGY							9
oduction - Tin	ne varying optimal control – LQR steady s ) - Solution of Ricatti'sequation – Applicat				I – Frequ	uency Do	main Interpretatio	n
roduction - Tin R (LTI system	ne varying optimal control – LQR steady s ) - Solution of Ricatti'sequation – Applicat DBLEM FORMATION				I – Frequ	uency Do	main Interpretatio	9
roduction - Tin R (LTI system nit IV PR timal Control: nstrained opti- uation and its	) - Solution of Ricatti'sequation – Applicat DBLEM FORMATION Introduction, formation of optimal control mization. Pontryagin's Minimum/Maximum	ion exar problem	nples	culus	of variat	ions mini	mization of function	<b>9</b>
roduction - Tin R (LTI system nit IV PR timal Control: nstrained opti- uation and its nit V AD	) - Solution of Ricatti'sequation – Applicat DBLEM FORMATION Introduction, formation of optimal control mization. Pontryagin's Minimum/Maximum solution. /ANCED SYSTEMS	ion exar problem m Princ	nples n, cale iple,	culus Linea	of variat r Quadr	ions mini atic Prob	mization of functio lem-Hamilton Jac	9 on co 9
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Department	ELECTRONICS AND INSTRUMENT	ATION	I EN	GINE	ERING	R 2019	Semester VIII PE
Course Code	Course Name		-	Veek		Total	Maximum Marks
19EIX15	OPTIMAL STATE ESTIMATION	L 3	T 0	P 0	C 3	Hours 45	100
	tive (s): The purpose of learning this cours		U	0	3	45	100
<ul> <li>Design a</li> <li>Design a</li> <li>Secondo</li> <li>Design a</li> <li>variants</li> </ul>	Knowledge and Skills and implement a Discrete Kalman Filter and implement Extended Kalman Filter, Ite orderExtended Kalman filter and implement Derivative Free Kalman filter and Ensemble Kalman Filter and implement Particle Filter, Unscented P	er such	as Ur			A 29.5	and its
	mes: At the end of this course, learners wi						
Kalman Design a and Sim Apply va Select va Unit I INTR Review of Matrix observers for De	variants of Derivative Based Kalman Fi filter, Second order Extended Kalman Filte and Implement variants of Derivative free H plex transformations based Unscented Kal iriants of H-infinity filters. arious types of Particle filters for non-linear <b>CODUCTION TO STATE ESTIMATION AN</b> Algebra and Matrix Calculus and Probal terministic System- Derivation of the Discr	er for no Kalman Iman filt r and no ND KAL bility Th	n-line Filter er MAN eory	ear sy s suc ussia FILT - Lea	stems h as Uns n system ER ist Squar	scented K ns. re Estima	Calmanfilter, Spherica
	ENDED KALMAN FILTER						10
	an filter - Extended Kalman filter - The itera onstrained Extended Kalman filter- Simulta						
Unit III UNS	SCENTED KALMAN FILTER			_			9
General Unscent	ariance of non-linear transformations - U ted transformation - The simplex unscent ate and Parameter Estimation using UKF (	ted tran	sform	nation	- Spheric	calUnsce	nted transformation
Unit IV THE	H-INFINITY FILTER						9
	er - Introduction - Kalman filter Limitations iltering: Mixed Kalman - Robust Kalman-						finityfiltering - Steady
Unit V ENSI	EMBLE KALMAN FILTER AND PARTICL	E FILT	ER	-	1		8
	stimation - Ensemble Kalman filter-Introdustion - SIR - Particle filter with EKF as p						lementation issues:
TEXT BOOK(S): 1. Bruce P. 2011 REFERENCE(S)	Gibbs, "Advanced Kalman Filtering, Leas	st-Squa	res a	nd Me	odeling:	A Practic	al Handbook", Wiley

- Adrian Pizzinga, "Restricted Kalman Filtering Thoery, Methods and Application", Springer, 2012
   Xiao-Heng Chang, "Takagi Sugeno Fuzzy systems Non fragile H infinity filtering", Springer, 2012

