Department of Electronics and Communication Engineering

Periyar Nagar, Vallam Thanjavur - 613 403, Tamil Nadu, India Phone: +91 - 4362 - 264600 Fax: +91- 4362 - 264660 Email: <u>headece@pmu.edu</u> Web: www. pmu.edu





think • innovate • transform

SCHOOL OF ENGINEERING AND TECHNOLOGY B.TECH. - ELECTRONICS AND COMMUNICATION ENGINEERING

REGULATION 2015 – Revision 1

FOUR YEAR FULL TIME

BATCH: 2015-2019 & 2016-2020

CURRICULUM AND SYLLABUS

I – VIII SEMESTERS

1. University Vision and Mission

Vision

• To be a University of global dynamism with excellence in knowledge and innovation ensuring social responsibility for creating an egalitarian society.

Mission

- **UM1:** Offering well balanced programmes with scholarly faculty and state-ofart facilities to impart high level of knowledge.
- UM2: Providing student centered education and foster their growth in critical thinking, creativity, entrepreneurship, problem solving and collaborative work.
- **UM3:** Involving progressive and meaningful research with concern for sustainable development.
- **UM4:** Enabling the students to acquire the skills for global competencies.
- **UM5:** Inculcating Universal values, Self respect, Gender equality, Dignity and Ethics.

Core Values

- Student centric vocation
- Academic excellence
- Social Justice, gender justice, equity, and equality.
- Skills and use of technology for global competency.
- Continual improvement
- Leadership qualities.
- Societal needs towards sustainability
- Learning, a life long process
- Team work
- Entrepreneurship for all
- Rural development
- Basic, Societal, and applied research on Energy, Environment, and Empowerment.

2. Department Vision and Mission

Department of Electronics and Communication Engineering

Vision

To be an innovative leading department in the domain of Electronics and Communication Engineering in promoting academic growth by offering UG, PG and Ph.D programmes to augment the industrial and societal needs through cutting edge research activities.

Mission

- DM1: To offer UG, PG and Ph.D programmes in Electronics and Communication Engineering through State-of-art facilities and Technology Enabled Teaching Methodologies.
- DM2: To produce Exemplary Electronics and Communication Engineers to meet the contemporary requirements of the industries and institutions.
- DM3: To excel in research and development activities along with establishing collaborative research ventures and linkages with leading organizations.
- DM4: To cultivate entrepreneurial skill and concern for society among students.

3. Mapping of University Mission and Department Mission

	UM1	UM2	UM3 UM4		UM5
DM1	3	2	0	1	1
DM2	1	2	1	3	1
DM3	1	1	3	3	0
DM4	0	1	1 1		3
Total	5	6	4	8	5

1. Low Relation 2 – Medium Relation 3-High Relation

4. Program Educational Objectives (PEOs)

PEO1	Graduates will be successful Electronics and Communication Engineering Professionals in industries, higher education and research.
PEO2	Graduates will be technically competentin identifying, analyzing and creating appropriate Electronics and Communication engineering solutions to become an entrepreneur.
PEO3	Graduates will work as a member and lead following ethical practices.
PEO4	Graduates will strive to develop their knowledge and skills throughout their career for the benefit of the society.

Mapping of Department Mission (DM) with Program Educational Objectives (PEOs)

PEO / DM	DM1	DM 2	DM 3	DM4
PEO 1	3	2	1	1
PEO 2	2	3	1	1
PEO 3	0	2	2	2
PEO 4	0	1	1	3
5	8		5	7

1. Low Relation 2 – Medium Relation

3-High Relation

5. Graduate Attributes

- 1. **Knowledge base for Engineering:** Demonstrate competence in mathematics, natural sciences, engineering fundamentals and specialized engineering knowledge appropriate to the program.
- 2. Problem Analysis: Identify, formulate, analyse and solve diverse engineering problems.
- 3. **Design:** Solution for complicated open–ended engineering problems and design the components with appropriate standards to meet specified needs with proper attention to public health, safety, environment and society.
- 4. **Experimental Investigation:** Technical skills to conduct investigation, interpretation of observed data and provide solution for multifaceted problems.
- 5. **Modern Engineering tools usage**: Acquire, select, manipulate relevant techniques, resources and advanced engineering ICT tools to operate simple to complex engineering activities.
- 6. **Impact of engineering on society:** Provide a product / project for use by the public towards their health, welfare, safety and legal issues to serve the society effectively.
- 7. **Environment and Sustainability:** Design eco-friendly and sustainable products in demonstrating the technology development to meet present and future needs.
- 8. **High Ethical Standards:** Practice ethical codes and standards endorsed by professional engineers.
- 9. Leadership and team work: Perform as an individual and as a leader in diverse teams and in multi-disciplinary scenarios.
- 10. **Communication Skills:** Professional communication with the society to comprehend and formulate reports, documentation, effective delivery of presentation and responsible to clear instructions.
- 11. Project management and Finance: Appropriate in incorporating finance and business practices including project, risk and change management in the practice of engineering by understanding their limitations.
- 12. **Life-long learners:** Update the technical needs in a challenging world in equipping themselves to maintain their competence.
- 6. Program Outcomes(POs) and Program Specific Outcomes(PSOs)

Program Outcomes(POs)

- 1. Able to apply the knowledge of Mathematics, Science, Engineering and Technology in the field of Electronics and Communication Engineering
- 2. Capable to identify and analyse the Electronics and Communication engineering problems.
- 3. Proficient to provide solutions to meet the specific needs of the public health, safety, environment and society.
- 4. Competent to conduct experiments, interpret the data and compare the performance and provide solutions for complex problems.
- 5. Adept to handle modern Electronics and Communication Engineering tools, equipments and software.
- 6. Skillful to design Electronics and Communication products and validate by analysis and test for the benefit of the society towards safety and legal issues.
- 7. Efficient to develop a Electronics and Communication system or process to meet the economical growth, eco friendly environment and sustainability.
- 8. Instill to integrate professional, ethical and social responsibility in all walks of life.
- 9. Masterful to lead the group activities or as a team member for best outputs.
- 10. Effective to comprehend and formulate reports, deliver presentations and respond to the queries with clear ideas.
- 11. Capable to incorporate business practices and project management for the economical growth of the nation.
- 12. Able to update technical knowhow and engage in lifelong learning to meet the challenges of the modern world.

Program Specific Outcomes(PSOs)

- 13. (PS01) Will be able to specialize networking practice.
- 14. (PSO2) will be able to specialize in Wireless Communications pertaining to physical layer.

7. Mapping of Program Outcomes (POs) with Graduate Attributes (GAs)

PO/GA	GA1	GA2	GA3	GA4	GA5	GA6	GA7	GA8	GA9	GA10	GA11	GA12
P01	3	1	0	0	1	0	0	0	0	0	0	0
P02	1	3	1	1	1	0	0	0	0	0	0	0
P03	1	1	3	1	1	0	0	0	0	0	0	0
P04	1	1	1	3	1	0	0	0	0	0	0	0
P05	1	1	1	1	3	0	0	0	0	0	0	0
P06	1	1	1	1	1	3	0	0	0	0	0	0
P07	1	1	1	1	1	1	3	1	0	0	0	0
P08	0	0	0	0	0	1	1	3	1	0	0	0
PO 9	0	0	0	0	0	0	0	0	3	1	0	0
P010	0	0	0	0	0	0	0	0	1	3	1	0
P011	1	1	1	0	1	0	0	0	0	0	3	0
P012	1	1	1	1	1	0	0	0	0	0	0	3
PS013	1	2	2	2	3	2	1	0	2	0	0	3
PS014	1	2	2	2	2	2	1	0	2	0	0	3

0-Relation 1- Low Relation 2 – Medium Relation

3-High Relation

8. Mapping of Program Outcomes (POs) with Program Educational Objectives (PEOs)

PEO / PO	P01	PO2	PO3	PO4	PO5	P06	P07	P08	P09	P010	P011	P012	PS013	PSO14
PEO 1	3	3	2	3	3	2	1	0	0	1	2	0	3	3
PEO 2	2	3	2	3	3	2	2	0	1	3	2	3	3	3
PEO 3	0	0	1	0	0	1	2	1	3	0	3	3	1	1
PEO 4	2	2	1	1	2	3	2	3	1	1	3	0	3	3

0-No Relation	1- Low Relation	2 - Medium Relation	3-High Relation
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Curriculum

SEMESTER I

Course	Course Name	Credits Hours								
Code		L	Т	Р	С	L	Т	Р	S.S	Total
XMA101	Algebra, Differential Calculus and	3	1	0	4	3	2	0	0	5
	their applications									
XEM102	Engineering Mechanics	3	1	0	4	3	2	0	0	5
XBE103	Electrical and Electronics	3	1	1	5	3	2	2	0	7
	Engineering Systems									
XAP104	Applied Physics	3	1	1	5	3	2	2	0	7
XGS105	Study skills	1	0	0	1	1	0	0	2*	3
XUM106	Human Ethics, Values, Rights and	1	0	0	1	1	0	0	2*	3
	Gender Equality									
	Total	14	4	2	20	14	8	4	4	30

*Non – credit hours

Total Credits - 20

SEMESTER II

Course	Course Name		Cı	edi	ts			Но	ours	
Code		L	Т	Р	С	L	Τ	Р	S.S	Total
XMA201	Calculus and Laplace Transforms	3	1	0	4	3	2	0	0	5
XCP202	Computer Programming	3	0	1	4	3	0	2	0	5
XWE203	Mechanical and Civil Engineering Systems	3	1	1	5	3	2	2	0	7
XAC204	Applied Chemistry	3	1	1	5	3	2	2	0	7
XEG205	Engineering Graphics	2	0	1	3	2	0	2	0	4
XGS206	Speech Communication	1	0	0	1	1	0	0	2*	3
	Total	15	3	4	22	15	6	8	2	31

*Non – credit hours

Total Credits - 22

In-plant training during vocation for 15 days. The credits are added in III Semester.

SEMESTER III

Course	Course Nome	Cred	its			Hour	S			
Code	course name	L	Т	Р	С	L	Т	Р	S.S	Т
XMA301	Transforms and Partial									
	Differential Equations /Discrete	3	1	0	4	3	2	0	0	5
	Mathematics									
XEC302	Electric Circuits Analysis	3	1	0	4	3	2	0	0	5
XEC303	Digital Electronics	3	0	1	4	3	0	2	0	5
						5	0	2	0	5
XEC304	Electronic Devices and Circuits	3	1	1	5	3	2	2	0	7
XMS305	Material Science	3	0	0	3	3	0	0	0	3
XEP306	Entrepreneurship Development	2	0	0	2	2	0	0	1*	3
XGS307	Interpersonal Communication	0	0	0	0	0	0	0	2*	2
	(Non credit course)	0	U	0	0	0	0	0	Ζ.	2
	In-plant Training - I	-	-	-	1	-	-	-		-
	Total	17	3	2	23	17	6	4	3	30

* Non-credit hours

Total Credits - 23

SEMESTER IV

Course		Cred	its			Hours					
Code	Course Name	L	Т	Р	С	L	Т	Р	S.S	Т	
XRP401	Random process	2	1	0	3	2	2	0	0	4	
XEC402	Signals and Systems	3	0	0	3	3	0	0	0	3	
XEC403	Linear Integrated Circuits	3	0	1	4	3	0	2	0	5	
XEC404	Communication Theory	3	1	1	5	3	2	2	0	7	
XEC405	Electro Magnetic Fields and Transmission Lines	3	1	0	4	3	2	0	0	5	
XUM406	Economics for Engineers	3	0	0	3	3	0	0	0	3	
XGS407	Technical Communication	1	0	0	1	1	0	0	2*	3	
	Extracurricular activities - NCC/NSS/YRC/RRC/Sports	-	-	-	-	-	-	-	-	-	
	Total	18	3	2	23	18	6	4	2	30	

* Non-credit hours

Total Credits - 23

In-plant training during vocation for 20 days. The credits are added in V Semester.