Department	And the second	ECTRONICS AND INSTRUMENTATION ENGINEERING		and the second se			Semester V		PE	
Course Code	Course Name		rs / W	100 million (1990)	the second se		2228101	Maximum	Mar	ks
1051110		L	T	P	C	Ho	_	400	1	
19EIX16	INTRODUCTION TO PROCESS DATA ANALYTICS	3	0	0	3	4	5	100		28
	ive (s): The purpose of learning this course bout the experimental design	e is to	-							
	pout the linear regressionanalysis									
	owledge about the linear model selection	andre	gulari	zatio	n					
	bout the different types of Classification bout the process identification, performan	ce mo	nitorin	na an	d soft s	onsor	deci	an		
Course Outcon	<b>nes:</b> At the end of this course, learners will	be ab	le to	ig an	u son a	011301	ucoi	gii.		
	understand the statistical terms related			tics.						
	select the right regression method for a									
	analyzeandcomparetheperformanceofvar					regul	ariza	tionmethods.		
	suggest and develop right classifier for a					tand	aant	aller		
	recommendappropriatedataanalysistoolfo ancemonitoring.	orsonse	ensor	ueve	lopmen	tanu	CON	oller		
	RODUCTION			572			*			9
troduction to F	Process data analytics and Statistical lea	arnina	- Rev	iew	of Linea	ar Ala	ebra	Concepts - F	evie	ew o
	atistics - Design of experiments - Industria								9	
Init II RE	GRESSION								T	9
near Regressi actical Consid oproach, Leave	GRESSION on:- Simple Linear Regression, Multiple eration in the Regression Model - Valida e-One-Out Cross Validation, k-Fold Cros	tion me	ethods	s to a	assess	mode	l qua	lity:-The valida	ation	n – set
near Regressi actical Consid pproach, Leave alidation Jnit III LIN ubset Selection ethods: - LAS agression, Part	on:- Simple Linear Regression, Multiple leration in the Regression Model - Valida e-One-Out Cross Validation, k-Fold Cross IEAR MODEL SELECTION&REGUL n: - Best Subset Selection, Step-wise SSO, Ridge regression, Elastic nets - tial Least Squares.	tion me ss Valie ARIZA Select - Dime	ethods dation ATIO ion al ensior	s to a - B N nd C n rec	assess ias-var choosin duction	mode ance g the Meth	l qua Trac Opt iods:	lity:-The valida e-off for k-Fol imal Model – - Principal C	ation d Cr	n – set ross 9 inka onei
near Regressi ractical Consid oproach, Leave alidation Jnit III LIN ubset Selection ethods: - LAS egression, Part Jnit IV SUPI TECI	on:- Simple Linear Regression, Multiple leration in the Regression Model - Valida e-One-Out Cross Validation, k-Fold Cross IEAR MODEL SELECTION&REGUL n: - Best Subset Selection, Step-wise SSO, Ridge regression, Elastic nets - tial Least Squares. ERVISED LEARNING WITH REGRE HNIQUES	tion me ss Valid ARIZ/ Select - Dime SSIO	ethods dation ATIO ion au ensior N AN	s to a - B N nd C n rec ID C	assess ias-var choosin duction LASSI	mode ance g the Meth	l qua Trac Opt ods:	lity:-The valida e-off for k-Fol imal Model – - Principal Co N	ation d Cr Shr omp	n – set ross 9 inka oner 9
near Regressi ractical Consid oproach, Leave alidation Jnit III LIN ubset Selection ethods: - LAS egression, Part Jnit IV SUPI TECI	on:- Simple Linear Regression, Multiple leration in the Regression Model - Valida e-One-Out Cross Validation, k-Fold Cross IEAR MODEL SELECTION&REGUL n: - Best Subset Selection, Step-wise SSO, Ridge regression, Elastic nets - tial Least Squares. ERVISED LEARNING WITH REGRE HNIQUES on- Linear Discriminant Analysis - Quad	tion me as Valid ARIZ/ Select - Dime SSIO	ethods dation ATIO ion an ensior N AN	s to a - B N nd C n rec ID C ninar	hoosin duction	mode ance g the Meth FICA sis –	l qua Trac Opt ods: <b>TIO</b> Regi	lity:-The valida e-off for k-Fol mal Model – - Principal Co N ession & Clas	ation d Cr Shr Shr ompo	9 inka oner 9 ation
near Regressi ractical Consid oproach, Leave alidation Jnit III LIN ubset Selection ethods: - LAS egression, Part Jnit IV SUPI TECI ogistic regression rees – Support	on:- Simple Linear Regression, Multiple leration in the Regression Model - Valida e-One-Out Cross Validation, k-Fold Cross IEAR MODEL SELECTION&REGUL n: - Best Subset Selection, Step-wise SSO, Ridge regression, Elastic nets - tial Least Squares. ERVISED LEARNING WITH REGRE HNIQUES	tion me as Valid ARIZ/ Select - Dime SSIO	ethods dation ATIO ion an ensior N AN	s to a - B N nd C n rec ID C ninar	hoosin duction	mode ance g the Meth FICA sis –	l qua Trac Opt ods: <b>TIO</b> Regi	lity:-The valida e-off for k-Fol mal Model – - Principal Co N ession & Clas	ation d Cr Shr Shr ompo	9 inkagoner 9 ation
near Regressi ractical Consid oproach, Leave alidation Jnit III LIN ubset Selection ethods: - LAS egression, Part Jnit IV SUPI TECI ogistic regression ees – Support Jnit V API occess data and Principal comp esign - Data-ba	on:- Simple Linear Regression, Multiple eration in the Regression Model - Valida e-One-Out Cross Validation, k-Fold Cross IEAR MODEL SELECTION&REGUL n: - Best Subset Selection, Step-wise SSO, Ridge regression, Elastic nets - tial Least Squares. ERVISED LEARNING WITH REGRE HNIQUES on- Linear Discriminant Analysis - Quad Vector Machines - Random forests, Bag	tion me ss Valid ARIZ/ Select Dime SSIO Iratic D ging an en and hitoring	ethods dation ATIO ion an ensior NAN Discrim nd boo close and	s to a - B N nd C n rec ID C ninan ostin ed loc Part	choosin duction LASSI g - Neu ops) - C ial Lea	mode ance g the Meth FICA sis – ral Ne	I qua Trac Opt ods: TIO Regi etwoi	lity:-The valida e-off for k-Fol imal Model – - Principal Co N ession & Clas ks – Deep Lea erformance M	sifica arnin	9 9 9 9 9 9 9 9 9 9 9 9 9 9
near Regressi ractical Consid oproach, Leave alidation Jnit III LIN ubset Selection ethods: - LAS egression, Part Jnit IV SUPI TECI ogistic regression ees – Support Jnit V API occess data and Principal comp esign - Data-ba ST BOOK(S): 1. Gareth Ja	ion:- Simple Linear Regression, Multiple leration in the Regression Model - Valida e-One-Out Cross Validation, k-Fold Cross IEAR MODEL SELECTION&REGUL n: - Best Subset Selection, Step-wise SSO, Ridge regression, Elastic nets - tial Least Squares. ERVISED LEARNING WITH REGRE HNIQUES on- Linear Discriminant Analysis - Quad Vector Machines - Random forests, Bag PLICATIONS alysis for system identification (under ope onents analysis (PCA) for Process Mor used causality analysis for identification of ames, Daniela Witten, Trevor Hastie, Ro	tion me ss Valid ARIZ/ Select Dime SSIO Iratic D ging an en and hitoring f proce	ATIO ion an ension NAN Discrim nd boo close and ess top	N N N N C N N C N N C N N N C N N N C N N N C N N N C N N N C N N N C N N N C N N C N N C N	assess ias-var duction LASS t Analy g - Neu ops) - C ial Lea y.	g the Meth FICA sis – ral Ne control	I qua Trac Opt oods: <b>TIO</b> Regi etwoi	lity:-The valida e-off for k-Fol imal Model – - Principal Co N ession & Clas ks – Deep Lea erformance M s (PLS) for so	ation d Cr Shr omposifica arnin	9 9 9 9 9 9 9 9 9 9 9 9 9 9
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Course Code	LECTRONICS AND INSTRUME	NTATION	ENC	SINE	ERING	R 2019	Semester VIII	PE
	Course Name	Hour			Credit	Total	Maximum Ma	rks
19EIX17	VIRTUAL INSTRUMENTATION	L 3	T 0	P 0	C 3	Hours 45	100	
Course Objectiv Provide ar Bring out t Know about Learn the p Know about Course Outcome Explain the	<ul> <li>(s): The purpose of learning this co overview of Virtual instruments</li> <li>ne overview of the software</li> <li>at the programming structure of the sorocedure to install DAQ in various O</li> <li>at the IMAQ Motion control and mach</li> <li>s: At the end of this course, learners</li> <li>basics of Virtual or graphical instrume</li> <li>the overview of G programming, lab</li> </ul>	urse is to software S and its in ine vision o will be ab nentation c	nterfac conce le to: oncep	cing pts fo	methods or industri	al applicatio	on	
<ul><li>Select the</li><li>Formulate</li><li>Implement</li></ul>	appropriate structuring concept to be the procedure to install DAQ in variou the IMAQ Motion control and machin DUCTION	used in gr us OS and	aphic its int	al pro	ogrammin bing metho	g ods		9
	lescription of digital instrument - Block	diagram	faVi	tual	Instrumen	t - Advanta	ges of Virtual Instru	1.1
over conventional in	istruments - Architecture of a Virtual I over conventional instruments							
Unit II SOFT	WARE OVERVIEW					0		9
	nterfaces - Controls and indicators - '	G' program	mina	-La	pels and T	ext - Shape	e, size and color -	Owne
	a type, Format, Precision and represe							
	al Instrument - Graphical programmi	ng palettes	and t	tools	- Front pa	anel objects	- Data types	
	RAMMING STRUCTURE	Sector 1	1.0	$= e^{-\epsilon}$	1000		Marine Marine State	9
undle - Bundle/Ur	Loops, CASE Structure, Formula no bundle by name, graphs and charts	- String ar						
nodes Local and G	lobal variables. Bundle/Unbundle by	name.					and the second sec	ttribut
Unit IV OPERA	TING SYSTEM AND HARDWARE	ASPECTS			199			9
Unit IV OPERA Current trends Op Resolution, Analog neasurement.	TING SYSTEM AND HARDWARE A erating system requirements - Data I/O, Digital I/O - DAQ Software Arch	ASPECTS Acquisition	on Ca					9 ethods eratur
Unit IV OPERA current trends Op tesolution, Analog neasurement. Unit V APPL	TING SYSTEM AND HARDWARE A erating system requirements - Data I/O, Digital I/O - DAQ Software Arch CATIONS	ASPECTS Acquisition itecture - C	on Ca Config	uring	the DAQ	hardware/	software for temp	9 ethods eratur 9
Unit IV         OPERA           Current trends Op         Operation           Cesolution, Analog         Description           Description         Analog           MAQ Motion Contractor         APPL           Optical Character         R	TING SYSTEM AND HARDWARE A erating system requirements - Data I/O, Digital I/O - DAQ Software Arch CATIONS ol: components of a motion control pper motor in LabVIEW. Machine Visi ecognition	ASPECTS Acquisitio itecture - C system, co	on Ca Config	uring	the DAQ	hardware/	software for temp evelopment - Inte	9 ethods eratur 9 rfacin
Unit IV         OPERA           uurrent trends Op         op           esolution, Analog         op           neasurement.         unit V           Unit V         APPL           MAQ Motion Contr         ervomotor and Steptical Character R           ORFURTHER RE         CI bus : Architect	TING SYSTEM AND HARDWARE A erating system requirements - Data I/O, Digital I/O - DAQ Software Arch CATIONS ol: components of a motion control pper motor in LabVIEW. Machine Visi ecognition ADING ure, function, configuring PCI bus in	ASPECTS Acquisitio itecture - C system, co on: Edge I	on Ca Config Donfigu Detect	uring ratio	the DAQ n, prototy Dimensior	hardware/ ping and d nal Measure	software for temp evelopment - Inte ements, Color Insp	9 ethods eratur 9 rfacin ectior
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<b>Course Code</b>	ELECTRONICS AND INSTRUMEN					R 2019	Semester VIII	
course coue	Course Name		_	Veek		Total	Maximum Ma	rks
4051740	ADVANCED PROCESS CONTROL	L	T 0	P	C	Hours	100	_
19EIX18	ADVANCED PROCESS CONTROL ive (s): The purpose of learning this cou		0	0	3	45	100	-
<ul> <li>Develop reference</li> <li>Make the</li> <li>Provide foundation</li> </ul>	udents to build and analyze models for the skills needed to design adaptive c e adaptive controller and Self-tuning cor e students learn to formulate optimal cor basic knowledge about Fractional-ord on for the systematic approach to Design	controllers ntroller for ntrol scher ler system n controlle	such vario nes ns ar r for	as ga ous ap nd Fra fractio	ain-sched oplications actional-o onal order	uled adap rder- cont systems	tive controller, M roller and to la	y tł
	e FDI Techniques, such as Principal con rs and actuators.	nponent A	nalys	is, sta	ate observ	er to dete	ct and diagnose	faul
	nes: At the end of this course, learners	will he abl	e to:		1	1		-
<ul> <li>adaptive</li> <li>Identify,</li> <li>Analyze systems</li> </ul>	and implement adaptive controllers su controller and Self-tuning controller formulate, and solve optimal controller Fractional-order systems, Fractional-co and implement H2 and H-infinity Con	order- con	trolle	r and	l Design	controlle	r for fractional	orde
compone	ent Analysis, state observer to detect an	d diagnose	e faul	lts in s				
	ITROL OF TIME-VARYING AND NONI varying and Nonlinear systems – Input s							6+
nd Model Refer Unit II OP troduction – Pe r solving Contr	n - Types of Adaptive Control - Gain sche ence Adaptive Controller – Control of Ha FIMAL CONTROL & FILTERING rformance Measure for optimal control p ol Problem – LQR – Introduction to O	ammerstei problem –	n and Dyna	d Wie amic F	ner Syste Programm	ms. ning – Com	nputational Proce	6+
aussian (LQG) Jnit III FRA	CTIONAL ORDER SYSTEM & CONTR							6+
ractional-order ystems - Filter	Calculus and Its Computations – Freque Approximations to Fractional-Order Difference Iler Design Studies for Fractional Order	uency and erentiations						inea
	IFINITY CONTROLLER					7.55	e heelen wie en	6+6
	orms for Signals – Robust Stability – - H-Infinity Controller Design — Effects							al H
						-mining CC		
ontroller Design	ILT DIAGNOSIS AND FAULT-TOLERA	ANT CONT		-		-mining CC		6+6
ontroller Design Jnit V FAL ocess Monitoria ault Detection w and Actuator Fau		control – Fa	ROL ault [	Detect	tion with F	Principal C	omponent Analy	sis
Ditroller Design Dit V FAL rocess Monitorin ault Detection with Actuator Fau EXT BOOK(S): 1. Karl J. As 2. Shankar 1994	ILT DIAGNOSIS AND FAULT-TOLERA ng - Introduction – Statistical Process C ith State Observers – Fault Detection w It-Tolerant Control Design. strom& Bjorn Wittenmark, 'Adaptive Con Sastry and Marc Bodson, 'Adaptive Con	control – Fa with signal ntrol', Pear ntrol: Stabi	rROL ault E mode son E ility, (	Detect els - I Educa Conve	tion with F Fault Dete ation (Sing ergence, a	Principal C ection of C gapore), Se and Robus	omponent Analy ontrol Loops- So econd Edition, 2	vsis enso 003
ontroller Design Jnit V FAL rocess Monitorin ault Detection w ault Actuator Fau EXT BOOK(S): 1. Karl J. As 2. Shankar 1994	ILT DIAGNOSIS AND FAULT-TOLERA ng - Introduction – Statistical Process C ith State Observers – Fault Detection v It-Tolerant Control Design. strom& Bjorn Wittenmark, 'Adaptive Con Sastry and Marc Bodson, 'Adaptive Con u, R. Lozano, and M. M'Saad, 'Adaptive	control – Fa with signal ntrol', Pear ntrol: Stabi	rROL ault E mode son E ility, (	Detect els - I Educa Conve	tion with F Fault Dete ation (Sing ergence, a	Principal C ection of C gapore), Se and Robus	omponent Analy ontrol Loops- So econd Edition, 2	vsis ensc

 R. Isermann, "Fault-Diagnosis Systems: An Introduction from Fault Detection to Fault Tolerance", Springer,2006

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Chairman - Bo Dept. of EIE - ESEC