SEMESTER V

Course		Cred	its				Н	Hours		
Code	Course Name	L	Т	Р	С	L	Т	Р	S.S	Т
XMA501	Numerical Methods	2	1	0	3	2	2	0	0	4
XEC502	Computer Communication Networks	3	0	0	3	3	0	0	0	3
XEC503	Object Oriented Programming and Data structures	3	0	1	4	3	0	2	0	5
XEC504	Digital Signal Processing	3	1	1	5	3	2	2	0	7
XEC505*	Professional Elective – I	3	0	0	3	3	0	0	0	3
XTQ506	Total Quality Management	3	0	0	3	3	0	0	0	3
XGS507	Business Communication	1	0	0	1	1	0	0	2*	3
XEC508	In-plant Training – II	-	-	-	1	-	-	-	-	-
	Total	18	2	2	23	18	4	4	2	29

* Non-credit hours

Total Credits - 23

SEMESTER VI

Course	Course Name	Cred	its			Hou	rs			
Code	course name	L	Τ	Р	С	L	Τ	Р	S.S	Т
XOE601*	Open Elective – I	3	0	0	3	3	0	0	0	3
XEC602	Digital Communication	3	0	0	3	3	0	0	0	3
XEC603	Antennas and Wave Propagation	3	0	1	4	3	0	2	0	5
XEC604	Microprocessors and	3	1	1	5	3	2	2	0	7
	Microcontrollers					5	2	2		'
XEC605	Control Systems	3	1	0	4	3	2	0	0	5
XEC606*	Professional Elective – II	3	0	0	3	3	0	0	0	3
	Environmental Studies(Non	0	0	0	0	2*	0	0	0	3
XUM607	credit course)	U	0	U	U	5	U	U		5
XGS608	Academic writing (Non credit	0	0	0	0	0	0	0	2*	2
	course)	0	0	0	0	0	0	U		2
	Total	18	2	2	22	21	4	4	2	31

* Non-credit hours

Total Credits - 22

In-plant training during vocation for 45 days. The credits are added in VII Semester.

SEMESTER VII

Course	Course Name	Credi		Hours						
Code	course name	L	Τ	Р	С	L	Т	Р	S.S	Т
XOE701*	Open Elective – II	3	0	0	3	3	0	0	0	3
XEC702	Embedded Systems and VLSI Design	3	0	1	4	3	0	2	0	5
XEC703	Microwave Engineering and Optical Communication	3	1	1	5	3	2	2	0	7
XEC704*	Professional Elective - III	3	0	0	3	3	0	0	0	3
XEC705*	Professional Elective – IV	3	0	0	3	3	0	0	0	3
XUM706	Cyber Security (Non Credit Course)	0	0	0	0	3*	0	0	0	3
XEC707	Project Phase – I	0	0	2	2	0	0	4	0	4
XGS708	Career Development Skills (Non credit course)	0	0	0	0	0	0	0	1*	1
XEC 709	In-plant Training – III	-	-	-	2	-	-	-	-	-
	Total	13	1	4	22	18	2	8	1	29

* Non-credit hours

Total Credits - 22

SEMESTER VIII

Course	Course Norse	Cred	lits			Hours				
Code	Code Course Name			Р	С	L	Т	Р	Т	
XEC801*	Open Elective – III	3	0	0	3	3	0	0	3	
XEC802*	Professional Elective – V	3	0	0	3	3	0	0	3	
XEC803*	Professional Elective – VI	3	0	0	3	3	0	0	3	
XEC804	Project Phase – II	0	0	12	12	0	0	24	24	
	Total	9	0	12	21	9	0	24	33	

Total Credits - 21

*Denotes A,B,C from corresponding Groups from Electives

Grant Total Credits: 176

LIST OF ELECTIVES

SEMESTER	COURSE TITLE	L	Т	Р	С
	V Semester (PE–I)				
XEC505A	Medical Electronics	3	0	0	3
XEC505B	Instrumentation and Measurements	3	0	0	3
XEC505C	Power Electronics	3	0	0	3
	VI Semester (PE-II)	•	•		
XEC606A	Telecom Switching Networks	3	0	0	3
XEC606B	Electromagnetic Interference and Compatibility	3	0	0	3
XEC606C	Speech Processing	3	0	0	3
	VII Semester (PE-III)				
XEC704A	DSP Processors and their Applications	3	0	0	3
XEC704B	Digital Image Processing	3	0	0	3
XEC704C	Advanced Microprocessors and	3	0	0	3
	Microcontrollers				
	VII Semester (PE- IV)				
XEC705A	Disaster Management	3	0	0	3
XEC705B	Wireless Communication Systems	3	0	0	3
XEC705C	Radar and Navigational Aids	3	0	0	3
	VIII Semester (PE- V)				
XEC802A	Optical Networks	3	0	0	3
XEC802B	Wireless Networks	3	0	0	3
XEC802C	Television and Video Engineering	3	0	0	3
	VIII Semester (PE- VI)				
XEC803A	Introduction to MEMS	3	0	0	3
XEC803B	Internet of Things	3	0	0	3
XEC803C	Software Defined Radio	3	0	0	3

LIST OF OPEN ELECTIVES

CODE NO.	COURSE TITLE	L	Т	Р	С
	THEORY				
XECOE1	Industrial Electronics	3	0	0	3
XECOE2	Entertainment Electronics and Management	3	0	0	3

SYLLABUS I SEMESTER

COURSECODEXMA 101LT									
COU	RSE	NAME	ALGEBRA, DIFFERENTIAL CALCUL	3	1	0	4		
PREI	REQI	JISITE	BASIC CONCEPTS OF MATRICES, N DIFFERENTIATION AND INTEGRA	UMBERS, FION					
C	Р	Α			L	Τ	Р	H	
3	0	0		T	3	5			
COU	RSE	OUTCOMI	ES	DOMAIN	LEV	EL			
CO1Explain the Properties of Eigen values and Eigen vectors of the matrices, Make Use of orthogonal and similarity transformation and Construct the quadratic form to Canonical form.Cogniti Cogniti Canonical form.					Und App	lersta lying	ndin	50	
CO2Define and Find the radius and circle of curvature in cartesian and polar coordinates and to Explain evolutes and envelopes.Cognitive						nemb lersta	ering ndin	b	
CO3		Explain the erms, alte using tests	e convergence of series of positive rnating series, and power series of convergence.	Cognitive	Und	ersta	ndin	5	
CO4		Find total series exp extremum application	and partial derivatives, Taylor bansions of functions and the of functions and their s.	Cognitive	Ren	nemb	ering		
C05		Solve the nigher ord coefficients differential of variatio differential	linear equations of second and er with constant and variable and simultaneous first order equations and to <i>Apply</i> Method on of parameters to <i>Solve</i> the equation	Cognitive	Арр	lying			
UNIT I - MATRICES								15	
Eigen values and Eigenvectors of a real matrix – Properties of Eige							nd Ei	gen	
vect	ors	- Cayley-H	amilton theorem (excluding proc	of) - Similar	ity tr	ansfo	rmat	ion	
(Con	cept	only) – (Orthogonal matrix - Orthogonal t	ransformatio	on of	a sy	mme	tric	
matr	rix t	o diagona	l form – Reduction of quadratio	c form to C	lanon	ical d	form	by	
Orth	Orthogonal transformation.								
UNI	Г II-	GEOMETR	ICAL APPLICATIONS OF DIFFERE	ENTIAL CAL	CULU	S		15	

Curvature – Cartesian and polar co-ordinates – Centre and radius of curvature – Circle of curvature – Involutes and evolutes – Envelopes – Properties of envelopes and evolutes.

UNIT III-INFINITE SERIES

Sequences – Convergence of series – General properties – Series of positive terms – Tests of convergence (Comparison test, Integral test, Comparison of ratios and D'Alembert's ratio test – Statement of theorems and problems only) – Alternating series – Series of positive and negative terms – Absolute and conditional convergence – Power Series – Convergence of exponential, logarithmic and Binomial Series (Simple problems only)

UNIT IV -FUNCTIONS OF SEVERAL VARIABLES

Functions of two variables – Partial derivatives – Total differentiation – Taylor's expansion – Maxima and Minima – Constrained maxima and minima – Lagrange's Multiplier method – Jacobian Determinants.

UNIT V -ORDINARY DIFFERENTIAL EQUATIONS AND APPLICATIONS

15

15

Linear equations of second and higher order with constant and variable coefficients (Euler's and Legendre's equations) – Simultaneous first order linear equations with constant coefficients – Method of variation of parameters - Applications to electrical circuit problems.

HOURS	LECTURE	TUTORIAL	TOTAL
	45	30	75
ТЕХТ	10		
1. Grewal, B.S. Higher Engineering Mathe	matics, 42 nd	Edition, Khann	a
	·		
2. Erwin Kreyszig, "Advanced Engineer	ing Mathemat	ics", 8 th Edit	ion, Wiley
India, 2007.			
3. T Veerarajan, Engineering Mathem	natics – I, I	First Edition,	Published
by McGraw Hill Education, 2013.			
REFERENCES			
1. Bali N.P and Narayana lyengar, Engine	ering Mathema	atics, Laxmi Puł	olications
(P) Ltd, New Delhi, 2003.			
2. Kandasamy P., Thilagavathy K, and Gui	navathy K, Eng	ineering Mathe	ematics
Volume I, II and III, S. Chand & Co, New	7 Delhi, 2005.		
3. Venkataraman M. K, Engineering Math	ematics, Volur	ne I and II Revis	sed
enlarge			
Fourth Edition, The National Publishin	g Company, Cl	nennai, 2004.	
E REFERENCES		· · · · · · · · · · · · · · · · · · ·	
www.nptel.ac.in			
1. Advanced Engineering Mathematics Pr	of. PratimaPa	nigrahi	
Department of Mathematics Indian Ins	titute of Techr	nology Kharagr	nir

CO VS PO Mapping

	PO	РО	PO	РО	РО	РО						
	1	2	3	4	5	6	7	8	9	10	11	12
CO 1	3	2			2					1		2
CO 2	3	1								1		1
CO 3	3	1								1		1
CO 4	3	2								1		1
CO 5	3	2			1					1		2
	15	8			3					5		7

COUR	RSE CO	DDE	XEM 102		L	Т	Р	С		
COUF	RSE NA	AME	ENGINEERING MECHANICS	3	1	0	4			
С	Р	Α			L	Т	Р	Н		
3	0	0			3	2	0	5		
COUF	RE CO	UTCOM	ES							
CO	LI	LEVEL								
CO1 Iden load strue			<i>fy</i> and <i>choose</i> various types of g and support conditions that act on ural and dynamic systems.	Cogni	itive	U	Understanding			
CO2		Apply engine systen	pertinent mathematical, physical and eering mechanics principles to the n to predict the problem.	Cogni	itive	Re Aj Ev	Remembering Applying Evaluating			
CO3		<i>Apply</i> and m solids.	knowledge on the concepts of centroid oment of inertia of various sections and	Cogni Psyco	itive omoto	or Aj Ev	ememt oplying valuati	embering ving ating		
CO4		Model and a finding	the problem using free-body diagrams accurate equilibrium equations and g the solution.	Cogni	tive	Aı	Analyzing			
CO5		Develo kinem on the simple kinem	pp concepts of friction, rigid body atics and dynamics with an emphasis e modeling and analysis and solving e dynamic problems involving atics and momentum.	Cogn Psyco	itive omoto	Re or Aj Ev	ememt oplying valuati	oering g ng		
UNIT	IT I BASICS AND STATICS OF PARTICLES							15		
	Introduction - Units and Dimensions - Laws of Mechanics –Coplana Non coplanar Forces - Resolution and Composition of forces - Equil a particle - Equivalent systems of forces - Principle of transmissibil single equivalent force.									
UNIT	' II - E(QUILIB	RIUM OF RIGID BODIES					15		
	Free body diagram - Types of supports and their reactions - requirement stable equilibrium – Equilibrium of Rigid bodies in two dimensions - Equilibrium of rigid bodies in three dimensions.									