R 2019 Semester VI Total Maximum M		Credit		rs / W	Hou	ELECTRONICS AND INSTRUMENTA Course Name	Department Course Code
Hours		C	P	T	L	oourse Name	Sourse Code
45 100		3	0	0	3	FIBRE OPTICS AND LASERINSTRUMENTATION	19EIX19
				1.12	is to	tive (s): The purpose of learning this course	Course Object
		properties	their p	and	l fibres	the students to the basic concepts of optical	<ul> <li>Expose</li> </ul>
		cal fibres	f optio	ons o	plicati	adequate knowledge about the Industrial ap	Provide
						the students to the Laser fundamentals.	<ul> <li>Expose</li> </ul>
			ers.	of lase	ation o	adequate knowledge about Industrial applic	<ul> <li>Provide</li> </ul>
er	iser	ions of La	plicati	al ap	Medic	adequate knowledge about holography and	Provide
				le to:	be ab	omes: At the end of this course, learners will	Course Outco
						tand the principle, transmission, dispersion a	
						ne gained knowledge on optical fibers for its i	
I and biomedical	ial and	ng industi	octurir	anufa	tion, m	which have important applications in product	
							applicati
					n.	tand laser theory and laser generation syster	
		1. 1.	sv v			about Industrial application of lasers.	
al application.	cal app	nd medi	trial a	Indus	ecific I	aser theory for the selection of lasers for a sp	
	list even		×		0-1-1	TICAL FIBRES AND THEIR PROPERTIES	CALIFORNIA CONTRACTOR
						optical fiber cable: Guiding mechanism in	
						-Principles of light propagation through a fi	
			prope	their		ure and Skow mode — Different types of fibre	
eristics and Iransm	teristic					ure and Skew mode, –Different types of fibre	
				Mech	stics:	nd graded index fibers,- fibrecharacteris	tep index and
		ectors ar	Conn	Mech on –	stics: ispersi	nd graded index fibers,– fibrecharacteris – Absorption losses – Scattering losses – Di	tep index and naracteristics, –
		ectors ar	Conn	Mech on –	stics: ispersi ectors:	nd graded index fibers, – fibrecharacteris – Absorption losses – Scattering losses – Di es: Light Emitting Diode (LED), – Optical dete	tep index and naracteristics, – Optical sources
splicers –Fibre termi	d splic	ectors ar	Conn Diode	Mech on – PIN I	tics: ispersi ectors: BRES	nd graded index fibers,- fibrecharacteris - Absorption losses - Scattering losses - Di es: Light Emitting Diode (LED), - Optical dete DUSTRIAL APPLICATION OF OPTICAL FI	tep index and naracteristics, – Optical sources Jnit II IND
splicers –Fibre termin e sensor, Extrinsic ser	d splic	ectors ar re/ Pressu	Conn Diode	Mech on – PIN I	tics: ispersi ectors: BRES nsor- 7	nd graded index fibers, – fibrecharacteris – Absorption losses – Scattering losses – Di es: Light Emitting Diode (LED), – Optical dete DUSTRIAL APPLICATION OF OPTICAL FIE ors: Types of fiber optics sensor, Intrinsic ser	tep index and haracteristics, – Optical sources Jnit II IND bre optic sense
splicers –Fibre termin e sensor, Extrinsic ser Fibre optic instrumen	d splic ire sen - Fibre	ectors ar	Conne Diode eratur	Mech on – PIN I empe	etics: ispersi ectors: BRES nsor- T ensor (	nd graded index fibers, – fibrecharacteris – Absorption losses – Scattering losses – Di es: Light Emitting Diode (LED), – Optical dete <b>DUSTRIAL APPLICATION OF OPTICAL FIE</b> ors: Types of fiber optics sensor, Intrinsic ser ed Fibre Optic Sensor and Displacement se	tep index and haracteristics, – Optical sources Jnit II IND bre optic sense hase Modulate
splicers –Fibre termin e sensor, Extrinsic ser Fibre optic instrumen eters, Fiber Scattering	d splic ire sen - Fibre neters,	ectors ar  e/ Pressu Sensor) - reflector	Conn Diode eratur nsic S omain	Mech on – PIN I empe Extrir cal do	stics: ispersi ectors: BRES nsor- T ensor ( , Optic	nd graded index fibers,- fibrecharacteris - Absorption losses - Scattering losses - Di es: Light Emitting Diode (LED), - Optical dete DUSTRIAL APPLICATION OF OPTICAL FIE ors: Types of fiber optics sensor, Intrinsic ser ed Fibre Optic Sensor and Displacement ser rement of attenuation (by cut back method).	tep index and naracteristics, – Optical sources <b>Jnit II IND</b> bre optic sense nase Modulate stem: Measure
splicers –Fibre termin e sensor, Extrinsic ser Fibre optic instrumen eters, Fiber Scattering eflection method and	d splic ire sen - Fibre neters, reflect	ectors ar e. re/ Pressu Sensor) - reflector ents, End	Conne Diode eratur nsic S omain ureme	Mech on – PIN I empe Extrir cal do neasu	stics: ispersi ectors: BRES nsor- T ensor ( , Optic rsion n	nd graded index fibers,- fibrecharacteris - Absorption losses - Scattering losses - Di es: Light Emitting Diode (LED), - Optical dete DUSTRIAL APPLICATION OF OPTICAL FIE ors: Types of fiber optics sensor, Intrinsic ser ed Fibre Optic Sensor and Displacement ser rement of attenuation (by cut back method), Fiber Absorption Measurement, Fiber disper	tep index and naracteristics, – Optical sources Jnit II IND bre optic senso nase Modulate stem: Measure easurement, F
splicers –Fibre termin e sensor, Extrinsic ser Fibre optic instrumen eters, Fiber Scattering eflection method and M) –Interferometric m	d splic ire sen - Fibre neters, reflect DM) –I	ectors ar e. Pressi Gensor) - reflector ents, End ulator (EC	Conne Diode eratur nsic S omain ureme modu	Mech on – PIN I empe Extrir cal do neasu	stics: ispersi ectors: BRES nsor- T ensor ( , Optic rsion n ilectro-	nd graded index fibers,- fibrecharacteris - Absorption losses - Scattering losses - Di es: Light Emitting Diode (LED), - Optical dete DUSTRIAL APPLICATION OF OPTICAL FIE ors: Types of fiber optics sensor, Intrinsic ser ed Fibre Optic Sensor and Displacement ser rement of attenuation (by cut back method), Fiber Absorption Measurement, Fiber disper echniques - Different types of modulators: E	tep index and naracteristics, – Optical sources Jnit II IND bre optic senso nase Modulater stem: Measure easurement, F eld scanning teo
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splicers –Fibre termin e sensor, Extrinsic ser Fibre optic instrumen eters, Fiber Scattering eflection method and M) –Interferometric m ent, voltage, liquid leve aser, Quasi Three and ctionality and Brightne ng – Types of lasers; - ement of velocity, Las easurement of Atmosp Material processing: Laser Melting, Condu Trimming, Types Of f Material Removal. Recording, Condition	d splic ire sen - Fibre neters, reflect DM) –I rrent, v Laser, v Laser, v Laser, v Laser, v remem Mater g, Lase r Trim Of Mat	ectors ar 	Conne Diode Diode Praturn Sic S Somain Ireme modu mpera , Three gence – Ca aser f and L pplica Lase occess ation: Of H ge- H	Mech on – PIN I Extrir cal do centric cal do coptic ure, te Laser Diverg cking oth, Li ltage AR A atil, Pr poriza	atics: ispersi ectors: BRES BRES BRES Insor- T ensor ( , Optic rsion n :lectro- pressu Level I ence, I node lo of leng ent, vo d LID/ ser Hea materi and vaj /, Prir graphi	Absorption losses – Scattering losses – Di es: Light Emitting Diode (LED), – Optical deter DUSTRIAL APPLICATION OF OPTICAL FIL ors: Types of fiber optics sensor, Intrinsic ser ed Fibre Optic Sensor and Displacement se rement of attenuation (by cut back method), Fiber Absorption Measurement, Fiber disper echniques – Different types of modulators: E to flength – Moire fringes – Measurement of f SER FUNDAMENTALS maracteristics of lasers – Level Lasers: Two-I roperties of laser: Monochromaticity, Cohere Resonator configuration – Q-switching and m ers, liquid lasers and semiconductor lasers. DUSTRIAL APPLICATION OF LASERS rement of distance, Laser for measurement f LIDAR, Construction And Working, and for material processing, Powder Feeder, Las and Key Hole Melting – Laser trimming of fu d Working Advantages – Material Removal a DUOGRAM AND MEDICAL APPLICATIONS sic Principle, Holography vs. photography logram, Reconstructing and viewing the holography logram, Reconstructing and viewing the holography	tep       index       and maracteristics, –         Optical sources       Jnit II       IND         bre optic sense       bre optic sense       for the sense         bre optic sense       mase Modulates         vistem: Measure       for the sense         easurement, F       for the sense         easurement, F       for the sense         easurement, F       for the sense         and amental char       for the sense         vel lasers – Proviser modes – R       for the sense         sers, solid lase       IND         user for measurement of a fact: Types of strumentation for mited Melting a construction And         Init V       HOI         polography: Base       Base         acording A Hold       Hold
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#### TEXT BOOK(S):

- 1. J.M. Senior, 'Optical Fibre Communication Principles and Practice', Prentice Hall of India, 1985
- J. Wilson and J.F.B. Hawkes, 'Introduction to Opto Electronics', Prentice Hall of India, 2001
   Eric Udd, William B., and Spillman, Jr., "Fiber Optic Sensors: An Introduction for Engineers and Scientists ", John Wiley & Sons, 2011.

#### **REFERENCE(S):**

- 1. G. Keiser, 'Optical Fibre Communication', McGraw Hill, 1995.
- M. Arumugam, 'Optical Fibre Communication and Sensors', Anuradha Agencies, 2002
   John F. Ready, "Industrial Applications of Lasers", Academic Press, Digitized in 2008
- 4. Monte Ross, 'Laser Applications', McGraw Hill, 1968
- 55 John and Harry, "Industrial lasers and their application", McGraw-Hill, 2002
- 6. Keiser, G., "Optical Fiber Communication", McGraw-Hill, 3rd Edition, 2000

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Course Code	ELECTRONICS AND INSTRUMENTA	ATION	I EN	GINE	ERING	R 2019	Semester VI	II PE
	Course Name	Hou	-	Veek		Total	Maximum M	larks
		L	Т	P	С	Hours		
19EIX20	INSTRUMENTATION IN FOODPROCESSING INDUSTRIES	3	0	0	3	45	100	
Course Object	ive (s): The purpose of learning this course	e is to		1.08	a second	ji çı an		
Provide	exposure to various techniques and methoc	ds that	occu	rs in t	he variou	us regions	s of foodanalysi	S
	dequate knowledge about various techniqu				food sul	ostances		
	out different controllers and indicators used							
	romatography and mass spectrometry to th							
industrie			Sector of the	as pot	tential ap	plications	s in foodand be	verag
Course Outcor	nes: At the end of this course, learners will	be ab	le to:					
	y the Role of moisture content in food and a							dity
	enzyme sensors, biosensors, Electronics N						dustries	
	ize the concepts of automatic controllers an							
	nt chromatography and mass spectrometry							
	other Analytical Equipment like Scanning el				oy, Tande	em Electr	onMicroscopy	
	ISTURE, TURBIDITY AND HUMIDITY MEA							9
	content in food - wet and dry method - IR te							ssing
	wet and dry bulb hygrometer - Electronic me					ur: Definit	ion and role,	
	hits, basic turbidity meter, light scattering an	d abso	orbtio	n type	Э.			
	D ENZYMES AND FLAVOUR				L		in a second second second	9
	nd flavour: Human olfaction - Importance of e	enzym	e ser	isors ·	- biosens	ors -sens	ing arrays- Elec	tronic
Nose. UNIT III CON	ITROLLERS AND INDICATORS		-					9
						-	h e via e è vatue II e v i	
preservation	cept - Temperature controller in dryer - ratio				1		nericcontroller	
UNIT IV CHR	OMATOGRAPHY AND MASS SPECTRO	METR	Y IN	FOOL	D INDUS	TRY		9
Basics of gas and	l liquid chromatography - GC and HPLC Ap	plication	on in	food	analysis ·	- MS appl	licationin food a	nalysi
COMPANY AND A STOCK OF	ER ANALYTICAL EQUIPMENTS							9
ourier transform	n Infra red spectroscopy, Scanning elect	tron n	nicros	сору	, Tander	n Electro	on Microscopy.	170
Fourier transform		tron n	nicros	сору	, Tander	n Electro	on Microscopy.	170
Fourier transform fluorescence - Dif TEXT BOOK(S):	n Infra red spectroscopy, Scanning elect fferential Scanning Calorimenter							X-ray
Fourier transform luorescence - Dif TEXT BOOK(S): 1. Nielsen, 5	n Infra red spectroscopy, Scanning elect							X-ray
Fourier transform fluorescence - Dif TEXT BOOK(S): 1. Nielsen, 3 2004	n Infra red spectroscopy, Scanning elect fferential Scanning Calorimenter S.S,-Introduction to the chemical analysis o	of food	ls- Jo	ones a	and Bartl	ett Publis	hers, Boston, L	X-ray
Fourier transform luorescence - Dif <b>TEXT BOOK(S):</b> 1. Nielsen, 3 2004 2. Mahindru	n Infra red spectroscopy, Scanning elect fferential Scanning Calorimenter S.S,-Introduction to the chemical analysis o ,S.N, -Food additives. Characteristics, de	of food	ls- Jo	ones a	and Bartl	ett Publis	hers, Boston, L	X-ray
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# **OPEN ELECTIVES**