UNIT III- P	ROPERTIES OF SURFACES AND SOLIDS			15							
Determination of Areas and Volumes - First moment of area and the centroid - second and product moments of plane area - Parallel axis theorem and Perpendicular axis theorem - Polar moment of inertia – Mass moment of inertia - relation to area moment of inertia.											
UNIT IV - DYNAMICS OF PARTICLES 15											
Displacement, Velocity and Acceleration - their relationships - Relative motion - Curvilinear motion - Newton's Law - Work Energy Equation of particles - Impulse and Momentum - Impact of elastic bodies.											
UNIT V - E	LEMENTS OF RIGID BODY DYNAMICS ANI	D FRICTION	ĺ	15							
	Translation and Rotation of Rigid Bodies - Velocity and acceleration - General Plane motion - Moment of Momentum Equations - Rotation of rigid Body - Work energy equation. Frictional Force - Laws of Coulomb friction - Simple Contact friction - Rolling Resistance - Belt Friction.										
	HOURS LECTURE TUTORIAL TOTAL										
		45	30	75							
Text book	S		I								
1. Eng 201	ineering Mechanics: Statics (14th Edition) b 5	y <u>Russell C. I</u>	<u>Hibbeler</u> , Best	Sellers,							
2. Eng Selle	ineering Mechanics: Dynamics (14th Editioners, 2015	ı) by <u>Russel</u>	<u>l C. Hibbeler</u> , I	3est							
3. D.S.	Kumar "A text book of Engineering Mechani	ics" Publishe	ers S.K.Kataria	and							
4. Velu Pub	isami.M.A. "Engineering Mechanics with Vec lishers, 2012	ctor Approac	h": S.Chand								
5. <u>J. L.</u> 6. R.S.	<u>Meriam, L. G. Kraige</u> "Engineering Mechanic Khurmi "A Texthook of Engineering Mechan	s: Dynamics ics" . S. Chan	",Sixth Edition d Publishers. 2	2012 2011							
Reference	S	ieo , er anan									
1. Jaya	1. Jayakumar and Kumar , Engineering Mechanics, PHI Learning Pvt Ltd. 2013										
2. Chandramouli, Engineering Mechanics, PHI Learning Pvt Ltd, 2011											
3. K.V.Natarajan, "Engineering Mechanics", Dhanalakshmi Publishers, Chennai, 2006.											
4. Bee	r F.P and Johnson E.R., "Vector Mechanics fo	r Engineers	- Statics and								
שאת ק אוג	annes, rata meeraw-fill Publishing Compa	any Ltu., New	" Sri Balaii								
Pub	lications. 2004		, 511 Dalaji								

Program outcomes elements as addressed in the course and corresponding Indicators (I) and outcome elements

	Program outcomes	Course Outcome	Indicators
P01	An ability to apply knowledge of mathematics and science in identifying, formulating and solving engineering	PI-1A PI-1B PI-1C	Explain the measuring Units and Dimensions. Explain the concepts of equilibrium of rigid bodies Properties of surfaces and solids
	problems. Identify, formulate,	PI-ID	Evaluate the concepts of Dynamics
P02	Identify, formulate, research literature	PI-2A	Resolve all type of forces
	and analysis complex	PI-2B	Determine the support reactions
	civil engineering problems reaching	PI-2C	Calculation of centroid and Inertia
	substantiated conclusions using first principles of mathematics and Engineering Sciences.	PI-2D	Determination of Velocity, acceleration and related parameters.

Mapping of CO's with PO's:

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PSO2
C01	3	3												
CO2	3	3												
CO3	3	3												
CO4	3	3												
CO5	3	3												

1 – Low relation, 2 – Medium relation, 3 – High relation 0- no relation

COU	RSE CO	DDE	XBE103	L	Τ	Р	C	
COU	RSE NA	AME	ELECTRICAL AND ELECTRON ENGINEERING SYSTEMS	3	1	1	5	
PREI	REQUI	SITES	Physics					
С	Р	Α		L	Τ	Р	Т	
3	1	0			3	2	7	
COURSE OUTCOME			S	DOMAIN		LEV	/EL	
CO1 Define electri explai measu			, <i>Relate,</i> the fundamentals of cal parameters and <i>build</i> and <i>n</i> AC, DC circuits by Using ring devices	Cognitive Psychomo	otor	Ren Und Med Set	ering nding m	
CO2		Define of DC a	<i>and Explain</i> the of operation and AC machines.	Cognitive		Ren Unc	nembe lersta	ering nding
CO3		Recall, semico applica output semico	<i>Illustrate</i> , various onductor Devices and their ations and <i>displays</i> the input characteristics of basic onductor devices.	Cognitive Psychomo	otor	Ren Und Med	ering nding m	
CO4 Relate and lo differe			, <i>Explain,</i> the number systems gic gates. <i>Construc</i> t the nt digital circuit.	Cognitive Psychomo	otor	Ren Und Orig	nembe lerstar ginatio	ering nding on
CO5 Label, o microp applica		<i>Label,</i> microp applica	<i>Outline</i> different types of processors and their ations.		Remembering Understanding			

UNIT - I FUNDAMENTAL OF DC AND AC CIRCUITS, MEASUREMENTS

30

Fundamentals of DC– Ohm's Law – Kirchoff's Laws - Sources - Voltage and Current relations –Star/Delta Transformation - Fundamentals of AC – Average Value, RMS Value, Form Factor - AC power and Power Factor, Phasor Representation of sinusoidal quantities - Simple Series, Parallel, Series Parallel Circuit - Operating Principles of Moving coil and Moving Iron Instruments (Ammeter, Voltmeter) and Dynamometer type meters (Watt meter and Energy meter). Basic concepts of electrical wiring.

UNIT- I	ELEC	TRICAL MACHINE	S		15							
Constru	ction, Prin	nciple of Operation	, Basic Equations	s, Types and Applica	tion of DC							
Generat	ors, DC m	otors - Basics of Si	ngle Phase Induc	tion Motor and Thre	ee Phase							
Inductio	n Motor-	Construction, Prin	ciple of Operatio	n of Single Phase Tr	ansformer,							
Three p	hase tran	sformers, Auto trar	nsformer.									
UNIT -I	I SEMI	CONDUCTOR DEV	ICES		20							
Classific	ation of S	Semiconductors, Co	nstruction, Oper	ation and Character	istics: PN							
Junction	Junction Diode – Zener Diode, PNP, NPN Transistors, Field Effect Transistors and Silicon											
Controll	Controlled Rectifier – Applications.											
UNIT- I	- IV DIGITAL ELECTRONICS 16											
Basic of	of Concepts of Number Systems, Logic Gates, Boolean Algebra, Adders, Subractors,											
multiple	ciplexer, demultiplexer, encoder, decoder, Flipflops, Up/Down counters, Shift											
Register	'S.											
UNIT- V	MICR	OPROCESSORS			16							
Archited	ture, 808	5, 8086 - Interfacir	ng Basics: Data tr	ansfer concepts – Si	mple							
Program	nming cor	ncepts										
LIST OF	EXPERI	MENTS :										
1.	Study of	Electrical Symbols	s, Tools and Safet	y Precautions, Powe	er Supplies.							
2.	Study of	Active and Passive	e elements – Resi	stors, Inductors and	l Capacitors,							
	Bread B	oard.										
3.	Verificat	tion of AC Voltage,	Current and Pow	er in Series and Par	allel connection.							
4.	Testing	of DC Voltage and	Current in series	and parallel resisto	ors which are							
	connect	ed in breadboard b	y using Voltmete	er, Ammeter and Mu	ltimeter.							
5.	Fluores	cent lamp connection	on with choke.									
6.	Staircas	e Wiring.										
7.	Forward	l and Reverse bias	characteristics o	f PN junction diode								
8.	Forward	l and Reverse bias	characteristics o	f Zener diode.								
9.	Input an	nd Output Characte	ristics of NPN tra	ansistor.								
10.	Constru	ction and verificati	on of simple Log	ic Gates								
11.	Construction and verification of adders											
12.	Constru	ction and verificati	on of and subtra	ictions								
HO	URS	LECTURE	TUTORIAL	PRACTICAL	TOTAL							
		45	30	30	105							

TEXT BOOKS

1. Metha V.K., 2008. Principles of Electronics. S.Chand and Company.

2.Malvino, A. P., 2006. Electronics Principles. 7th ed. New Delhi: Tata McGraw-Hill.

3. A.K. Theraja, B.L., Theraja A Text book of Electrical Technology Volume -II

3.Rajakamal, 2007. Digital System-Principle & Design. 2nd ed. Pearson education.

4. Moris Mano, 1999. Digital Design. Prentice Hall of India.

5. Ramesh, S. Gaonkar, 2000. Microprocessor Architecture, Programming and its

Applications with the 8085. 4th ed. India: Penram International Publications.

REFERENCE BOOKS:

- 1.Corton,H.,2004. Electrical Technology. CBS Publishers & Distributors.
- 2. Syed, A. Nasar, 1998, Electrical Circuits. Schaum Series.
- 3. Jacob Millman and Christos, C. Halkias, 1967. Electronics Devices.New Delhi: McGraw-Hill.
- 4. Millman, J. andHalkias, C. C., 1972. Integrated Electronics: Analog and Digital Circuits and Systems. Tokyo: McGraw-Hill, Kogakusha Ltd.

5.Mohammed Rafiquzzaman, 1999. Microprocessors - Theory and Applications: Intel and Motorola. Prentice Hall International.

E-REFERENCES:

1.NTPEL, Basic Electrical Technology (Web Course), Prof. N. K. De, Prof. T. K. Bhattacharya and Prof. G. D. Roy, IIT Kharagpur.

- 2. Prof.L.Umanand ,http://freevideolectures.com/Course/2335/Basic-Electrical-Technology#, IISc Bangalore.
- 3. http://nptel.ac.in/Onlinecourses/Nagendra/, Dr. Nagendra Krishnapura , IIT Madras.
- 4. Dr.LUmanand , http://www.nptelvideos.in/2012/11/basic-electrical-

technology.html, IISC Bangalore

Table: 1 Mapping of COs with POs:

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO1	PSO2
CO 1	3	3		2	1				1			1		
CO 2	2	3		1	1							1		
CO 3	2	3		2	1				1			1		
CO 4	3	3		3	1				1			1		
CO 5	2	3		1	1							1		
Total	12	15		13	5				3			5		
Scaled value	3	3		3	1				1			1		

COU	RSE CO	DE	XAP104 / XAP204	L	Τ	Р	С			
COUI	RSE NA	ME	APPLIED PHYSICS	3	1	1	5			
C	Р	Α		L	Τ	Р	Н			
2.8	0.8	0.4		3	2	2	7			
COURS	E OUTO	COMES		Do	omai	n	Level			
CO1	Ident	i fy the	basics of mechanics, explain the	Cogn	itive		Remembering,			
	princi	ples	of elasticity, viscosity and				Understanding			
	deter	mine	its significance in engineering	Psycl	nome	otor:	Mechanism			
	syster	ns and	technological advances.							
CO2	Descr	ibe	the production, propagation,	Cogn	itive	:	Remembering,			
	perce	ption	& analysis of acoustical wave and				Analyzing,			
	locate	e basio	c acoustical problem encountered	Affec	tive:		Respond			
	in con	struct	ed buildings.	0						
CO3	Under		the fundamental phenomena in	Cogn	itive	:	Understanding,			
	optics	by	measurement and <i>describe</i> the	PSyci		otor:	Appling			
	WORKI	ng pri	here and application of various	Allec	uve:		Deceiving			
<u> </u>	Anab		forent erustal structures disgues	Com	itino		Understanding			
604	and u	se un se nhv	sics principles of latest technology	Pevel	nom	ntor:	Analyze			
	hv vis	ualizir		Affec	tive		Mechanism			
	59 115	uuniiin	·ð·	mee			Receive			
CO5	Devel	op Kn	owledge on engineering materials,	Cogn	itive	:	U, App			
	its pro	opertie	es and application.	0						
UNIT I	- MECH	IANIC	S ANDPROPERTIES OF MATTER				9+6+12			
Mechai	nics: F	orce -	Newton's laws of motion - wo	ork an	d er	nergy	- impulse and			
momen	tum - to	orque	 law of conservation of energy and a 	mome	ntun	n - Fri	ction.			
Elastici	i ty: Stre	ess - S	train - Hooke's law - Stress strain d	liagrar	n - C	lassif	ication of elastic			
modulu	s - Mo	ment,	couple and torque - Torsion pend	dulum	- Aj	pplica	ations of torsion			
pendulu	ım - B	endin	g of beams - Experimental deter	minat	10n	of Yo	oung's modulus:			
Viscosi		ng and fficion	t of viscosity Laminar flow str	iers.	o fl	2147	turbulant flow			
Revnold	iy. 000 1's num	her - F	oiseuille's method	eannn	le no	500 -	turbulent now -			
UNIT II	- ACOI		S. ULTRASONICS AND SHOCK WAY	/ES			9+6+0			
Acoust	ics: Cla	sifica	tion of sound - Characteristics of m	usical	soun	d - L	oudness - Weber			
Fechne	r law -	Decib	el - Absorption coefficient - Rever	berati	on -	Reve	rberation time -			
Sabin's	formu	la (g	rowth and decay) - Factors af	fecting	g ac	ousti	cs of buildings			
(reverb	eration	time,	loudness, focussing, echo, echelon e	effect -	resc	nanc	e and noise) and			
their re	medies									
Ultraso	nics: P	roduc	tion: Magnetostriction and Piezoele	ectric r	neth	ods -	NDT: Ultrasonic			
flaw de	tector.	_					-			
Shock	Shock waves : Definition of Mach number - Description of a shock wave - Characteristics									
- Methods of creating shock waves.										
UNITI	- OP II	LS, LA	SERS AND FIBRE OPTICS				9+6+12			
Optics:	Disper	sion- ()ptical instrument: Spectrometer - [Determ	inat	ion of	f refractive index			
and dis	spersive	e pow	er of a prism- Interference of li	ght in	thi	n filr	ns: air wedge -			
	ion: gra	ting.	Dopulation inversion Dumping	lagon	. atio	n Na	VAC locar CO			
LASEK:	inu ou	ducto	- ropulation inversion - Pulliping - I	Laser a ng	1010	11 - IN($1 - 1 AG lasel - UO_2$			
Fihre O	ntice	Princir	ble and propagation of light in optic	113 al fihr4	- N1	imeri	cal aperture and			
accenta	nce and	de - Tv	mes of optical fibre - Fibre optic con	nmiini	catio	n svs	tem			
uccepta	eptance angle - Types of optical fibre - Fibre optic communication system									