Department		-	the second se		RING	R 2019	OE
Course Code	Course Name				Credit	Total	Maximum Marks
1051001	BADAB AND NAVICATION AIDS	L		P	C	Hours	100
19EIY01	RADAR AND NAVIGATION AIDS ive (s): The purpose of learning this cours	3	0	0	3	45	100
Apply Do     Refresh     Learn ab     Know ab     Course Outcor	nd discuss the Radar equation and the nat oppler principle to radars and hence detect principles of antennas and propagation as yout the principles of navigation, in addition yout the navigation ships from shore to sho mes: At the end of this course, learners with	t moving related n to app pre Il be abl	g target to rada roach a e to	ts, clu ars, a and la	also stud anding a	y of transm ids as relat	hitters and receivers. ted to navigation
<ul> <li>Derive an</li> <li>Describe</li> <li>Understa</li> </ul>	principles of navigation, in addition to appro nd discuss the Range equation and the na a about the navigation systems using the se and principles of navigation, in addition to a and navigation ships from shore to shore	ture of o atellite.	detectio	on.			
	RODUCTION TO RADAR EQUATION			1.1.1			9
Signals - Signal- Parameters- Sys							
Unit II MTI	AND DUILOF DODDI FD DADAD						
	AND PULSE DOPPLER RADAR		~				9
ntroduction to D ilter Banks - Dig vith Radar –Mon	oppler and MTI Radar- Delay –Line Cano gital MTI Processing - Moving Target Dete opulse Tracking –Conical Scan and Seque DAR TRANSMITTERS AND RECEIVERS	ector - L ential Lo	imitatic	ons to	o MTI - F	Pulse Dopp	requencies –Doppler bler Radar –Tracking
ntroduction to D ilter Banks - Dig vith Radar –Mon Unit III RAI htroduction –Line RF Power Source	oppler and MTI Radar- Delay –Line Cano gital MTI Processing - Moving Target Dete opulse Tracking –Conical Scan and Seque DAR TRANSMITTERS AND RECEIVERS ear Beam Power Tubes - Solid State RF P es The Radar Receiver - Receiver noise F	ector - L ential Lo ower So	imitatic obing - ources	Limit	o MTI - F tations to ignetron	Pulse Dopp Tracking	requencies –Doppler oler Radar –Tracking Accuracy 9 Field Amplifiers - Oth
ntroduction to D Filter Banks - Dig with Radar –Mon Unit III RAI ntroduction –Line RF Power Source Protectors- Rada	oppler and MTI Radar- Delay –Line Cano gital MTI Processing - Moving Target Dete opulse Tracking –Conical Scan and Seque DAR TRANSMITTERS AND RECEIVERS ear Beam Power Tubes - Solid State RF P es The Radar Receiver - Receiver noise F	ector - L ential Lo ower So	imitatic obing - ources	Limit	o MTI - F tations to ignetron	Pulse Dopp Tracking	requencies –Doppler oler Radar –Tracking Accuracy 9 Field Amplifiers - Oth
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ntroduction to D.         Filter Banks - Dig         with Radar - Mon         Unit III       RAI         ntroduction - Line         Protectors- Rada         Unit IV       RAI         Protectors- Rada         Unit IV       RAI         ntroduction - Fou         The Goniometer         Commutated Aeri         VHF Omni Dir         Developments.         Unit V       SAT	oppler and MTI Radar- Delay –Line Cano gital MTI Processing - Moving Target Dete opulse Tracking –Conical Scan and Seque DAR TRANSMITTERS AND RECEIVERS ear Beam Power Tubes - Solid State RF P es The Radar Receiver - Receiver noise F r Displays. DIO DIRECTION AND RANGES ur methods of Navigation The Loop Ante - Errors in Direction Finding - Adhoc ial Direction Finder - Range and Accuracy rectional Range(VOR) - VOR Receiving	ector - L ential Lo ower So igure – igure – Directio of Direc Equipt	imitatic obing - ources Super oop Inp on Finc tion Fin ment -	- Ma heter but C ders nders Rar	o MTI - F tations to gnetron rodyne F ircuits - 7 - Autom s - The Lf nge and	Pulse Dopp Tracking Crossed Receiver - E An Aural N natic Direc F/MF Four Accuracy	requencies –Doppler oler Radar –Tracking Accuracy 9 Field Amplifiers - Oth Duplexers and Receiv 9 Iull Direction Finder - tion Finders – The course Radio Range of VOR – Recent 9
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Department	ELECTRONICS AND INSTRUMENTA	and the second s			and the second se	R 2019	OE	
Course Code	Course Name	Hour			Credit	Total	Maximum Ma	arks
		L	Т	P	C	Hours	100	_
19EIY02	ELECTRONIC INSTRUMENTATION ive (s): The purpose of learning this course	3	0	0	3	45	100	
Provide analyzer     Introduce Educate     Give exp Course Outcor     Underst Gained H analyzer     Describe Understa Exposed Jnit I ELE ectronic Voltmo oltmeter – Elect MM with auto ra	e different types of waveform generators an on virtual instrumentation, its applications, osure to telemetry, modulation techniques a <b>nes:</b> At the end of this course, learners will and and analyze Instrumentation systems a mowledge on various types of cathode ray s. the different types of waveform generators and the virtual instrumentation, its applicatio to telemetry, modulation techniques and m <b>CTRONIC INSTRUMENTS</b> eter and their advantages – Types, Differe ronic multimeter and ohmmeter – Current m anging and self diagnostic features. <b>THODE RAY OSCILLOSCOPE &amp; SIGNAL</b>	oscillo progran and mu be able and the oscillos and an oscillos and an oscillos and an oscillos and an ans, pro aultiple>	scope yzers a mming <u>ultiplex</u> e to ir appl scopes nalyze ogrami king. mplifie	s, the and t g and king. lication s, the ers ar ming er, so – Por	eir applic their appl I DAQ ca ons to va eir applica and their a and DAQ	ications. rds and mo rious indust ations and c pplications. Ω cards and ower, rectifi surement - I	dules. ries. lifferent types of s modules. er – Truerms rea Microprocessor ba	signa ding asec
	cathode ray oscilloscope – Dual trace, de				mpling o	scilloscope	s- Analog and di	-
	ope - frequency selective and heterodyne							
nalyzer.	spe - nequency selective and neterodyne	wave e	anaiyz	.01	namon	c distortion	analyzer opeo	urun
	VEFORM GENERATORS		-			the second	S TOTAL	9
lien's bridge ar	d phase shift oscillators – Hartley and cr shape generator - Signal and function g							
		Jeriera		Q.	motor		Journere.	9
	tation (VI) - Definition, flexibility - Block	diagra	m and	d arc	chitecture	of virtual	instruments – Vi	-
struments versi	us traditional instruments – Software in virtu plications – DAQ modules with serial con	ual inst	rumer	ntatio				
	EMETRY			40). 	2-11 - 11	1. 1. 1. 1.	and the second sec	9
and the second sec	v system - voltage, current and position tel	emetry	svste	ems	- Radio	frequency t	elemetry – Freque	ency
	-amplitude modulation and pulse-code mod							
XT BOOK(S):								101
1. A.D. Helf	rick and W.D. Cooper, Modern Electronic	Instrum	nentati	ion a	nd Meas	urement Te	echniques, Prentio	ce H
	ate Ltd., New Delhi, 2010. 3ell, "Electronic Instrumentation and Measu	romon	to" O	for	Universit	Prose 20	12	
	., Virtual Instrumentation using Lab VIEW, I							
3. Jerome J EFERENCE(S):		Prenuc	e naii	mai	a Privale	Ltd., New L	Jeini,2010.	
	i, Electronic Instrumentation, Tata McGraw	Hill N		alhi (	2010			
	Elements of Electronic Instrumentation and					Education In	ndia New Delhi 2	011
	nand, Electronics Instruments and Instrume							
					9,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		10, 11011 00111, 20	00.
3. M.M.S. A	upta VirtualInstrumentationusing abview T	alawica	Graw-	Hill E	-ducation			
3. M.M.S. A	upta, VirtualInstrumentationusingLabview,T	atalvic	Graw-	Hill E	Education			17
3. M.M.S. A	upta, VirtualInstrumentationusingLabview,T	atawic	Graw-	Hill E	Education		11. /	ic.
3. M.M.S. A	upta, VirtualInstrumentationusingLabview,T	atamic	Graw-	Hill E	Educatior		by/	1
3. M.M.S. A	upta, VirtualInstrumentationusingLabview,T	atalvic	Graw-	Hill E	Educatior		by	
3. M.M.S. A	upta, VirtualInstrumentationusingLabview,T	atalvic	Graw-	<u>Hill E</u>	Educatior	n,2010.	Wy Bos	17
3. M.M.S. A	upta, VirtualInstrumentationusingLabview,T	atamo	Graw-	<u>Hill E</u>	Educatior	n,2010.	irman - BoS of EIE - ESE	c

Department	ELECTRONICS AND INSTRUMEN	TATION	I EN	GINE	ERING	R 2019	OE	
Course Code	Course Name	Hour	s/W	leek	Credit	Total Hours	Maximum	Marks
		L	T	P	С			
19EIY03	SENSOR TECHNOLOGY	3	0	0	3	45	100	
	ive (s): The purpose of learning this cour							
	nowledge about various sensors in multic							
	and the concept of sensing circuits and its							
<ul> <li>Familiari</li> </ul>	ze students with different applications an	d its mat	erial	handl	ing techn	ology.		
	oout sensor for different industrial applica							
<ul> <li>Knowled</li> </ul>	ge about the modern technologies to des	sign vario	ous se	ensor	S.			
	mes: At the end of this course, learners v							
	ize the static and dynamic characteristics							
	e the characteristics and working principle							
	t the interfacing and signal conditioning o		mea	surer	nent syste	em using differe	nt types of se	nsor
	uitable sensor for different industrial appli							
	the modern technologies to design vario				1.1074			
	NSORS FUNDAMENTALS AND CHARA		Contraction of the local sectors of the local secto		1.1.2	1073		9
	les of Sensing-Sensor Classification ar	nd termin	nology	/- Un	its of Me	easurements - N	Measurands-	Sensor
	static and Dynamic.		150.04	51.15			and the state	
	SICAL PRINCIPLES OF SENSING							9
	Fields, and Potentials; Capacitance; Ma							Effect;
	Thermal Properties of Material; Heat Tra	anster; L	ignt; i	Jyna	mic wode	els of Sensor Ele	ements	10
and the second se	ERFACE ELECTRONIC CIRCUITS	aitation (	Virguit	- An	alog to F	Vigital Convertor	Direct Digi	9
	stics of Interface Circuits, Amplifiers, Exc Bridge Circuits, Data Transmission, Batte						s, Direct Digi	uzatior
and the second se	SORS IN DIFFERENT APPLICATION	the second division of	_0001	Ower	06113013			9
	Motion Detectors; Position, Displacement	and the second se	vel: V	elocit	v and Ac	celeration. Force	e Strain and	
	e Sensors, Temperature Sensors		vci, v	cioci	ly and no	ocieration, r ore	c, otrain, and	ractic
	SOR MATERIALS AND TECHNOLOGI	ES						9
	ce Processing-MEMS microsystem co		ts- I	Micro	fluidics r	nicrosystem co	mponents -	
	ctronic/wireless integration							
XT BOOK(S):		(19) (19) (19) (19) (19) (19) (19) (19)					1. A. 1997 A. 1997	
	n, Handbook of Modern Sensors:Physical	l, Design	s, an	d App	lications,	AIP Press, Spri	inge.	
EFERENCE(S)	in the second						1.24	
	nabis, Sensors and Transducers, PHI Pul							
2. Mechatro	nics -Ganesh S. Hegde, Published by	Universit	v Sci	ence	Press (A	n imprint of La	xmi Publicatio	n Priva

2. Mechatronics -Ganesh S. Hegde, Published by University Science Press (An imprint of Laxmi Publication Private Limited)

Department	ELECTRONICS AND INSTRUMENT			and the second second second		R 2019	OE
Course Code	Course Name	Hour	s/W	leek	Credit	Total Hours	Maximum Marks
		L	Т	P	С	1 Standard	
19EIY04	INSTRUMENTATION IN AEROSPACE AND NAVIGATION	3	0	0	3	45	100
Course Object	ive (s): The purpose of learning this cours	se is to		0	part a	ALC: N. 1. 1. 1.	
<ul> <li>Understa</li> </ul>	and the concept of instruments used in the	aircraft	t and	aeros	space.		
<ul> <li>Analyze</li> </ul>	the different types of flight control system	and nav	vigatio	on.			
<ul> <li>Identify t</li> </ul>	ne sensor and controls used in satellite ar	nd space	e veh	icle.			
<ul> <li>Identify t</li> </ul>	ne suitable flight control scheme for a give	en situat	tion.				
	out the working principle of instrumentation			and s	space vel	nicle	
	nes: At the end of this course, learners wi				-		
	he principles of measuring instruments an			for air	craft and	aerospace	
<ul> <li>Applicati</li> </ul>							
	appropriate navigation system for a give	n proble	m				
	suitable flight control scheme for a given s						
	nd the working principle of instrumentatio			and e	nace veh	icle	
	CRAFT AND AEROSPACE VEHICLE IN						9
- Contraction -	nts - types of air speeds - Air data instrume					licator altitude	
	uments - turn and back indicator - artifici						
ensors and actu		ai nonz	011	21000	i ornio ingi	it mot amont a	
and the second	DIO NAVIGATION AIDS				1.0		9
	s types - Automatic direction finder - dista	nce me	asuri	na ea	nuipment	's - non directio	
	r - instruments landing system - microwa						
	cal Air Navigation - radar basic terminolog						
	GHT CONTROL SYSTEM						9
	control, flight control surfaces, flight contr	ol linkad	ae sv	stems	. Autopil	ot system , trim	and feel, flight control
stustion flucture	rire system, fly by light fcs, Airbus and Boe	ing imp	leme	ntatio	ns, Interr	elationship of fl	ight control, guidance
cluation, ily by v							0
nd vehicle mana	gement systems.						
nd vehicle mana	gement systems. ELLITE AND SPACE VEHICLE INSTRU	MENTA	TION	1	1.		9
nd vehicle mana Unit IV SA1	gement systems. ELLITE AND SPACE VEHICLE INSTRU	and the second	and the second se		un senso	ors - Horizon se	
nd vehicle mana Unit IV SAT Global Positionin	gement systems. ELLITE AND SPACE VEHICLE INSTRU g System (GPS) - propulsion controls - p	ropulsio	on un	it - S			ensors - star tracker -
nd vehicle mana Unit IV SAT Bobal Positionin tabilisation cont	gement systems. ELLITE AND SPACE VEHICLE INSTRU	ropulsio ation (G	on un AGAN	it - S V) and	d Indian I	Regional Navig	ensors - star tracker -
nd vehicle mana Unit IV SAT Blobal Positionin tabilisation cont RNSS) - Local A	gement systems. ELLITE AND SPACE VEHICLE INSTRU g System (GPS) - propulsion controls - p rols - GPS Aided GEO Augmented Naviga	ropulsio ation (G Area Au	on un AGAN ugme	it - S V) and	d Indian I	Regional Navig	ensors - star tracker -
Ind vehicle mana Unit IV SAT Blobal Positionin Btabilisation cont IRNSS) - Local A Unit V AIR	gement systems. ELLITE AND SPACE VEHICLE INSTRU g System (GPS) - propulsion controls - p rols - GPS Aided GEO Augmented Naviga area Augmentation System (LASS), Wide	oropulsion ation (G, Area Au MENTA	on un AGAN ugme <b>FION</b>	it - S N) and ntatio	d Indian I on Systen	Regional Naviga n (WAAS).	ensors - star tracker - ation Satellite System 9
Ind vehicle mana       Unit IV     SA1       Global Positionin       Global Position cont       RNSS) - Local A       Unit V     AIR       Basic description       /ibration measur	gement systems. ELLITE AND SPACE VEHICLE INSTRU g System (GPS) - propulsion controls - p rols - GPS Aided GEO Augmented Naviga virea Augmentation System (LASS), Wide CRAFT FLIGHT SIMULATION INSTRUM of a flight simulator - Solution of Aerodyn ements - Tachometers -Temperature gau	ropulsio ation (G Area Au <b>IENTA</b> amics e iges - P	on un AGAN ugme FION equati Pressu	it - S N) and ntatio ons - ure ga	d Indian I on Systen various auges - C	Regional Naviga n (WAAS). types of aircraft Operation and F	ensors - star tracker - ation Satellite System 9 engine instruments -
nd vehicle mana Unit IV SAT Blobal Positionin tabilisation cont RNSS) - Local A Unit V AIR asic description ibration measur	gement systems. ELLITE AND SPACE VEHICLE INSTRU g System (GPS) - propulsion controls - p rols - GPS Aided GEO Augmented Naviga virea Augmentation System (LASS), Wide CRAFT FLIGHT SIMULATION INSTRUM of a flight simulator - Solution of Aerodyn	ropulsio ation (G Area Au <b>IENTA</b> amics e iges - P	on un AGAN ugme FION equati Pressu	it - S N) and ntatio ons - ure ga	d Indian I on Systen various auges - C	Regional Naviga n (WAAS). types of aircraft Operation and F	ensors - star tracker - ation Satellite System 9 engine instruments -
Ind vehicle mana         Unit IV       SA1         Blobal Positionin         Stabilisation cont         RNSS) - Local A         Unit V       AIR         Basic description         fibration measur         ituation Indicato         EXT BOOK(S):	gement systems. ELLITE AND SPACE VEHICLE INSTRU g System (GPS) - propulsion controls - p rols - GPS Aided GEO Augmented Naviga wrea Augmentation System (LASS), Wide CRAFT FLIGHT SIMULATION INSTRUM of a flight simulator - Solution of Aerodyn ements - Tachometers -Temperature gau r - Simulation of autopilot system - Dopple	ation (G Area Au <b>IENTA</b> amics e ges - P er and Ir	on un AGAN ugme FION equati ressu nertial	it - S N) and ntatio ons - ire ga I Navi	d Indian I on Systen various auges - C igation in	Regional Navigan (WAAS). Types of aircraft Operation and F struments	ensors - star tracker - ation Satellite System 9 engine instruments - Principles - Horizontal
nd vehicle mana         Unit IV       SA1         Blobal Positionin         tabilisation cont         RNSS) - Local A         Unit V       AIR         asic description         ibration measurituation Indicato         EXT BOOK(S):         1. John G.	gement systems. ELLITE AND SPACE VEHICLE INSTRU g System (GPS) - propulsion controls - p rols - GPS Aided GEO Augmented Naviga wrea Augmentation System (LASS), Wide CRAFT FLIGHT SIMULATION INSTRUM of a flight simulator - Solution of Aerodyn ements - Tachometers -Temperature gau r - Simulation of autopilot system - Dopple Webster and HalitEren, "Measurement,	ation (G Area Au <b>IENTA</b> amics e ges - P er and Ir	on un AGAN ugme FION equati ressu nertial	it - S N) and ntatio ons - ire ga I Navi	d Indian I on Systen various auges - C igation in	Regional Navigan (WAAS). Types of aircraft Operation and F struments	ensors - star tracker - ation Satellite System 9 engine instruments - Principles - Horizontal
nd vehicle mana         Unit IV       SA1         Slobal Positionin         tabilisation cont         RNSS) - Local A         Unit V       AIR         asic description         ibration measur         ituation Indicato         EXT BOOK(S):         1. John G.         Francis G	gement systems. ELLITE AND SPACE VEHICLE INSTRU g System (GPS) - propulsion controls - p rols - GPS Aided GEO Augmented Naviga wrea Augmentation System (LASS), Wide CRAFT FLIGHT SIMULATION INSTRUM of a flight simulator - Solution of Aerodyn ements - Tachometers -Temperature gau r - Simulation of autopilot system - Dopple Webster and HalitEren, "Measurement, iroup, New York, 2014.	ation (G Area Au <b>IENTA</b> amics e ges - P er and Ir	on un AGAN ugme FION equati ressu nertial	it - S N) and ntatio ons - ire ga I Navi	d Indian I on Systen various auges - C igation in	Regional Navigan (WAAS). Types of aircraft Operation and F struments	ensors - star tracker - ation Satellite System 9 engine instruments - Principles - Horizontal
nd vehicle mana Unit IV SAT Slobal Positionin tabilisation cont RNSS) - Local A Unit V AIR asic description ibration measur ituation Indicato EXT BOOK(S): 1. John G. Francis G EFERENCE(S):	Agement systems. ELLITE AND SPACE VEHICLE INSTRU g System (GPS) - propulsion controls - p rols - GPS Aided GEO Augmented Naviga Augmentation System (LASS), Wide CRAFT FLIGHT SIMULATION INSTRUM of a flight simulator - Solution of Aerodyn ements - Tachometers -Temperature gau r - Simulation of autopilot system - Dopple Webster and HalitEren, "Measurement, iroup, New York, 2014.	ropulsion Area Au <b>IENTA</b> amics e Iges - P er and Ir	on un AGAN ugme <b>FION</b> equati ressu hertial	it - S N) and ntatio ons - ure ga I Navi on, a	d Indian I on System various auges - C igation in and Sens	Regional Navig n (WAAS). types of aircraft Operation and F struments ors Handbook'	ensors - star tracker - ation Satellite System 9 engine instruments - Principles - Horizontal 4, CRC Press, Taylor
nd vehicle mana         Unit IV       SA1         Slobal Positionin         tabilisation cont         RNSS) - Local A         Unit V       AIR         asic description         ibration measur         ituation Indicato         EXT BOOK(S):         1. John G.         Francis G         EFERENCE(S):         1. Nagaraja	Igement systems. ELLITE AND SPACE VEHICLE INSTRU g System (GPS) - propulsion controls - p rols - GPS Aided GEO Augmented Naviga area Augmentation System (LASS), Wide CRAFT FLIGHT SIMULATION INSTRUM of a flight simulator - Solution of Aerodyn ements - Tachometers -Temperature gau r - Simulation of autopilot system - Dopple Webster and HalitEren, "Measurement, iroup, New York, 2014. N.S., "Elements of Electronic Navigation"	Area Au Area Au <b>IENTA</b> amics e Iges - P er and Ir Instrume	AGAN Jgme <b>FION</b> Pressu Pressu Pertial entati	it - S N) and ntatio ons - ire ga Navi on, a w Hill	d Indian I on System various auges - C igation in and Sens I Publishi	Regional Navig n (WAAS). types of aircraft Operation and F struments ors Handbook' ng Ltd., New Do	ensors - star tracker - ation Satellite System 9 engine instruments - Principles - Horizontal 4, CRC Press, Taylor
nd vehicle mana         Unit IV       SA1         Slobal Positionin         tabilisation cont         RNSS) - Local A         Unit V       AIR         asic description         ibration measur         ibration Indicato         EXT BOOK(S):         1. John G.         Francis G         EFERENCE(S):         1. Nagaraja         2. Keyton.M	Igement systems. ELLITE AND SPACE VEHICLE INSTRU g System (GPS) - propulsion controls - p rols - GPS Aided GEO Augmented Navigation area Augmentation System (LASS), Wide CRAFT FLIGHT SIMULATION INSTRUM of a flight simulator - Solution of Aerodyn ements - Tachometers -Temperature gau r - Simulation of autopilot system - Dopple Webster and HalitEren, "Measurement, iroup, New York, 2014. N.S., "Elements of Electronic Navigation" and Walker.R, Fried, "Avionics navigation"	Area Au Area Au <b>IENTA</b> amics e ges - P er and Ir Instrume , Tata M system	AGAN ugme <b>FION</b> equati ressu hertial entati	it - S N) and ntatio ons - ire ga Navi on, a w Hill hn W	d Indian I on System various auges - C igation in and Sens I Publishi <i>I</i> iley, 199	Regional Navig n (WAAS). Types of aircraft Operation and F struments ors Handbook' ng Ltd., New Do 7.	ensors - star tracker - ation Satellite System 9 engine instruments - Principles - Horizontal 7, CRC Press, Taylor elhi, 2006.
und vehicle mana         Unit IV       SA1         Global Positionin         Stabilisation cont         ERNSS) - Local A         Unit V       AIR         Basic description         /ibration measur         Situation Indicato         EXT BOOK(S):         1. John G.         Francis G         EFERENCE(S):         1. Nagaraja         2. Keyton.M         3. Pallett E.	Agement systems. ELLITE AND SPACE VEHICLE INSTRU g System (GPS) - propulsion controls - p rols - GPS Aided GEO Augmented Navigative and Augmentation System (LASS), Wide CRAFT FLIGHT SIMULATION INSTRUM of a flight simulator - Solution of Aerodyn ements - Tachometers -Temperature gau r - Simulation of autopilot system - Dopple Webster and HalitEren, "Measurement, froup, New York, 2014. N.S., "Elements of Electronic Navigation" and Walker.R, Fried, "Avionics navigation G.H., "Aircraft Instrumentation and Integra	Area Au Area Au <b>IENTA</b> amics e ges - P er and Ir Instrume , Tata M system ted Sys	AGAN ugme <b>FION</b> equati ressu- nertial entati Acgra ns",Jo	it - S N) and ntatio ons - ure ga I Navi on, a on, a w Hill hn W ", Lor	d Indian I on System various + auges - C igation in and Sens I Publishi /iley, 199 ngman So	Regional Navig n (WAAS). Types of aircraft Operation and F struments ors Handbook' ng Ltd., New Do 7. cientific and Tea	ensors - star tracker - ation Satellite System 9 engine instruments - Principles - Horizontal 7, CRC Press, Taylor elhi, 2006. chnical, 1992
Ind vehicle management         Unit IV       SAT         Solobal Positionin         Stabilisation cont         ERNSS) - Local A         Unit V       AIR         Basic description         fibration measur         ibration Indicato         EXT BOOK(S):         1. John G.         Francis G         EFERENCE(S):         1. Nagaraja         2. Keyton.M         3. Pallett E.         4. Ching-Fa	Igement systems. ELLITE AND SPACE VEHICLE INSTRU g System (GPS) - propulsion controls - p rols - GPS Aided GEO Augmented Navigation area Augmentation System (LASS), Wide CRAFT FLIGHT SIMULATION INSTRUM of a flight simulator - Solution of Aerodyn ements - Tachometers -Temperature gau r - Simulation of autopilot system - Dopple Webster and HalitEren, "Measurement, iroup, New York, 2014. N.S., "Elements of Electronic Navigation" and Walker.R, Fried, "Avionics navigation"	Area Au Area Au <b>IENTA</b> amics e ges - P er and Ir Instrume , Tata M system ted Sys	AGAN ugme <b>FION</b> equati ressu- nertial entati Acgra ns",Jo	it - S N) and ntatio ons - ure ga I Navi on, a on, a w Hill hn W ", Lor	d Indian I on System various + auges - C igation in and Sens I Publishi /iley, 199 ngman So	Regional Navig n (WAAS). Types of aircraft Operation and F struments ors Handbook' ng Ltd., New Do 7. cientific and Tea	ensors - star tracker - ation Satellite System 9 engine instruments - Principles - Horizontal 7, CRC Press, Taylor elhi, 2006. chnical, 1992
nd vehicle mana         Unit IV       SA1         Slobal Positionin         Stabilisation cont         RNSS) - Local A         Unit V       AIR         asic description         ibration measur         ibration Indicato         EXT BOOK(S):         1. John G.         Francis G         EFERENCE(S):         1. Nagaraja         2. Keyton.M         3. Pallett E.         4. Ching-Fa         1991	Agement systems. ELLITE AND SPACE VEHICLE INSTRU g System (GPS) - propulsion controls - p rols - GPS Aided GEO Augmented Navigative and Augmentation System (LASS), Wide CRAFT FLIGHT SIMULATION INSTRUM of a flight simulator - Solution of Aerodyn ements - Tachometers -Temperature gau r - Simulation of autopilot system - Dopple Webster and HalitEren, "Measurement, froup, New York, 2014. N.S., "Elements of Electronic Navigation" and Walker.R, Fried, "Avionics navigation G.H., "Aircraft Instrumentation and Integra	Area Au Area Au <b>IENTA</b> amics e ges - P er and Ir Instrume , Tata M system ted Sys d contro	AGAN ugme FION equati ressu- nertial entati Acgra s", Jo stems of pro-	it - S N) and ntatio ons - ure ga Navi on, a on, a w Hill hn W ", Lor cessi	d Indian I on System various - auges - C igation in and Sens I Publishi /iley, 199 ngman So ng", Prer	Regional Naviga n (WAAS). Types of aircraft Operation and F struments ors Handbook' ng Ltd., New Do 7. cientific and Tea tice hall, Engle	ensors - star tracker - ation Satellite System 9 engine instruments - Principles - Horizontal 7, CRC Press, Taylor elhi, 2006. chnical, 1992 ewood cliffs, New Jers