UNIT	IV - SOLID STATE PHYSICS	9+6+6
Crysta	al Physics: Lattice - Unit cell - Lattice planes - Bravais lattice - Mill	er indices -
Sketch	ning a plane in a cubic lattice - Calculation of number of atoms per unit o	cell - Atomic
radius	- Coordination number - Packing density for SC, BCC, FCC and HCP stru	ctures.
Semico	onductors: Semiconductor properties - Types of semiconductor -	Intrinsic -
Extrin	sic: P-type and N-type semiconductor - PN junction diode - Biasing - Jun	nction diode
charac	cteristics.	0
UNIT	V - NOVEL ENGINEERING MATERIALS AND BIOMETRICS	9+6+0
novel	Engineering Materials: Introduction - Metallic glasses: Melt spinning	g technique,
of SM	A characteristics - Riomaterials, Properties interaction of biomaterials	torials with
	A, characteristics - Diomaterials. Fropercies, interaction of Dioma	cations
Biome	s, applications - Nano phase materials. I foldection, properties and appli etrics. Introduction - definition - instrumentation - devices -advantage	
TEXT	BOOKS	5
1	Avadhanulu M. N. and Kehirsagar P. C. "A Text Book of Engineering P	hysics" 7th
1.	Filarged Revised Edition S Chand & Company Ltd New Delhi 2005	ilysics, / til
2	Senthil Kumar G " Engineering Physics" 2nd Enlarged Revised F	dition VRB
2.	Puhlishers, Chennai, 2003.	
3.	Mani P., "Engineering Physics", Dhanam Publications, Chennai, 2005.	
4.	Prabu P. and Gayathri P., " Applied Physics", PMU Press, Thanjavur, 201	3
REFEF	RENCE BOOKS	
1.	Gaur R.K. and Gupta S. L., "Engineering Physics", Dhanpat Rai Publ	ishers, New
	Delhi, 2001.	
2.	Pillai S.O., "Solid State Physics", 5th Edition, New Age International	Publication,
	New Delhi,2003.	
E RES	OURCES	
NPTEI	, Engineering Physics, Prof. M. K. Srivastava, Department of Physics, II	Г, Roorkee.
	LABORATORY	
1. Т	Forsional Pendulum - determination of moment of inertia and rigidity r	nodulus of
t	he given material of the wire.	
2. U	Jniform Bending - Determination of the Young's Modulus of the materia beam	ll of the
3. N	Non-Uniform Bending - Determination of the Young's Modulus of the ma he beam.	aterial of
4. F	Poiseuille's flow - Determination of coefficient of viscosity of the given li	quid.
5. S	Spectrometer - Determination of dispersive power of the give prism.	
6. S	Spectrometer - Determination of wavelength of various colours in Hg so grating.	urce using
7. A	Air wedge - Determination of thickness of a given thin wire.	
8. L	Laser - Determination of wavelength of given laser source and size of the nicro particle using Laser grating.	e given
9. F	Post office Box - Determination of band gap of a given semiconductor.	
10. F	PN Junction Diode - Determination of V-I characteristics of the given dio	de.

REFERENCE BOOKS

- 1. Srinivasan M. & others, "A text book of Practical Physics", Sultan Chand & Sons, 2001.
- 2. Shukla R.K., "Practical Physics", New Age International Publication, New Delhi, 2011.
- *3.* UmayalSundari AR., "Applied Physics Laboratory Manual", PMU Press, Thanjavur, 2012.

HOURS	LECTURE	TUTORIAL	PRACTICAL	TOTAL
				HOURS
	45	30	30	105

Table:1 Mapping of CO's with PO

	P01	P02	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS1	PS2
C01	3	2	2	2	1	-	-	-	1	-	-	1		
CO2	3		1		1	-	-	-		-	-	1		
CO3	3	2	2	2	1	-	-	-	1	-	-	1		
CO4	3	2	2	2	1	-	-	-	1	-	-	1		
CO5	3		2			-	-	-		-	-	1		
Total	15	6	9	6	4				3			5		
Scaled to 0,1,2,3 scale	3	2	2	2	1				1			1		

0-No Relation, 1- Low Relation, 2-Medium Relation, 3-High Relation

COUI	COURSE CODEXGS105LTPSS									
COUI	RSE NA	ME	STUDY SKILLS		1	0	0	2	1	
C	Р	Α			L	T	Р	SS	H	
1.8	0.6	0.6			1	0	0	2	3	
COUI	RSE OU	тсом	IES:	Don	nain	Level				
C01	<i>Ident</i> writir	if y diff ng skill	erent strategies of reading and s.	Cogn	Cognitive Reme					
CO2	<i>Revis</i> proce	<i>e</i> the li ss.	brary skills in their learning	Affeo	ctive	Ir	nter Va	nalizi alues	ng	
CO3	Apply mater dram	v differ rial suc a and c	ent techniques to various types of ch as a novel, newspaper, poem, other reading papers.	Cogn	itive		Арј	olying	r >	
CO4	Use v langu	isual a age di:	ids to support verbal matters into scourse.	Cogn	itive	Un	ıder	stand	ing	
CO5	Prepa confid	are to lence a	face the written exam with and without any fear or tension.	Cogn Psycho	itive motor	Un F	ider Gu Resp	stand iided oonsir	nding ed sing	
UNIT	I - IN	rod	UCTION TO STUDY SKILLS	L		1			5	
Learr skills librar etc.	ning Sk , Libran rian - fa	ills and ry skil imiliar	d Strategies of Learning - Cognitive ls (How to use Library), familiariza ization of basic cataloguing techniq	Study s ation of ues, how	kills and library w to ran	d pł faci isac	nysio ilitie k th	cal str es by e libr	udy the ary	
UNIT	'II - RI	EFERE	NCE SKILLS						5	
How out re dictio	to use eferenc onary a	the lib e bool nd the	rary facilities for research and to w ks, articles, journals and other e- lea saurus.	vrite ass arning n	signmer naterial	its - s - l	hov now	w to f to us	ind se a	
UNIT	'III - R	EADI	NG RELATED STUDY SKILLS						5	
Process of reading, various types of reading materials and varied reading techniqu - familiarization to materials written by various authors - features of scientific writing and familiarization to scientific writing by renowned authors - note making skills										
UNIT	' IV - V	/RITIN	NG RELATED STUDY SKILLS						5	
Proce and n	ess of w	riting king a	- characteristics of writing - discou nd note taking skills.	rse anal	ysis - u	se o	f vis	sual a	ids,	
UNIT	' V - EX	AM PI	REPARATION SKILLS						5	
Anxie	ety red	uction	skills - familiarization with various	us types	s of exa	am	/ ev	valuat	ion	
teenn	iquest									

Text books

Appropriate Chapters/Units from the following textbooks

- 1. Narayanaswamy. Strengthen Your Writing. Orient Longman. New Delhi, 2006
- 2. Sasikumar, Writing with A Purpose, ChampaTickoo, Oxford University Press.2009
- 3. Freeman, Sarah: *Study Strategies*. New Delhi: Oxford University Press, New Delhi *1979*.
- 4. Peter Viney. *Streamline English: Destinations*, Oxford University Press, 1992.

References

- 1. Susan Fawcett Evergreen: A Guide to Writing with Readings Paperback 2013
- 2. Raymond Murphy.English. Grammar in Use A reference and practice book for Intermediate, Third Edition, OUP, New Delhi, 2010
- 3. KiranmaiDutt and GeethaRajeevan. A Course in Listening and Speaking I & II. New Delhi: Foundation Books, Cambridge House, 2006.
- **4.** David Bolton, English Grammar in Steps, Richmond Publishing, New Delhi,2000

	P01	PO2	PO3	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO1	PSO2
C01	2	0	0	0	0	0	2	0	1	0	0	0	0	0
CO2	2	0	0	0	0	0	2	0	1	0	0	0	0	0
CO3	1	0	0	0	0	0	1	0	1	0	0	0	0	0
CO4	2	0	0	0	0	0	1	0	1	0	0	0	0	0
C05	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	7	0	0	0	0	0	6	0	4	0	0	0	0	0
Scaled Value	2	0	0	0	0	0	2	0	1	0	0	0	0	0
	1	0	0	0	0	0	1	0	1	0	0	0	0	0

Table 1: Mapping of COs with POs:

1-5= 1, 6-10 = 2, 11-15= 3

0-No Relation, 1- Low Relation, 2 – Medium Relation, 3- High Relation

COU	JRS	E CODE	L	Τ	Р	S.S	C			
COU	JRS	E NAME	HUMAN ETHICS, VALUES, RIGHTS AND GENDER	1	0	0	2	1		
	-		EQUALITY							
C	P				T	P	SS	H		
2.7		0.3)MES Domain	$\frac{1}{1}$		0	2	3		
LUI	JKS		Domain Domain	Le	vei					
601		Relate	nd <i>Interpret</i> the human ethics and human	Remembering,						
	L	relation	ships	Un	ders	tand	ling			
			1							
CO2	2	<i>Explain</i>	and <i>Apply</i> gender issues, equality and Cognitive	Understanding,						
		VIOLENCO	against women	Ap	plyir	ıg				
		Classify	and <i>Develop</i> the identify of women issues Cognitive &	٨n	วโบซ	na				
CO 3	3	and cha	lenges	Ro	aiyzi cojvi	ng				
			Affective	Ne		ng				
		Classify	and <i>Dissect</i> human rights and report on	Un	ders	tand	ling.			
CO 4	ŀ	violatio	ns.	An	alvzi	ng	0,			
					- 5	0				
		<i>List</i> an	d respond to family values, universal Cognitive &	Re	mem	beri	ing,			
COS	5	brother	hood, fight against corruption by common	(Re	espo	nd)				
		IIIdii dii	Affective Affective							
UNI	ΤΙ	-HUMA	N ETHICS AND VALUES					7		
Hur	nan	Ethics a	nd values - Understanding of oneself and others- motive	es a	nd r	need	s- So	cial		
serv	vice	, Social J	istice, Dignity and worth, Harmony in human relationship	: Fa	mily	and	Socie	ety,		
Inte	gri	ty and	Competence, Caring and Sharing, Honesty and Coura	age,	WF	10's	holis	stic		
dev	eloj	pment - V	alung Time, Co-operation, Commitment, Sympathy and E	mpa	athy,	Self	resp	ect,		
Self	-00	nfidence	character building and Personality.							
UNI		I- GENDI	REQUALITY					9		
Gen	der	• Equali	y - Gender Vs Sex, Concepts, definition, Gender ec	quity	y, e	qual	ity, a	and		
emp	oow	verment.	Status of Women in India Social, Economical, Education, I	Heal	lth, I	Empl	loyme	ent,		
HDI	, G	DI, GEM.	Contributions of Dr.B.R. Ambethkar, Thanthai Periyar a	nd l	Phul	e to	Won	nen		
Em IIN	200 (T 1	ill- WON	EN ISSUES AND CHALLENGES					9		
Wo	mei	n Issues	and Challenges- Female Infanticide Female feticide Viole	nce	aga	inst	wom	en .		
Dor	nes	tic viole	ice, Sexual Harassment, Trafficking, Access to education,	Ma	rriag	ge. F	Reme	dial		
Mea	isui	res – Act	s related to women: Political Right, Property Rights, and	Rig	hts t	o Ec	lucati	ion,		
Mee	Medical Termination of Pregnancy Act, and Dowry Prohibition Act.									
UN	TI	V - HUM	AN RIGHTS					9		
Hur	nan	Rights l	Novement in India – The preamble to the Constitution of	Indi	a, H	uma	n Rig	hts		
and	Du	ties, Un	iversal Declaration of Human Rights (UDHR), Civil, Politica	al, E	conc	mic	al, So	cial		
and	Cu	iltural R	ghts, Rights against torture, Discrimination and forced	Lat	bour	, R1§	ghts a	and		
pro	tect	tion of c	hildren and elderly. National Human Rights Commission	and	1 oth	ier s	tatut	ory		
Con	nmi	ssions, C	ceation of Human Rights Literacy and Awareness Intellec	ctua	I Pro	per	ty Rig	nts		
(IPI	(). ľ	vational	olicy on occupational safety, occupational health and worl	king	genv	iron	ment			

UNIT V- GOOD GOVERNANCE AND ADDRESSING SOCIAL ISSUES

Good Governance - Democracy, People's Participation, Transparency in governance and audit, Corruption, Impact of corruption on society, whom to make corruption complaints, fight against corruption and related issues, Fairness in criminal justice administration, Government system of Redressal. Creation of People friendly environment and universal brotherhood.