Chairman - BoS Dept. of EIE - ESEC

Department	ELECTRONICS AND INSTRUMENTAT					R 2019	OE
Course Code	Course Name	Ηοι		in the second second	<pre>Credit</pre>	Total	Maximum Marks
		L	Т	P	С	Hours	
19EIY05	INDUSTRIAL PROCESS AUTOMATION		0	0	3	45	100
	tive (s): The purpose of learning this course is		1				
	and the fundamentals of Programmable Logic				), Superv	isory Con	trol
	quisition (SCADA) and Distributed Control Sys						
	n and configure the advanced controller for a g	iven	appl	ication	1		
	bout the interfacing methods in DCS					1.1.2	
	ize the functions of different communication pr				1.00	_	5
	mes: At the end of this course, learners will be		e to				
	t the architecture and concepts of PLC program						
	PLC and Supervisory Control and Data Acqui	sitio	n (SC	CADA)	for variou	us applica	tions
	e the concepts of Distributed Control System						
	the interfacing methods in DCS						
	ent the communication protocol for given applic	atio	n	1			
and the second se	OGRAMMABLE LOGIC CONTROLLER						9
	Cs- Components of PLC - Architecture of PLC	- D	iscre	te and	analog I	O module	es - Programming
anguages Lac		-	1				
	C SCADA AND ITS APPLICATIONS						9
	LC - Program control instructions, math instruct						is, sequencer and
Unit III DIS	ructions - Introduction to SCADA - component TRIBUTED CONTROL SYSTEM	s or	SCA	DA - Te	eatures of	SCADA	9
and the second se	rchitectures - Comparison - Local control unit	Dre		interf	olna loor	100	9
	ERFACES IN DCS	PIC	cess	intena	acing issu	les	9
	ces - Low level and high level operator interfa	000	Die	nlave	Engino	oring into	
	ngineering interfaces - Factors to be considere					ening inter	laces - Low level
	MMUNICATION PROTOCOLS	u m	30100		00	1.0711	9
	ommunication protocols- TCP/IP protocol - HAI	RT c	omm	unicat	or protoc	ol – Media	
Data link control	protocol - PROFI bus - Mod bus - CAN bus-	Field	bus	: Gene	eral Field	bus archi	tecture. Field bus
standard, Field b					-		
TEXT BOOK(S)							C 10 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1. F.D. Pet	ruzella, Programmable Logic Controllers, Tat	a Mo	c-Gra	w Hill	, Third ed	dition, 20°	10 Benjamin C Kuo
	ic Control Systems, Prentice Hall of India, 2012	2					
REFERENCE(S)							
	rk, Steve Mackay, Edwin Wright, Practical d /Elsevier, 2013	ata	com	nunica	ations for	instrume	ntation and control
2. K. L.S. S	harma, Overview of Industrial Process Automa	ation	, Els	evier, 2	2011		
3. John WV 2013	Webb and Ronald A Resis, Programmable Log	ic Co	ontrol	ler, Pr	entice Ha	ll of India	Pvt. Ltd., New Delhi
4. Michael							

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	ELECTRONICS AND INSTRUMENTATIO		1		and the second se	R 2019	OE
Course Code	Course Name	Hour	's / V	Veek	Credit	<b>Total Hours</b>	Maximum Mark
	A SHORE A HEALTH CONTRACTOR AND A	L	T	P	С		
19EIY06	PROGRAMMABLE LOGIC CONTROLLER	3	0	0	3	45	100
<ul> <li>Impart k</li> <li>Learn al</li> <li>Underst</li> <li>Learn al</li> <li>Familiar</li> <li>Course Outco</li> <li>Explain</li> <li>Summar</li> <li>Select tr</li> <li>Attribute</li> </ul>	tive (s): The purpose of learning this course is to nowledge about automation. bout architecture of PLC and the PLC programming using timers and count bout the advanced PLC functions ize the student with applications mes: At the end of this course, learners will be ab the fundamentals Concepts of Automation rize the architecture and interfacing techniques of the suitable PLC Programming languages the various functions and instruction sets of PLC e a suitable logical programming for given applica	le to PLC	nd				
	RODUCTION TO AUTOMATION	lions		15.1			9
	tomation -Types of automation -Fixed, flexible	and	nroar	amm	able au	tomation - R	T
	ess - open loop system and closed loop system -						
	ed and Laser - Actuators : Solenoid valve – servo			i sen	3013 - 11	Ioxining Senso	is. Oapacitive and
	CHITECTURE OF PLC	moto					
							9
		lemor	v Ma	nping	a - Input	and Output n	9 nodules: Discrete
omponents of	PLC - Processor - Memory: Types of memory, N						
omponents of nalog -Scan tin	PLC - Processor - Memory: Types of memory, M ne of PLC -Interfacing computer and PLC: RS232,						
omponents of nalog -Scan tin Unit III PLO	PLC - Processor - Memory: Types of memory, M ne of PLC -Interfacing computer and PLC: RS232, C PROGRAMMING	RS48	85, Et	thern	et - Sele	ction criteria fo	or PLC 9
omponents of nalog -Scan tin Unit III PLO rogramming mo	PLC - Processor - Memory: Types of memory, M ne of PLC -Interfacing computer and PLC: RS232, C PROGRAMMING ethods - Ladder logic - Function block diagram (FI	RS48 3D) -	85, Ef	thern ture	et - Sele text - La	ction criteria fo	or PLC <b>9</b> ponents: Boolean
omponents of nalog -Scan tin Unit III PLO rogramming mo gic using ladde	PLC - Processor - Memory: Types of memory, M ne of PLC -Interfacing computer and PLC: RS232, C PROGRAMMING ethods - Ladder logic - Function block diagram (Fi r logic programming-Timers: On Delay timer, OFF	RS48 3D) -	85, Ef	thern ture	et - Sele text - La	ction criteria fo	or PLC <b>9</b> ponents: Boolean
omponents of nalog -Scan tin Unit III PLC rogramming mo gic using ladde nd Down Count	PLC - Processor - Memory: Types of memory, M ne of PLC -Interfacing computer and PLC: RS232, C PROGRAMMING ethods - Ladder logic - Function block diagram (Fil r logic programming-Timers: On Delay timer, OFF rer	RS48 3D) -	85, Ef	thern ture	et - Sele text - La	ction criteria fo	pr PLC 9 ponents: Boolean nters: Up Counter
omponents of nalog -Scan tin Unit III PLC rogramming me gic using ladde nd Down Count Unit IV AD	PLC - Processor - Memory: Types of memory, M ne of PLC -Interfacing computer and PLC: RS232, C PROGRAMMING ethods - Ladder logic - Function block diagram (Fi r logic programming-Timers: On Delay timer, OFF rer VANCED PLC FUNCTONS	RS48 BD) - Dela	85, Et Struc y time	ture f	et - Sele text - La d Retent	ection criteria fo dder logic com ive timer - Cou	pr PLC 9 ponents: Boolean nters: Up Counter 9
omponents of nalog -Scan tin Unit III PLC rogramming me gic using ladde nd Down Count Unit IV AD structions in Forerations, Data	PLC - Processor - Memory: Types of memory, M ne of PLC -Interfacing computer and PLC: RS232, C PROGRAMMING ethods - Ladder logic - Function block diagram (Fil r logic programming-Timers: On Delay timer, OFF rer	RS48 3D) - Delay	Struc y time	ture t er and	et - Sele text - La d Retent anipulati	dder logic com ive timer - Cou on Instruction	pr PLC 9 ponents: Boolean nters: Up Counter 9 s: Data compare
components of nalog -Scan tin       Unit III     PL0       rogramming me ogic using ladde nd Down Count       Unit IV     AD       ustructions in Forerations, Data astructions	PLC - Processor - Memory: Types of memory, M ne of PLC -Interfacing computer and PLC: RS232, <b>C PROGRAMMING</b> ethods - Ladder logic - Function block diagram (Fl r logic programming-Timers: On Delay timer, OFF er <b>VANCED PLC FUNCTONS</b> PLC: Program Control Instructions, Math Instruc-	RS48 3D) - Delay	Struc y time	ture t er and	et - Sele text - La d Retent anipulati	dder logic com ive timer - Cou on Instruction	pr PLC 9 ponents: Boolean nters: Up Counter 9 s: Data compare
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# ADDITIONAL ONE CREDIT COURSES