TOTAL HOURS	LECTURE	SELF STUDY	TOTAL
	15	30	45
REFERENCES	I		I
1. Aftab A, (Ed.), Human Rights in India	a: Issues and C	hallenges, (New	Delhi: Raj
Publications, 2012).			
2. Bajwa, G.S. and Bajwa, D.K. Human Rights	in India: Implem	entation and Viola	tions (New
Delhi: D.K. Publications, 1996).			
3. Chatrath, K. J. S., (ed.), Education for Hu	man Rights and	Democracy (Shim	ala: Indian
Institute of Advanced Studies, 1998).			
4. Jagadeesan. P. Marriage and Social legis	slations in Tamil	Nadu, Chennai:	Elachiapen
Publications, 1990).			
5. Kaushal, Rachna, Women and Human Righ	its in India (New	Delhi: Kaveri Book	xs, 2000)
6. Mani. V. S., Human Rights in India: An O	verview (New D	elhi: Institute for	the World
Congress on Human Rights, 1998).			
7. Singh, B. P. Sehgal, (ed) Human Rights in	India: Problems a	and Perspectives (New Delhi:
Deep and Deep, 1999).			
8. Veeramani, K. (ed) Periyar on Women Rig	ht, (Chennai: Em	erald Publishers, 1	.996)
9. Veeramani, K. (ed) Periyar Feminism	, (Periyar Mani	ammai Universit	y, Vallam,
Thanjavur: 2010).			
11.Planning Commission report on	Occupational	Health and	l Safety
http://planningcommission.nic.in/aboutu	<u>s/committee/wr</u>	<u>kgrp12/wg_occup</u>	<u>safety.p</u>
11. Central Vigilance Commission (Gov. of Ind	ia) website: <u>http:</u>	//cvc.nic.in/welco	<u>me.html</u> .
12. Weblink of Transparency International: ht	tps://www.trans	<u>sparency.org/</u>	
13. Weblink Status report: https:/	//www.hrw.org/	world-report/201	5/country-
chapters/india			

Table 1 : Mapping of COs with Pos

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PSO2
CO1								2						
CO2								3	1					
CO3								2						
CO4								3		2				
C05								3	2	2		2		
Total		2						13	3	4		2		
Scaled Value		1						3	1	1		1		

 $1 - 5 \rightarrow 1$, $6 - 10 \rightarrow 2$, $11 - 15 \rightarrow 3$

0 – No relation, 1 – Low relation, 2 – Medium relation, 3 – High relation

COU	RSE (CODE	XMA201	L	Т	Р	С				
COUI	RSE N	JAME	CALCULUS AND LAPLACE TRANSF	3	1	0	4				
PRER	EQU	SITES	Basic concepts of Differentiation, Int	egration, Vectors							
			and Complex numbers.								
С	Р	Α			L	Τ	Р	H			
3	0	0			3 2 0 5						
COUR	SE O	UTCOM	IES	DOMAIN							
CO	1	Makel	Cognitive		Reme	mbei	ing, ~				
		and ir	te transforms of derivatives			Ар	piyin	g			
		equation	ons.								
CO	2	CO2.A	pply multiple integral concepts	Cognitive		Reme	mber	ing.			
		to Find	thearea, volume and to understand			Ap	plyin	g			
		the ord	ler of integration.					0			
CO	3	CO3. D	<i>efine</i> the gradient, divergent curl	Cognitive]	Reme	mber	ing,			
		of vect	ors. <i>Find</i> directional derivative,			Ap	plyin	g			
		unit ve	ector normal to the surface. <i>Apply</i>								
		corres	ponding theorems to <i>Find</i> the line,								
<u> </u>	4	Surface	e and volume integrals.	Cognitivo	т	Indor	aton	ling			
LU4	4	functio	<i>uct</i> and examine the analytic	Cognitive	l	An	stant	nng, a			
		Conius	sate and to Explain the concept of			πр	prym	B			
		confor	mal mapping and to <i>Construct</i> the								
		bilinea	r transformation.								
CO	5	Explai	n the poles , singularities and	Cognitive	J	Jnder	stand	ling,			
		residu	es of functions and to <i>solve</i> the			Ap	plyin	g			
		proble	ms using contour integration								
UNIT	I - LA	PLACE	TRANSFORMS					15			
Trans	form	s of ele	ementary functions – properties –	derivatives and int	egral	s of	trans	sforms-			
Trans	form	s of der	ivatives and integrals - Transforms (of unit step function a	and I	mpuls	se fui	iction -			
diffor	ontial	and int	equations - Convolution The	frem – mverse trans	510111	15 –	solut	10115 01			
	II -M		F INTEGRALS					15			
Doubl	e int	egration	- Cartesian and polar coordinates	- change of order of i	integ	ratio	1 - ar	ea as a			
doubl	e inte	egral – c	hange of variables between Cartesiar	and polar coordinate	es - tr	iple i	ntegr	ation			
Simpl	e app	lication	s (Finding area & volume of a certain	region).		1	0				
UNIT	III -	VECTO	R CALCULUS					15			
Gradie	ent, c	liverger	nce and curl - directional derivative	- normal and tangen	it to	a give	en su	rface –			
angle	betw	een two	o surfaces – irrotational and solenoid	dal vector fields - Line	e, Su	rface	and	Volume			
Integr	al – (Green's	theorem in a plane, Gauss divergend	ce theorem and Stoke	e's th	eoren	n (ex	cluding			
proof.											
UNII	IV - 1	ANALY	IICFUNCTIONS	acconvert and sufficient a	andi	tion (ovolu	15 ding			
proof)) – Ca	uchy Ri	emann equations – properties of anal	ytic functions - harmo	onic c	conjug	gate -	ung			
constr	ructio	on of an	analytic function – Conformal mappin	ng: w= z + c, cz, $\frac{1}{z}$, sin	Z, C(oshz,	$z + \frac{k^2}{z}$	-			
Biline	Z Z Z Bilinear transformation.										

II SEMESTER

UNIT V COMPLEX INTEGRATION			15						
Statement and application of Cauchy's integral theorem and integral formula - Taylor's and Laurent's									
expansion - Residues – Cauchy's Residue Theorem - Contour integration over unit circle.									
Total Hours LECTURE TUTORIAL									
	45	30	75						
TEXT									
1. Grewal, B.S. Higher Engineering Mathematics, 41 st Edition,	Khanna Pub	lication, Delhi	, 2011.						
2. Kreyszig, E, Advanced Engineering Mathematics, Eighth Ed	tion, John W	iley and Son(A	Asia)						
Ltd, Singapore, 2001.	-		-						
REFERENCES									
1. Bali N.P and Narayana lyengar, Engineering Mathemati	cs, Laxmi Pu	blications (P)	Ltd,						
New Delhi, 2003.									
2. Veerarajan T, Engineering Mathematics Fourth Edition	Tata – McGr	aw Hill Publis	shing						
Company Ltd, New Delhi, 2005.			-						
3. Kandasamy P., Thilagavathy K, and Gunavathy K, Engin	eering Mathe	ematics Volun	ne I, II						
and III, S. Chand & Co, New Delhi, 2005.	-								
4. Venkataraman M. K, Engineering Mathematics, Volume	I and II Revi	sed enlarge F	ourth						
Edition, The National Publishing Company, Chennai, 20	04.	0							
E REFERENCES									
www.nptel.ac.in									
Advanced Engineering Mathematics Prof. Jitendra Kumar									
Department of Mathematics Indian Institute of Technology, Kh	aragpur								

Mapping of COs with Pos

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012
CO 1	3											1
CO 2	3											1
CO 3	3	2								1	1	2
CO 4	3	2			1					1	1	1
CO 5	3	2			1					1	1	1
	15	6	0	0	2	0	0	0	0	3	3	6

1 - Low, 2 – Medium, 3- high

COU	RSE (E CODE XCP202				Т	Р	С	
COUF	RSE N	NAME	COMPUTER PROGRAMMING				1	4	
С	Р	Α							
3	1	0							
COURSE OUTCOMES DOMAIN				DOMAIN		LE	VEL		
C01	CO1 <i>Define</i> programming fundamentals and <i>Solve</i>		Cognitive	Remembering					
	simple programs using I/O statements.			Psychomotor	Guided Response			е	
CO2	CO2 Define syntax and write simple programs			Cognitive	Remembering				
	l	using co	ontrol structures and arrays	Psychomotor	Guided Response				
CO3	1	Explain	and write simple programs using	Cognitive	Understanding				
	f	functio	ns and pointers	Psychomotor	Guided Response			е	
C04	1	Explain	and write simple programs using	Cognitive	Understanding				
	5	structu	res and unions	Psychomotor	Guided Response				
C05	1	Explain	and <i>write simple programs</i> using files	Cognitive	Unde	erstar	nding		
	ä	and <i>Build</i> simple projects Psychomotor			Guided Response				
UNIT I - PROGRAMMING FUNDAMENTALS AND INPUT /OUTPUT STATEMENTS						15			

• Theory

• Program – Flowchart – Pseudo code – Software – Introduction to C language – Character set – Tokens: Identifiers, Keywords, Constants, and Operators – sample program structure -Header files – Data Types - Output statements – Input statements.

Practical

- 1. Program to display a simple picture using dots.
- 2. Program for addition of two numbers
- 3. Program to swap two numbers
- 4. Program to solve any mathematical formula.

UNIT II - CONTROL STRUCTURE AND ARRAYS

• Theory

• Control Structures – Conditional Control statements: Branching, Looping - Unconditional control structures: switch, break, continue, goto statements – Arrays: One Dimensional Array – Declaration – Initialization – Accessing Array Elements – Searching – Sorting – Two Dimensional arrays - Declaration – Initialization – Matrix Operations – Multi Dimensional Arrays - Declaration – Initialization – Storage classes: auto – extern – static. Strings: Basic operations on strings.

15

15

• Practical

- 1. Program to find greatest of 3 numbers using Branching Statements
- 2. Program to display divisible numbers between n1 and n2 using Looping Statement
- 3. Program to remove duplicate element in an array.
- 4. Program to perform string operations.

UNIT III- FUNCTIONS AND POINTERS

• Theory

• Functions: Built in functions – User Defined Functions - Parameter passing methods - Passing arrays to functions – Recursion - Programs using arrays and functions. Pointers - Pointer declaration - Address operator - Pointer expressions & pointer arithmetic - Pointers and function - Call by value - Call by Reference - Pointer to arrays - Pointers and structures - Pointers on pointer.