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Course Code	Course Name		Hou				Total Hours	Maximum Mark
1051704				T	P	C	45	100
19EIZ01	ENTREPRENEURSHIP DEVELOPM ctive (s): The purpose of learning this			0	0	1	15	100
	of this subject provides an understandi				ofan	ontronr	onour kov a	reas of
	lopment, financial assistance by the in-							
	comes: At the end of this course, learn					axatio	i anu tax bei	
	nowledge about entrepreneurship, mot							
	ENTREPRENEURSHIP & GENERATIO				1033.		1	15
lature, sco					eprene	eur F	Personality	Characteristics,
hinking, Gen	hipprocess. Role of entrepreneurship in eration of Alternatives, Fractionation, R	n econ	omic	deve	lopme	ent, Cre	ativity and In	novation, Lateral
REFERENCE			10					
2. Prasan Publish	, Entrepreneurship, Tata McGraw Hill, na Chandra, Projects Planning, Analys ing Company Limited, New Delhi: 200 hwar Pathak, Legal Aspects of Busine	sis, Sel 0.	lectio	n, Im	pleme		and Review	s, TataMcGraw-H
Department	ELECTRONICS AND INSTRUMEN	TATIC	N E	IGIN	EERI	NG	R	2019
Course Code	Course Name				ek Cr		the second se	Maximum Marks
		L	T	P		C	Hours	
19EIZ02	INDUSTRIAL SAFETY STANDARD FOR INSTRUMENTATION PRODUC	Children and a second		0		1	15	100
Course Obie			e is to	)		Concernation of the second		
	ctive (s): The purpose of learning this	course			ical a	nd cont	inuous proce	essindustries.
<ul> <li>Acquire</li> </ul>	ctive (s): The purpose of learning this basic concepts of instrumentation in f	course ood, p	etro d	chem		nd cont	inuous proce	essindustries.
Acquire     Course Outc	ctive (s): The purpose of learning this	course ood, p ers wil	etro d I be a	chem		nd cont	inuous proce	essindustries.
Acquire     Course Outc     Provide     NDUSTRIAL	ctive (s): The purpose of learning this basic concepts of instrumentation in f omes: At the end of this course, learn awareness on the different safety star SAFETY STANDARDS FOR INSTRU	course ood, p ers will ndards	etro d l be a s. ATIC	chem ible t	o: RODU	ICTS		15
Acquire     Course Outc     Provide     NDUSTRIAL     ntroduction to     Different stand	ctive (s): The purpose of learning this basic concepts of instrumentation in f omes: At the end of this course, learned awareness on the different safety star SAFETY STANDARDS FOR INSTRU instrumentation involved in food indus ard requirements for safety products -	course ood, p ers will ndards <b>MENT</b> try / pe	etro d l be a 5. <b>ATIC</b> etrocl rdous	chem ible t DN P nemia s env	o: RODU cal inc ironm	ICTS lustry /c	continuous p	15 rocess industry -
Acquire     Course Outc     Provide     NDUSTRIAL     ntroduction to     Different stand     nethods for ins	ctive (s): The purpose of learning this basic concepts of instrumentation in f omes: At the end of this course, learned awareness on the different safety star SAFETY STANDARDS FOR INSTRU instrumentation involved in food indus ard requirements for safety products - strumentation electronics - Wiring and	course ood, p ers will ndards <b>MENT</b> try / pe	etro d l be a 5. <b>ATIC</b> etrocl rdous	chem ible t DN P nemia s env	o: RODU cal inc ironm	ICTS lustry /c	continuous p	15 rocess industry -
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Acquire Course Outc     Provide NDUSTRIAL troduction to ifferent stand tethods for ins REFERENCE 1. Nichola 2. Walt Bo Department Course Code 19EIZ03 Course Objec     Acquire Course Outco	ctive (s): The purpose of learning this basic concepts of instrumentation in f omes: At the end of this course, learned awareness on the different safety star SAFETY STANDARDS FOR INSTRU instrumentation involved in food indus ard requirements for safety products - strumentation electronics - Wiring and (S): s P. Cheremisinoff, Practical Guide To byes, Instrumentation Reference Book, ELECTRONICS AND INSTRUMENT Course Name DETAILED INSTRUMENTATION ENGINEERING ctive (s): The purpose of learning this basic knowledge in understanding the omes: At the end of this course, learned	course ood, p ers will ndards <b>MENT</b> try / pe Haza installa Indus Butter ATION L 1 course	etro d l be a S. ATIC etrock rdous ation trial S rworth N ENG S / W T 0 e is to g and	chem able t DN P nemia s env best Safet h-He GINE (eek P 0 instr	o: RODU cal inc ironm practii y, Mar inema ERIN Crec C 1 umen	ICTS lustry /c ent and ces cel Del nn, 200 G G Hd Hd	continuous p d instrumenta kker, Inc, 200 08 R 2 04 04 Ma 04 15	15 rocess industry - ation - Protection 06 2019 aximum Marks
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Acquire Course Outc     Provide NDUSTRIAL troduction to ifferent stand tethods for ins REFERENCE     Nichola     Walt Bc Department Course Code     19EIZ03 Course Objec     Acquire Course Outco     Analyze DETAILED IN	ctive (s): The purpose of learning this basic concepts of instrumentation in f omes: At the end of this course, learned awareness on the different safety star SAFETY STANDARDS FOR INSTRU instrumentation involved in food indus ard requirements for safety products - strumentation electronics - Wiring and (S): s P. Cheremisinoff, Practical Guide To byes, Instrumentation Reference Book, ELECTRONICS AND INSTRUMENT Course Name DETAILED INSTRUMENTATION ENGINEERING ctive (s): The purpose of learning this basic knowledge in understanding the omes: At the end of this course, learned the P& I diagramsfor smart plants. STRUMENTATION ENGINEERING	course ood, p ers will ndards <b>MENT</b> try / pe Haza installa Indus Butter ATION Hour L 1 course piping ers will	etro d l be a S ATIC etroch rdous ation trial S worth <b>V ENO</b> S <b>S / W</b> <b>T</b> <b>0</b> e is to g and be a	chem able t DN P nemia s env best Safet h-He GINE Veek P 0 instrible to	o: RODU cal inc ironm practin y, Mar inema ERIN Crec C 1 1 umen c:	ICTS lustry /c ent and ces cel Del nn, 200 G G Hd Hd tation c	continuous p d instrumenta kker, Inc, 200 08 <b>R</b> 2018 <b>Na</b> 2019 15 13 13	15 rocess industry - ation - Protection 06 2019 aximum Marks 100 15
Acquire Course Outc     Provide NDUSTRIAL troduction to ifferent stand tethods for ins REFERENCE     Nichola     Walt Bo Department Course Code     19EIZ03 Course Objec     Acquire Course Outce     Acquire DETAILED IN rocess flow di strumentation	ctive (s): The purpose of learning this basic concepts of instrumentation in f omes: At the end of this course, learned awareness on the different safety star SAFETY STANDARDS FOR INSTRU instrumentation involved in food indus ard requirements for safety products - strumentation electronics - Wiring and (S): s P. Cheremisinoff, Practical Guide To byes, Instrumentation Reference Book, ELECTRONICS AND INSTRUMENT Course Name DETAILED INSTRUMENTATION ENGINEERING ctive (s): The purpose of learning this basic knowledge in understanding the omes: At the end of this course, learned the P& I diagramsfor smart plants. STRUMENTATION ENGINEERING agrams - P&ID concepts - Standards a standards - API - IEC - ISA - Selection	course ood, p ers will ndards <b>MENT</b> try / pe Haza installa Indus Butter ATION Hour L 1 course piping ers will	etro d l be a s. ATIC etroch rdous ation trial S worth V ENO S / W T 0 e is to g and be a mbols	Chemible t DN P hemible t best Safet h-He GINE Veek P 0 instr ble to s - In	o: RODU cal inc ironm practi y, Mar inema ERIN Crec C 1 umen c: dicatio	ICTS lustry /c ent and ces cel Del nn, 200 G Lit To Ho tation o	continuous p d instrumenta kker, Inc, 200 08 <b>R</b> 018 <b>R</b> 018 <b>I</b> 018 <b>I</b> 15 <b>I</b> 15 <b>I</b> 16 <b>I</b> 17 <b>I</b> 18 <b>I</b> 19 <b>I</b> 10 <b>I</b> 10 <b>I</b> 10 <b>I</b> 10 <b>I</b> 10 <b>I</b> 10 10 10 10 10 10 10 10 10 10 10 10 10	15 rocess industry - ation - Protection 06 2019 aximum Marks 100 15 entions inP&ID -
Acquire Course Outc     Provide NDUSTRIAL troduction to ifferent stand tethods for ins REFERENCE 1. Nichola 2. Walt Bo Department Course Code 19EIZ03 Course Objec     Acquire Course Outco     Analyze DETAILED IN rocess flow di	ctive (s): The purpose of learning this basic concepts of instrumentation in f omes: At the end of this course, learned awareness on the different safety star SAFETY STANDARDS FOR INSTRU instrumentation involved in food indus ard requirements for safety products - strumentation electronics - Wiring and (S): s P. Cheremisinoff, Practical Guide To byes, Instrumentation Reference Book, ELECTRONICS AND INSTRUMENT Course Name DETAILED INSTRUMENTATION ENGINEERING ctive (s): The purpose of learning this basic knowledge in understanding the omes: At the end of this course, learned the P& I diagramsfor smart plants. STRUMENTATION ENGINEERING agrams - P&ID concepts - Standards a standards - API - IEC - ISA - Selection gement	course ood, p ers will ndards <b>MENT</b> try / pe Haza installa Indus Butter ATION Hour L 1 course piping ers will	etro d l be a s. ATIC etroch rdous ation trial S worth V ENO S / W T 0 e is to g and be a mbols	Chemible t DN P hemible t best Safet h-He GINE Veek P 0 instr ble to s - In	o: RODU cal inc ironm practi y, Mar inema ERIN Crec C 1 umen c: dicatio	ICTS lustry /c ent and ces cel Del nn, 200 G Lit To Ho tation o	continuous p d instrumenta kker, Inc, 200 08 <b>R</b> 018 <b>R</b> 018 <b>I</b> 018 <b>I</b> 15 <b>I</b> 15 <b>I</b> 16 <b>I</b> 17 <b>I</b> 18 <b>I</b> 19 <b>I</b> 10 <b>I</b> 10 <b>I</b> 10 <b>I</b> 10 <b>I</b> 10 <b>I</b> 10 10 10 10 10 10 10 10 10 10 10 10 10	15 rocess industry - ation - Protection 06 2019 aximum Marks 100 15 entions inP&ID -
Acquire Course Outc     Provide NDUSTRIAL troduction to ifferent stand tethods for ins REFERENCE     Nichola     Walt Bo Department Course Code     19EIZ03 Course Objec     Acquire Course Obj	ctive (s): The purpose of learning this basic concepts of instrumentation in f omes: At the end of this course, learned awareness on the different safety star SAFETY STANDARDS FOR INSTRU instrumentation involved in food indus ard requirements for safety products - strumentation electronics - Wiring and (S): s P. Cheremisinoff, Practical Guide To byes, Instrumentation Reference Book, ELECTRONICS AND INSTRUMENT Course Name DETAILED INSTRUMENTATION ENGINEERING ctive (s): The purpose of learning this basic knowledge in understanding the omes: At the end of this course, learned the P& I diagramsfor smart plants. STRUMENTATION ENGINEERING agrams - P&ID concepts - Standards a standards - API - IEC - ISA - Selection gement	Course ood, p ers will ndards <b>MENT</b> try / pe Haza installa Indus Butter ATION L 1 course piping ers will and syn n and	etro d l be a ATIC etrock rdous ation trial S worth <b>N ENO</b> <b>S / M</b> <b>T</b> <b>0</b> e is to g and be a mbol sizing	Chemible t DN P nemic s env best Safet h-He GINE GINE GINE Ceek P 0 instr ble to s - In g of in natio	o: RODU cal inc ironm practii y, Mar inema ERIN Crec C C 1 Umen o: dicatio	ICTS lustry // ent and ces cel Del nn, 200 G G Hd Hd tation d ons on hents -	continuous p d instrumenta kker, Inc, 200 08 <b>R</b> <b>Datal Ma</b> <b>Datal Ma</b> <b>Data Ma</b> <b>Da</b>	15 rocess industry - ation - Protection 06 2019 eximum Marks 100 100 15 entions inP&ID - dsizing of valves

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Department	ELECTRONICS AND INSTRUMENT	ATION	I ENG	GINE	ERING		R 2019	
Course Code	Course Name	Hour	s/W	leek	Credit	Total	Maximu	m Marks
V Stelly F		L	T	P	С	Hours		
19EIZ04	CALIBRATION TECHNIQUES	1	0	0	1	15	10	00
Course Object	ctive (s): The purpose of learning this	course	is to		The second			
<ul> <li>Impart r</li> </ul>	necessary knowledge in calibration tec	hnique	s and	d its a	applicatio	ons		
Course Outco	omes: At the end of this course, learned	ers will	be a	ble to	D:	1. 1. 1. 1.	The Pro-	28 N. H. N.
	and the calibration techniques in field							
CALIBRATIO	N			1.011	S. B.	- 1 A	A Later of the	15
ntroduction - I	ndustry Protection Standards - Temp	perature	e Ca	librat	ion - Re	sistance T	emperature	Detectors
RTD) - Thermo	ocouple - Thermostat - Calibration of	ressure	e Tra	nsmi	tter -Pres	sure switc	hes with Do	cumenting
rocess Calibr	ators (DPC)- Calibration of Control	Valve	Pos	itione	er - Loo	o Calibrati	on and Ma	intenance-
Calibrating Hig	hway Addressable Remote Transdu	cer (H/	ART)	com	nmunicat	on protoc	ol based tra	ansmitters-
	on-contact type transmitters							
REFERENCE	(S):		10	ñ		1. St. 9. 1	Section Dealer	Stre as a
1. Mike Ca	able, "Calibration - A Technician's Gu	ide, Th	ne In:	strun	nentation	, Systems	and Automa	ationSocief

 Mike Cable, "Calibration - A Technician's Guide, The Instrumentation, Systems and AutomationSociety, 2014.

Department	ELECTRONICS AND INSTRUMENT	ATION	I ENG	GINE	ERING	R 2019			
<b>Course Code</b>	Course Name	Hours / Week Credi				<b>Total Hours</b>	Maximum Marks		
		Т	P	С					
19EIZ05	IoT USING RASPBERRY PI	1	0	0	1	15	100		
Course Object	ctive (s): The purpose of learning this	course	is to			100 S 240	Line Line Line Line Line Line Line Line		
<ul> <li>Underst</li> </ul>	and the concepts of IoT using Raspbe	erry Pi							
Course Outco	omes: At the end of this course, learn	ers will	be a	ble to	D:	States South	NOT - THAT AND		
<ul> <li>Develop</li> </ul>	Phyton Programming in IoT applicati	ons usi	ing R	aspb	erry Pi.				
IOT USING RA				1		1990 - 1927 -	15		
Introduction to	IoT - PYTHON Programming - Access	sing Int	ernet	t - SM	MTP mai	server - Came	era Interfacing and		
	- Creating a project on security - HTM								
Location Finde	r with Map Integration - IoT based	Electr	ical .	Appli	cations	(Demo) - Link	ing MATLAB and		
Raspberry Pi									
REFERENCE	(S):					2 march 1			
1. Simon M	Aonk, Programming the Raspberry Pi:	Getting	g Sta	rted	with Pyth	on, McGraw H	ill, 2013.		

Department	ELECTRONICS AND INSTRUMENTATION ENGINEERING					R 2019			
Course Code	Course Name	Hours / Week			Credit	Total Hours	Maximum Marks		
		L	T	P	С	1 fill bar houses			
19EIZ06	MODELING AND ANALYSIS OF INSTRUMENTATION	1	0	0	1	15	100		

Modeling the continuous and discrete systems.

Course Outcomes: At the end of this course, learners will be able to:

Simulate the solutions for instrumentation problems.

### MODELING AND ANALYSIS OF INSTRUMENTATION

Working with the MATLAB User Interface - Variables and Expressions - Automating Commands with Scripts -Analysis and Visualization with Matrices - Analysing Data from Files - Flow Control - Writing Functions - Creating and Simulating a Model - Modeling Programming Constructs - Modeling Discrete Systems - Modeling Continuous Systems - Instrumentation linear and nonlinear system examples with MATLAB/Simulink

REFERENCE(S):

- 1. KristerAhlersten, An Introduction to Matlab, BookBoon , 2012.
- Fornetti Francesco, Instrumentation Control, Data Acquisition and Processing with MATLAB, Explore RF Ltd, 2013.

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Department	ELECTRONICS AND INSTRUMENTATIO	R 2019					
Course Code	Course Name	Hours / Week			Credit	Total Hours	Maximum Marks
		L	T	Ρ	С		
19EIZ07	HIGH TEMPERATURE INSTRUMENTATION	1	0	0	1	15	100
Learn the Course Outc	ctive (s): The purpose of learning this course is he various types of sensors for high temperature omes: At the end of this course, learners will be	es for u		n pro	pulsion	and othe	er applications.
HIGH TEMPE	knowledge on high temperature measurements RATURE INSTRUMENTATION						15
Types of heat f calibration of combustion ch measurement byrometers - sj etc. Total tem emperature me	mportance of high temperature measurements i lux sensors - slug gauge, Gordon gauge, Therm heat flux sensors using black bodyfurnace - namber temperature measurements using re techniques using thermo couples and pyromet pectroscopic methods for flame temperature me perature measurements - recovery factor ca easurements and estimation of accuracies.	Type: Type: fractor ters - o easure	and t s of y th optic men	hin fi ther ermo al, ra t - S	Im gaug mocoup ocouples adiation odium li	ges - calc bles and s - surfa , two co ine rever	primetric methods their calibration, ace temperature lour and infrared sal method. LDA
2. R.P. Be 3. ASTM (	(S): Inett et al, Recent Advances in Heat and Mass nedict, Fundamentals of temperature, pressure committee on E20, Manual on the use of the ion 1981	and flo	ow m	easu	irement	s, Third I	Edition, 1984.

Department	ELECTRONICS AND INSTRUMENTATIO	ON EN	IGIN	EER	ING	R 2019		
Course Code	Course Name	Hours / Week C			Credit	Total	Maximum Marks	
		L	T	P	C	Hours		
19EIZ08	DESIGN OF LOW-COST AUTOMATION FOR INDUSTRIES	1	0	0	1	15	100	
Course Objec	tive (s): The purpose of learning this course	is to	-			5	E - 1	
	e designing and building a Low costautomati		ntrols	inm	anufactu	iring and i	process industries	
Course Outco	mes: At the end of this course, learners will I	he abl	e to:					
	owledge in designing and building a Low cos			on co	ontrols in	manufact	turing and process	
DESIGN OF LO	OW COST AUTOMATION FOR INDUSTRIES	S			1.4	1911	15	
ntroduction to r	manufacturing and process industries - Need	d for a	auton	natic	n - Need	for low	cost automation -	
Automation syst	em development methodologies - Interoperat	pility in	auto	mat	ion produ	icts - OLE	/ OPC Standards	
<ul> <li>Lesting and value</li> </ul>	alidation of automation systems - Introduction	n to fa	ctory	acc	eptance	test - Ha	nds on Designing	
an low cost SCA	ADA with LABVIEW		2.	32			0.0	
REFERENCE(	S):					10000		
1. John Pa 2010	rk, Steve Mackay, Practical Data Acquisition	for Ir	nstru	men	tation an	d Control	Systems, Elsevier	
2. Terry Ba	rtelt, Industrial Automated Systems: Instrum	nentati	ion a	nd I	Motion C	Control CI	ENIQAGE I	

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Department	ELECTRONICS AND INSTRUMENTATION	1G	R 2019				
Course Code	Course Name		s/W	leek	Credit	Total	Maximum Marks
		L	T	P	С	Hours	
19EIZ09	ENERGY MANAGEMENT SYSTEMS IN INDUSTRIES	1	0	0	1	15	100
<b>Course Object</b>	ive (s): The purpose of learning this course is	to			17	10.00	NAME OF TRACE
<ul> <li>Study the</li> </ul>	role of an instrumentation engineers in energ	y conse	ervat	ion.			
<b>Course Outcor</b>	nes: At the end of this course, learners will be	able to	D:	1	100	1. 6. 18	or builder of the
<ul> <li>Understation</li> </ul>	nd the role of an instrumentation engineers in	energy	con	serva	tion		
ENERGY MANA	AGEMENT SYSTEMS IN INDUSTRIES					1	15
leed for energy conservation pro	conservation in manufacturing / process indus gramme - Practical case studies on develop	tries - F ment c	Role of ins	of ins	trumen entatio	tation er	ngineer in energy ontrol for energy

management programme - Energy measurement - Data logging methods - Modbus, Can Bus & Ethernet protocols - Hands on training in development of an energy management system with LabVIEW
 REFERENCE(S):

 Richard A. Panke, Energy Management Systems and Direct Digital Control, 2011.
 Dr. Parag Diwan & Mohammed, Energy Management, Pentagon Energy Earth, 2012.

Department	ELECTRONICS AND INSTRUMENTATI	ING	R 2019				
Course Code	Course Name	Hour	s/V	Veek	Credit	Total	Maximum Marks
		L	Т	P	С	Hours	
19EIZ10	SMART PLANT INSTRUMENTATION	1	0	0	1	15	100
Course Object	tive (s): The purpose of learning this course	e is to					
<ul> <li>Study al</li> </ul>	bout the smart plant instrumentation statistic	al tools					
Course Outco	mes: At the end of this course, learners will	be abl	e to:	ļ			ALSO SOLUTION
Access a	and update the instruments used for different	tasks a	and e	ensur	es that th	ne consist	ency is maintained
in the pr							
	TINSTRUMENTATION			-		Contraction of the second	15
System and P	roject Administration Overview-Instrument	Index	Proc	cess	Data- (	Calculation	ns-Specifications-
Wiring-Loop Dia	grams-Hookups-Foundation Fieldbus-Brief	overvie	w of	Field	Bus, Ex	ternal Spe	ec Editor, External
Process Data E	ditor and Integration Specific to SPI						
<b>REFERENCE</b> (	S):	2.10		3		8.5	Maria Shara (and
1 Introduct	tion to SmartPlant (R) P&ID. The Pining and I	Instrum	onta	tion	Diagram	e (P&ID)	Handbook 6 August

2020 by Jagadeesh Pandiyan