• Practical

- 1. Program to find factorial of a given number using four function types.
- 2. Programs using <u>Recursion</u>
- 3. Programs using <u>Pointers</u>

			9+7
• Theory			
Structures and Unions - Giving values to members - Initializing s	tructure - Fu	nctions and stru	ictures -
Passing structure to elements to functions - Passing entire funct	ion to functio	ns - Arrays of st	tructure -
Structure within a structure and Union.			
Practical			
1. Program to read and display student mark sheet <u>Structu</u>	<u>es</u> with varia	bles	
2. Program to read and display student marks of a class usi	ng <u>Structures</u>	with arrays	
3. Program to create linked list using <u>Structures</u> with point	ers	U U	
UNIT V - FILES			15
Theory			
File management in C - File operation functions in C - Defining	and opening a	a file - Closing a	ı file - The
getw and putw functions - The fprintf & fscanf functions - fseek	unction – File	es and Structure	es.
Practical			
1 1 4011041			
1. Program for copying contents of one file to another file.			
 Program for copying contents of one file to another file. Program using files using structure with pointer 			
 Program for copying contents of one file to another file. Program using files using structure with pointer 	LECTURE	PRACTICAL	TOTAL
 Program for copying contents of one file to another file. Program using files using structure with pointer 	LECTURE 45	PRACTICAL 30	TOTAL 75
 Program for copying contents of one file to another file. Program using files using structure with pointer TEXT BOOKS	LECTURE 45	PRACTICAL 30	TOTAL 75
1. Program for copying contents of one file to another file. 2. Program using files using structure with pointer TEXT BOOKS 1. Byron Gottfried, "Programming with C", III Editio	LECTURE 45 n, (Indian	PRACTICAL 30 Adapted Editio	TOTAL 75 on), TMH
 Program for copying contents of one file to another file. Program using files using structure with pointer TEXT BOOKS Byron Gottfried, "Programming with C", III Editio publications, 2010 	LECTURE 45 n, (Indian	PRACTICAL 30 Adapted Editic	TOTAL 75 on), TMH
 Program for copying contents of one file to another file. Program using files using structure with pointer TEXT BOOKS Byron Gottfried, "Programming with C", III Edition publications, 2010 Yeshwant Kanethker, "Let us C", BPB Publications, 2008 	LECTURE 45 n, (Indian 4	PRACTICAL 30 Adapted Editio	TOTAL 75 on), TMH
 Program for copying contents of one file to another file. Program using files using structure with pointer TEXT BOOKS Byron Gottfried, "Programming with C", III Edition publications, 2010 Yeshwant Kanethker, "Let us C", BPB Publications, 2008 REFERENCES	LECTURE 45 n, (Indian	PRACTICAL 30 Adapted Editic	TOTAL 75 on), TMH
 Program for copying contents of one file to another file. Program using files using structure with pointer TEXT BOOKS Byron Gottfried, "Programming with C", III Edition publications, 2010 Yeshwant Kanethker, "Let us C", BPB Publications, 2008 REFERENCES Brian W. Kernighan and Dennis M. Ritchie, "The C 	LECTURE 45 n, (Indian A	PRACTICAL 30 Adapted Editio	TOTAL 75 on), TMH Pearson
 Program for copying contents of one file to another file. Program using files using structure with pointer TEXT BOOKS Byron Gottfried, "Programming with C", III Edition publications, 2010 Yeshwant Kanethker, "Let us C", BPB Publications, 2008 REFERENCES Brian W. Kernighan and Dennis M. Ritchie, "The C Education Inc. (2005). 	LECTURE 45 n, (Indian A	PRACTICAL 30 Adapted Edition	TOTAL 75 on), TMH Pearson

- Edition, Brooks-Cole Thomson Learning Publications, 2001.3. Johnsonbaugh R. and Kalin M., "Applications Programming in ANSI C", III Edition, Pearson Education India, 2003.
- 4. <u>https://iitbombayx.in/courses/IITBombayX/BMWCS101.1x/2015_T1/courseware</u>

Mapping of COs with Pos

 $1 - 5 \rightarrow 1$, $6 - 10 \rightarrow 2$, $11 - 15 \rightarrow 3$

0 – No relation, 1 – Low relation, 2 – Medium relation, 3 – High relation

COURSE CODE XWE203					L	Τ	Р	С
COURSE NAME MECHANICAL AND CIVIL ENGINEERING SYSTE				ING SYSTEMS	3	1	1	5
-			(WORKSHOP PRACTICE INCLUDED)				-	
C	P	A					P	H
1.5	1.5			3	2	2	7	
	RSE			DOMAIN	17 .	Ll	EVEL	
LO LO	1	Define a	ind visualize the working principles	Cognitive	Kn	owled	ge	
	2	Differen	arious bollers, turbilles and eligines	Cognitivo	Cor	nnroh	oncior	
	2	Dijjeren	manta humaina variana matrala m	Psychomotor	C01	npren	lensioi	1
		measure	ements by using various metrology	1 09 0110 110 001				
		Instrum	ents					
CO	3	Categor	rise and palpate the various metal	Cognitive	Syr	nthesi	S	
		forming	, joining and cutting processes	Psychomotor				
CO	4	Charact	terize and diagonose the quality of	Cognitive	Kn	owled	ge	
		the good	l Building materials; and measure	Psychomotor				
		linear ai	nd angular dimensions					
CO	5	Summa	<i>rize and palpate</i> the components of	Cognitive	Eva	aluatio	on	
		a substr	uctures and super structures.	Psychomotor				
UNI	Г І-В	asics of T	Thermal and Energy Systems					21
Intro	duct	ion to M	lechanical Engineering – Streams – T	hermal, Desigr	ı, ar	nd Ma	nufact	uring
Conv	renti	onal and	non conventional sources of energy - H	leat energy – Mo	odes	of hea	at tran	sfer –
Wor	king	principle	es of Boilers and Turbines - Classifica	tion of IC Engi	nes	- 4 st	troke a	and 2
strol	ke ei	ngines –	Petrol and diesel engines - Perform	nance and heat	t ba	lance	– Wo	rking
prine	ciple	s of hydel	, steam and nuclear power plants.					
Prac	tical	:	DUD					
Petro	ol en	gine perf	ormance – BHP					
Dies	el en	gine perio	ormance – BHP					
		Fundam	netals of Machina Flomonts and Moas	uromonte				15
Engi	noor	ng mate	rials – Machine elements – fasteners	and support sy	cton	nc - R	olt dri	
Tvne	$v_{\rm S} = V$	elocity r	atio and Length of helt – Gear drives – T	vnes – Velocity	ratio	13 – D)	en un	ves –
Prine	ciple	of measu	rements – Accuracy – Precision – Erro	rs – Measuring	inst	rumer	nts – S	cale –
Vern	ier C	aliper – N	/licrometer – Slip gauges – Spirit level.	8				
Prac	tical	:						
Meas	surer	nents usi	ng Vernier Caliper, Micrometer, Slip gau	iges and Spirit l	evel			
Dem	onst	ration of	transmission system in machines and su	uspension syste	m in	autor	nobile	s.
UNI	Г III	- Elemer	nts of Manufacturing					15
Man	ufact	uring pro	ocesses - Classification - Principles of	metal forming	g – f	orging	g, mou	lding,
casti	ng –	Principle	s of metal joining – welding, soldering a	nd brazing.				
Mach	inin	g – turnir	ng, drilling, milling and grinding – Machi	ining time and r	nate	rial re	emoval	rate.
Prac	tical	: 	han taala					
Exposure to workshop tools								
Sim	ig ex de tu	rning and	drilling					
Dem	onst	ration of	welding and mould preparation					
Demonstration of weighing and mould preparation								

UNIT IV-Surveying and Construction Materials					15			
Surveying: Definition – Survey Instruments – Classification of Survey – Linear and Ang								
Measurements – Measurement of area – Illustrative Examples.								
Construction Materials:Bricks – Stones – Timber –	Steel – Cemer	t – Sand -	- Aggregates	5 –				
Concrete			00 0					
Practical: Surveying								
UNIT V- Components and of Construction of Civ	il Structures				15			
Substructure:Bearing capacity - Types of Founda	tion – Applie	cation – I	Requiremen	t of	good			
foundations.			-		-			
Superstructure:Brick masonry – Types of bond -	- Flooring –	Beams –	Columns –	Lint	els –			
Roofing – Doors and windows fittings – Introductio	n to bridges a	and dams	– Building d	lrawi	ing			
Practical: Building drawing, Carpentry, Plumbing.								
Total Hours LECTURE TUTO PRACTI TO								
		RIAL	CAL					
	45	RIAL 30	CAL 30	1	05			
TEXT BOOKS	45	RIAL 30	CAL 30	1	05			
TEXT BOOKS 1. Dr. P.K. Srividhya, P. Pandiyaraj, S. Balan	45 nurugan, "Bas	RIAL 30 ic Civil an	CAL 30 d Mechanic	1 al	05			
TEXT BOOKS 1. Dr. P.K. Srividhya, P. Pandiyaraj, S. Balan Engineering", PMU Publications, Vallam,	45 nurugan, "Bas 2013.	RIAL 30 ic Civil an	CAL 30 d Mechanic	1 al	05			
TEXT BOOKS 1. Dr. P.K. Srividhya, P. Pandiyaraj, S. Balan Engineering", PMU Publications, Vallam, 2. Dr. B.C.Punmia, Ashok Kumar Jain, "Basi	45 nurugan, "Bas 2013. c Civil Engine	RIAL 30 ic Civil an ering", La	CAL 30 d Mechanic xmi Publica	1 al tions	05			
TEXT BOOKS Dr. P.K. Srividhya, P. Pandiyaraj, S. Balan Engineering", PMU Publications, Vallam, Dr. B.C.Punmia, Ashok Kumar Jain, "Basi New Delhi, 2003. 	45 nurugan, "Bas 2013. c Civil Engine	RIAL 30 ic Civil an ering", La	CAL 30 d Mechanic xmi Publica	1 al tions	05			
 TEXT BOOKS 1. Dr. P.K. Srividhya, P. Pandiyaraj, S. Balan Engineering", PMU Publications, Vallam, 2. Dr. B.C.Punmia, Ashok Kumar Jain, "Basin New Delhi, 2003. 3. Dr. B.C.Punmia, "Surveying – Volume I", June I", J	45 nurugan, "Bas 2013. c Civil Engine Laxmi Publica	RIAL 30 ic Civil an ering", La itions, Ne	CAL 30 d Mechanic xmi Publica w Delhi, 200	1 al tions)5	05			
 TEXT BOOKS 1. Dr. P.K. Srividhya, P. Pandiyaraj, S. Balan Engineering", PMU Publications, Vallam, 2. Dr. B.C.Punmia, Ashok Kumar Jain, "Basin New Delhi, 2003. 3. Dr. B.C.Punmia, "Surveying – Volume I", I 	45 nurugan, "Bas 2013. c Civil Engine Laxmi Publica	RIAL 30 ic Civil an ering", La itions, Ne	CAL 30 d Mechanic xmi Publica w Delhi, 200	1 al tions)5	05			
TEXT BOOKS1. Dr. P.K. Srividhya, P. Pandiyaraj, S. Balan Engineering", PMU Publications, Vallam, 2. Dr. B.C.Punmia, Ashok Kumar Jain, "Basi New Delhi, 2003. 3. Dr. B.C.Punmia, "Surveying – Volume I", IREFERENCES1. VenugopalK., BasicMechanica	45 nurugan, "Bas 2013. c Civil Engine Laxmi Publica l Engineeri	RIAL 30 ic Civil an ering", La itions, Nev ng, Anu	CAL 30 d Mechanic xmi Publica w Delhi, 200 radha Puł	1 al tions)5 olicat	05			
 TEXT BOOKS 1. Dr. P.K. Srividhya, P. Pandiyaraj, S. Balan Engineering", PMU Publications, Vallam, 2. Dr. B.C.Punmia, Ashok Kumar Jain, "Basin New Delhi, 2003. 3. Dr. B.C.Punmia, "Surveying – Volume I", I REFERENCES 1. Venugopal K., Basic Mechanica Kumbakonam, 2007. 	45 nurugan, "Bas 2013. c Civil Engine Laxmi Publica l Engineeri	RIAL 30 ic Civil an ering", La tions, Ne ng, Anu	CAL 30 d Mechanic xmi Publica w Delhi, 200 radha Puł	1 al tions)5 olicat	05			
TEXT BOOKS1. Dr. P.K. Srividhya, P. Pandiyaraj, S. Balan Engineering", PMU Publications, Vallam, 2. Dr. B.C.Punmia, Ashok Kumar Jain, "Basi- New Delhi, 2003. 3. Dr. B.C.Punmia, "Surveying – Volume I", IREFERENCES1. VenugopalKumbakonam, 2007. 2. Shanmugam G. and Palanichamy M. Survey M.	45 nurugan, "Bas 2013. c Civil Engine Laxmi Publica l Engineeri	RIAL 30 ic Civil an ering", La tions, Ne ng, Anu and Mech	CAL 30 d Mechanic xmi Publica w Delhi, 200 radha Pul anical Engir	1 al tions)5 olicat	05 , cions, ng",			

	P01	P02	PO3	P04	P05	P06	P07	P08	P09	P010	P011	P012
CO1	2	-	-	2	-	-	-	-	-	-	-	-
CO2	2			2		1	-	-	-	-	-	-
CO3		2			2	-	-	-	-	-	-	-
CO4		3		1		-	-	-	-	-	-	-
CO5	1	1			3	-	-	-	-	-	-	-
Total	5	6	-	5	5	1	-	-	-	-	-	-

Mapping of CO's with PO's:

1 - Low, 2 – Medium, 3 – High

COURSE CODE			XAC204	L	Τ	Р	C		
COU	RSE	NAME	APPLIED CHEMISTRY	3	1	1	5		
С	Ρ	Α			L	Τ	Р	H	
2.8	0.8	8 0.4			3	2	2	7	
COUR	RSE (DUTCOM	ES	DOMAIN		LE	VEL		
CO 1	Identify	Cognitive	Ren	ıemb	ering	5			
		paramete	ers and methods to purify water in contest	Psychomotor	Perception				
with boilers and domestics usage.									
CO2	2	Explain	the fundamental principles of	Cognitive	Und	lersta	ndin	g	
		electroch	nemical reactions, its applications in redox	Psychomotor	Set				
		reactions	s and calculate the different						
		electroch	nemical processes.			_			
CO 3	3	Interpre	<i>t</i> thetypes of corrosion, <i>use and measure</i>	Cognitive	App	lying			
		its contro	of by various methods including protective	Psychomotor	Med	hanis	sm		
		Describe	es.	AIIECTIVE	Rec Rec	elve	onin-		
LU4	ł	Describe	battorios, nuclear reactors, solar colla	Affective	App	lemb	ering	, ,	
		fuel cells	and anaerobic digestion	Allective	Res	nond	5		
		iuci cello	and ander oble digestion.		ites.	ponu			
COS	5	Apply an	d <i>measure</i> the different types of spectral	Cognitive	Ren	ıemb	ering	5	
		techniqu	es for quantitative chemical analysis and		App	lying			
		<i>list</i> nanoi	<i>list</i> nanomaterials for various engineering Psychom			Mechanism			
		processe	S						
UNIT	I-V	VATER T	ECHNOLOGY				7+	8 + 9	
Sourc	es a	nd types	of water - water quality parameters - BIS	and ISO specification	ons- l	nardn	ess:	types	
and e	estim	ation of	hardness (problems) - alkalinity: types an	nd estimation (prol	blems	;) – b	oiler	feed	
water	- r	equireme	ents – disadvantages of using hard water in	n boilers – internal	l trea	tmen	t, ext	erna	
treatr	nent	– demine	eralization process – desalination using reve	erse osmosis –dome	estic v	vater	treat	ment	
– Efflu	uent	treatmen	t processes in industries						
UNIT	II -E	<u>ELECTRO</u>	CHEMISTRY		1 .	1	8+5	<u>+15</u>	
Basic	cone	cepts of c	onductance – Kohlraush's law and conducto	ometric titrations –	electr	ode p	oten	tials-	
Nerns	st ec	quation:	derivation and problems – reversible an	a irreversible cells	s − e	electro	olytic	and mark	
and s	PCOR	ndary – o	alass electrode – determination of pH usi	a guinhydrone an	d ala	oues	- pri	des -	
electr	oche	emical se	ries and its applications – Galvanic cells a	nd concentration ce		note	ntion	netric	
titrati	ions	- redox ti	trations.		5110	pote			
UNIT	II-C	ORROSI	ON AND PROTECTIVE COATINGS				9+	4 +3	
Corro	sion	- causes	- types-chemical, electrochemical corro	sion (galvanic, di	fferer	ntial	aera	tion)	
corro	sion	in elec	tronic devices, corrosion control - mat	erial selection an	d de	sign	aspe	cts -	
electr	oche	emical pro	otection – sacrificial anode method and impr	essed current catho	odic m	etho	d.		
Prote	ectiv	e coating	gs : paints- constituents and functions - elect	roplating of copper	and g	old, E	Electi	oless	
platin	ig - D	Distinction	between electroplating and electroless plat	ting,					
advan	itage	es of elect	roless plating, electroless plating of nickel an	nd copper on PCB.			40	.	
	IV-	ENERGY	STURAGE DEVICES AND NUCLEAR ENERG	<u>iY</u>			12 -	+7+0	
Energ	gy ste	orage dev	Alces – Batteries: Types – primary (dry	cell, alkaline cells)	and s	econ		(lead	
	INI-CO	u and Lit	mum ion batteries) - Supercapacitors – Fue	i cens-Hyarogen-O	xygen	ruel	cell-	Solar	
Lens.									

Nuclear energy: nuclear fission and fusion –chain reaction and its characteristics – nuclear energy and calculations (problems) – atom bomb –Nuclear reactor- light water nuclear power plant – breeder reactor- Weapon of mass destruction- nuclear, radiological, chemical and biological weapons Disarmament - National and International Cooperation- Chemical Weapon Convention (CWC), Peaceful Uses of Chemistry. Bio fuels: biomethanation- anaerobic digestion process, biomass: sources and harness of energy.

UNIT V SPECTROSCOPY AND NANOCHEMISTRY

9 +6 +3

Electromagnetic spectrum - Lambert law and Beer-Lambert's law (derivation and problems) - molecular spectroscopy -UV- visible spectroscopy: electronic transitions - chromophores and auxochromes – instrumentation (block diagram) - applications – IR spectroscopy: principle - fundamental modes of vibrations – calculations of vibrational frequency – IR spectrophotometer instrumentation (block diagram) – applications of IR spectroscopy.

Nanochemistry - Basics - distinction between molecules, nanoparticles and bulk materials; size-

dependent properties. Nanoparticles: Nanocluster, nanorod, nanotube and nanowire. Synthesis ;

properties and applications of nano materials-Buckminister fullerenes, CNT"S(Single walled carbon

nano tubes and Multi-walled carbon tubes)-Graphene- advantages and applications.

TEXT BOOKS

- 1. Jain and Jain , "A Text book of Engineering Chemistry", Dhanapatrai Publications, New Delhi, 2011.
- 2. Gadag and NityanandaShetty , "Engineering Chemistry", I.K International publishing House Pvt. Ltd, 2010.
- 3. P. Atkins, J.D. Paula , "Physical Chemistry" , Oxford University Press, 2009.
- 4. S. S. Dara, S. S. Umare, "A Text Book of Engineering Chemistry", S. Chand Publishing, 2011
- 5. C.P. Poole and F.J. Owens, "Introduction to Nanotechnology", , Wiley, New Delhi ,2007.

REFERENCES

- 1. Puri B R Sharma L R and Madan S Pathania, "Principles of Physical Chemistry", Vishal publishing Co., Edition 2004
- 2. Kuriocose, J C and Rajaram, J, "Engineering Chemistry", Volume I/II, Tata McGraw-Hill Publishing Co. Ltd. New Delhi, 2000

E REFERENCES

E Resources - MOOCs:

- 1. http://www.mooc-list.com/course/chemistry-minor-saylororg
- 2. <u>https://www.canvas.net/courses/exploring-chemistry</u>
- 3. http://freevideolectures.com/Course/2263/Engineering-Chemistry-I
- 4. http://freevideolectures.com/Course/3001/Chemistry-I
- 5. http://freevideolectures.com/Course/3167/Chemistry-II
- 6. http://ocw.mit.edu/courses/chemistry/

Laboratory Part

30 hrs

- 1. Determination of total hardness, temporary and permanent hardness of water by EDTA method.
- 2. Determination of alkalinity of water sample.
- 3. Determination of chloride content of water sample by Argentometric method.
- 4. Conductometric titration of a strong acid with a strong base.
- 5. Determination of strength of hydrochloric acid by pH metric method.
- 6. Conductometric precipitation titration using barium chloride and sodiumsulphate.
- 7. Determination of strength of iron by potentiometric method using dichromate.
- 8. Potentiometric acid-base titration using quinhydrone electrode.
- 9. Corrosion inhibition efficiency by weight loss method.
- 10. Estimation of iron by colorimetric method.
REFERENCE BOOKS

- 1. Mendham, Denney R.C,. Barnes J.D and Thomas N.J.K., "Vogel's Textbook of Quantitative Chemical Analysis", 6th Edition, Pearson Education, 2004.
- 2. Garland, C. W.; Nibler, J. W.; Shoemaker, D. P. "Experiments in Physical Chemistry", 8th Ed.; McGraw-Hill: New York, 2003.
- 3. Sirajunnisa.A., Sundaranayagi.S.,Krishna.,Rajangam.R.,Gomathi.S., "Applied Chemistry Lab Manual", Department of Chemistry, PMU Press, Thanjavur, 2016.

E Resources - MOOCs:

1.http://freevideolectures.com/Course/2380/Chemistry-Laboratory-Techniques 2. <u>http://freevideolectures.com/Course/2941/Chemistry-1A-General-Chemistry-Fall-2011</u> 3.http://ocw.mit.edu/courses/chemistry/5-301-chemistry-laboratory-techniques

since if y bewinneed y courses y enemisery y soor enemisery habitatory teening ues											
	LECTURE	TUTORIAL	PRACTICAL	TOTAL HOURS							
HOURS	45	30	30	105							

Mapping of CO's with PO's:

	P01	PO2	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO 1	PSO2
C01	3	3	3	3	3	1	2	3	1	3	1	1	2	1
CO2	3	2	3	3	3	2	3	3	1	3		1	2	1
CO3	3	3	3	3	3	1	3	3	1	2	1	1	2	2
CO4	3		3	3	3	3	3	3	1	1		1	3	2
CO5	1	3		2	2	1	2		1	1		1	2	2
Total	13	11	12	14	14	8	13	12	5	10	2	5	11	8
Scaled Value	3	3	3	3	3	2	3	3	1	2	1	1	1	2
Total Scaled Value	13 3	3	3	14 3	3	8 2	13 3	3	5	2	2	5	11	

 $1 - 5 \rightarrow 1, 6 - 10 \rightarrow 2, 11 - 15 \rightarrow 3$

COUR	SE CO	DE	XEG205		L	Τ	Р	C			
COUR	SE NA	ME	ENGINEERING GRAPHICS		2	0	1	3			
С	Р	Α			L	Τ	Ρ	Η			
1	1	1			2	0	2	4			
COUR	SE OL	JTCOM	ES	DOMAIN		LEV	EL				
CO1	App cons	ly the n struct a	ational and international standards, and practice various curves	Cognitive Psychomotor Affective	App Guid Resp	lying led oonse					
CO2	Iı	n terpre proje	et, construct and practice orthographic otions of points, st. lines and planes.	Cognitive Psychomotor Affective	Und Mec Resp	ersta hanis ponse	nding m	5			
CO3 Construct Sketch and Practice projection of solids in various positions and true shape of sectioned solids. Cognitive Psychomotor Affective Applying Comprehension Response CO4 CO4 Cognitive Psychomotor Affective Applying Comprehension Psychomotor Affective											
CO4	CO4 Interpret, Sketch and Practice the development of lateral surfaces of simple and truncated solids, intersection of solids. Cognitive Psychomotor Affective Applying Comprehension Response										
CO5	CO5Construct, sketch and practice isometric and perspective views of simple and truncated solids.Cognitive Psychomotor AffectiveApplying Comprehension Response										
UNIT I CONST	- INT	'RODU TION (CTION, FREE HAND SKETCHING OF ENGG OF PLANE CURVE	OBJECTS AND			6	+6			
Import specifi Pictori two di hand s Polygo ellipse constr UNIT I	Importance of graphics in engineering applications – use of drafting instruments – BIS specifications and conventions as per SP 46-2003. Pictorial representation of engineering objects – representation of three dimensional objects in two dimensional media – need for multiple views – developing visualization skills through free hand sketching of three dimensional objects. Polygons & curves used in engineering practice – methods of construction – construction of ellipse, parabola and hyperbola by eccentricity method – cycloidal and involute curves – construction – drawing of tangents to the above curves.										
Genera project of line surface	General principles of orthographic projection – first angle projection – layout of views – projections of points, straight lines located in the first quadrant – determination of true lengths of lines and their inclinations to the planes of projection – traces – projection of polygonal surfaces and circular lamina inclined to both the planes of projection.										
UNIT III- PROJECTION OF SOLIDS AND SECTIONS OF SOLIDS6+6											
Projec one pl above perper one re	Projection of simple solids like prism, pyramid, cylinder and cone when the axis is inclined to one plane of projection – change of position & auxiliary projection methods – sectioning of above solids in simple vertical positions by cutting plane inclined to one reference plane and perpendicular to the other and above solids in inclined position with cutting planes parallel to one reference plane – true shapes of sections.										

UNIT IV- DEVELOPMENT OF SURFACES AND INTERSECTION OF SOLIDS 6+6										
Need for development of surfaces – development of lateral surfaces of simple and truncated										
solids – prisms, pyramids, cylinders and cones – development of lateral surfaces of the above										
solids with square and circular cutouts perpendicular to their axes – intersection of solids and										
curves of intersection -prism with cylinder, cylinder & cylinder, cone & cylinder with normal										
intersection of axes and with no offset.										
UNIT VI-SOMETRIC AND PERSPECTIVE PROJECTIONS 6+6										
Principles of isometric projection – isometric scale – isometric projections of simple solids,										
truncated prisms, pyramids, cylinders and cones – principles of perspective projections –										
projection of prisms, pyramids and cylinders by visual ray and vanishing point methods										
I ECTIDE DACTICAL TOTAL										
20 20 60										
IEAI 1. Netension KW "A Teathack of Engineering Creakies" Dhendelshui Dahlishere										
1. Natarajan, K.V, A Textbook of Engineering Graphics, Dhanalakshimi Publishers,										
Chennai, 2006.										
2 Dr. D.V. Srividhus, D. Dandiyarai "Engineering Cranhigs" DMU Dublications, Vallam, 2012										
2. DI. P.N. SHVIUHYa, P. Pahutyaraj, Engineering Graphics, PMO Publications, Valiani, 2015										
REFERENCES										
1. Luzadder and Duff. "Fundamentals of Engineering Drawing" Prentice Hall of India										
PvtLtd. XI Edition - 2001.										
2. Venugopal.K. and Prabhu Raia. V., "Engineering Graphics", New Age International (P) Ltd.										
2008.										
2000. 3 Gonalakrishnan K.R. "Engineering Drawing I & II" Subhas Publications 1998										
4. Shah.M.B and Rana.B.C., "Engineering Drawing". Pearson Education 2005.										
E REFERENCES										
1. http://perivarnet/Econtent										
2 http://pries/in/courses/112103019/										

Mapping of CO's with PO:

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012
CO1	3	2	3	1	1							1
CO2	3	2	1	1	1							1
CO3	3	2	1	1	1							1
CO4	3	2	1	1	1							1
CO5	3	2	1	1	1							1
Total	15	10	7	5	5							5
Scaled	3	2	2	1	1							1

1 – Low Relation, 2 – Medium Relation, 3 – High Relation

0	COURSE CODE XGS206 L T S.S										
C	OURSE	E NAME	SPEECH COMMUNICATION		1	0	2	2			
С	Р	Α			L T S.S H						
3	0	0			1 0 2						
C	OURSE	OUTCOM	MES	DOMAIN		LEV	/EL				
	CO1	I dentif y	v different styles to various forms of public	Cognitive	Rem	embe	ring				
		speakir	ng skills and presentation skills	doginerve	Ren		11115				
	CO2 Understand and identify the proper tone of Cognitive Understanding										
language required in writing and speaking											
CO3Adapt the speech structures and develop theCognitiveApplying											
speech outline according to the audience. Psychomotor Applying											
CO4											
		Ability	to communicate and develop presentation	Cognitive	Rest	onse					
skills Affective											
CO5 Equip the speaker to face the audience without											
	005	Guid	led Re	spon	se						
INIT I. INTRODUCTION TO PUBLIC SPEAKING											
Fi	inction	s of ora	al communication: skills and competencies n	eeded for succes	ssful s	speech	n ma	king:			
in	nportar	nce of pu	blic speaking skills in everyday life and in the a	rea of business, s	social.	politi	cal a	id all			
ot	her pla	ces of gr	oup work.		,	1					
U	NIT II-	TYPES O	F SPEECH					9			
Μ	anuscr	ipt, impr	omptu, rememorized and extemporaneous speec	hes; analyzing the	audie	nce ar	nd				
00	casion	; develop	ing ideas; finding and using supporting materials								
U	NIT II	I- ORGAN	NIZATION OF SPEECH					9			
Ir	ntroduc	tion, dev	elopment and conclusion; language used in vario	us types of speech	es; Ad	apting	g the				
S	beech s	tructures	s to the Audience; paralinguistic features.								
U	NII IV	- USE OF	VISUAL AIDS	aachaa, uaing had	long	11000 +		9			
	ow to p	icate	paper/assignment etc; using visual alus to the sp	eeches; using bou	y lang	uage i	.0				
I	NIT V-	SPEECH	ANXIETY					9			
P	ublic sr	bi <u>Elen</u>	nd speech anxiety, public speaking and critical lis	stening							
S	peech p	oractice (4-6 speeches per student)								
			Total Hours	LECTURE	TUT	ORIAL	, T()TAL			
45 45											
Τ	EXT BO	OOKS									
	1. P	rinciples	s and Types of Public Speaking - 2002 by Rayn	nie E. McKerrow (A	Autho	r), <u>Bru</u>	ice E.	_			
	<u>G</u>	<u>ronbeck</u>	, <u>Douglas Ehninger</u> , <u>Alan H. Monroe</u>			_					
	2. C	ommuni	cation : Principles for a lifetime, portable Editi	on- volume 2 Inter	rperso	nal					
1		ommunic	cation, Stevan A. Beebe, Texas State University-S	an Marcos, 2008.	D-11.	י . י	ad T	1:4:			
	3. N	riting a	inu speaking Author: John Sealy, Oxford Unive	ersity Press, New	Deini	1 ni		iition			
1	2	009. Co n	nmunicating in Business (8th Edition) Paper	back – 2012 by <u>V</u>	Nilliar	ns K	<u>S</u> , Er	igage			

Learning India Pvt. Ltd.

Mapping of Cos with POs:

	P01	P02	P03	P04	P05	P06	P07	P08	P09	РО	РО	PO
										10	11	12
C01	0	0	0	0	3	0	0	2	0	2	0	0
CO2	0	1	0	0	0	1	0	2	0	1	0	0
CO3	0	0	0	0	0	0	0	0	0	2	0	0
CO4	0	0	0	2	0	2	0	0	0	1	0	0
CO5	0	0	0	0	0	3	0	0	0	3	0	0
Total	0	1	0	2	3	6	0	4	0	9	0	0
Scaled Value	0	1	0	1	1	2	0	1	0	2	0	0

1-5= 1, 6-10 = 2, 11-15= 3

III SEMESTER

COUR	RSE CO	DE	XMA301				L	Τ	Р	С	
COUR	RSE NA	ME	TRANSFORMS AND PARTL	AL DIFFEREN	ITIAL		3	1	0	4	
	1		EQUATIONS / DISCRETE M	ATHEMATIC	S						
С	Р	Α					L	Τ	Ρ	Н	
3	0	0					3	2	0	5	
COUR	RSE OU	TCOM	ES			DOMAIN	L	EVE	L		
CO1	Expl	<i>ain</i> and	d Demonstrate the basic cond	cepts in partia	1	Cognitive	R	eme	mbe	ering	
	diffe	rential	equations and to <i>solve</i> linear	, nonlinear,							
	hom	ogeneo	ous and nonhomogeneous par	tial Differentia	al						
equations.											
CO2 Demonstrate the basic concept and properties of Fourier Cognitive Reme											
	serie	es and	to state Parseval's Ident	ity and Diri	tchiet s		U	nae	rstai	naing	
602	Cond	ition.	tandard Dantial Differential	Fauntiona ari	laina in	Comitivo	Δ.				
103	SOIV	e the s	anuaru Paruai Dinerenuai	Equations, and He	ISING IN	Cognitive	A	рріу	ing		
	engi	tion by	z Fourier series method	ation and nea	at now						
<u>CO4</u>	Equa Evnl	ain an	d Apply the concept of Fourie	r transform ar	nd ite	Cognitive	II	ndo	retai	nding	
COT	nron	erties	a Apply the concept of Fourie		iu its	Cognitive		liue.	vino	iuiiig	
C05	State	e and λ	Apply the properties of 7 tr	ansform and	to Find	Cognitive	R	eme	mhe	rinσ	
000	the 7	transf	form and inverse 7 transform			doginerve	A	nnlv	ving	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
UNIT	I - Par	tial Di	fferential Equations					ppij	8	15	
Form	ation o	f parti	al differential equations by	elimination of	of arbitra	arv consta	nts a	and	arbi	trarv	
functi	ons –	Solutio	n of standard types of first	order partial	differer	tial equat	ions	- L	agra	nge's	
linear	· equat	ion – L	linear partial differential equ	ations of sec	ond and	higher or	der v	vith	con	stant	
coeffi	cients.					U					
UNIT	II- Fou	rier So	eries							15	
Dirich	nlet's co	onditio	ns – General Fourier series –	Odd and ever	n functio	ns – Half 1	ange	sin	e se	ries –	
Half r	ange co	osine se	eries –Parseval's identity – Ha	rmonic Analy	sis.		-				
UNIT	III -Ap	oplicat	ions of Boundary Value Pro	blems						15	
Classi	fication	n of se	econd order quasi linear p	artial differe	ntial equ	uations –	Solu	tion	s of	one	
dimer	isional	wave	equation – One dimensiona	al heat equat	10n – St	eady state	e sol	utio	n of	two	
dimer	isional	heat	equation (Insulated edges e	xcluded) – Fo	ourier se	eries solut	lons	ın	Cart	esian	
coord	inates.										
UNIT	IV- FO	urier I	ransform							15	
Fouri	er inte	grai th	eorem (without proof) – Fo	ourier transfor	rm pairs	- Fourie	sin(e ar		osine	
identi	orms -	- prop	erties – Transforms of simp	ole functions -	- Convo	lution the	orem	- 1	arse	eval s	
	\mathbf{V} 7	'rancfe	rm and Difforence Equation	nc						15	
7 transform Elementary properties Inverse 7 transform Convolution theorem Initial and											
Final	value +	- Litil heorer	ns - Formation of difference	$\mu = \mu ansion m$	olution o	f differen		u – I Nati	nnud one	ii anu iising	
7-trar	value l Isform	HEULEI.		cquations - St			le eq	uau	0112	using	
		Т	otal Hours	LECTURE	TUTOR		TAI.				
				45	30) 75					
L				10	50	/ / /					

TEXT BOOKS

- 1. Grewal, B.S., "Higher Engineering Mathematics", 40th Edition Khanna Publishers, New Delhi, (2007).
- 2. Narayanan, S., Manicavachagom Pillay, T.K. and Ramaniah, G., "Advanced Mathematics for Engineering Students", Volumes II and III, S.Viswanathan (Printers and Publishers)Pvt. Ltd. Chennai, (2002).

REFERENCES BOOKS

- 1. Churchill, R.V. and Brown, J.W., "Fourier Series and Boundary Value Problems", Fourth Edition, McGraw Hill Book Co., Singapore, (1987).
- 2. Kandasamy, P., Thilagavathy, K., and Gunavathy, K., "Engineering Mathematics Volume III", S. Chand & Company Ltd., New Delhi, (1996).
- 3. Bali N.P. and Manish Goyal, "A Text Book of Engineering Mathematics" 7th Edition Lakshmi Publications (P) Limited, New Delhi, (2007)

E REFERENCES

1. www.nptel.ac.in, "Advanced Engineering Mathematics", Prof. Jitendra Kumar, Department of Mathematics, Indian Institute of Technology, Kharagpur.

Mapping of Cos with GAs:

	GA1	GA2	GA3	GA4	GA5	GA6	GA7	GA8	GA9	GA10	GA11	GA12
CO 1	3									1		1
CO 2	3									1		1
CO 3	3	2								1	1	2
CO 4	3	2			1					1	1	1
CO 5	3	2			1					1	1	1
Total	15	6	0	0	2	0	0	0	0	5	3	6
Scaled	3	2			1					1	1	2
value												

COURSE NAME ELECTRIC CIRCUITS ANALYSIS 3 1 0 4 C P A L T P H 3 0 0 3 2 0 5 COURSE OUTCOMES DOMAIN LEVEL Cognitive Remembering, Understanding C02 State and distinguish various theorems pertaining to electric circuits. Cognitive Remembering, Understanding C03 Outline and explain AC circuits. Cognitive Remembering, Understanding C04 Understand and classify transients and resonance circuit Cognitive Remembering, Applying C05 Discuss and explain coupled circuits and networks. Cognitive Understanding Applying C04 Understanding coupled circuits and networks. Cognitive Understanding Applying UNIT I- DC CIRCUIT ANALYSIS 9+6 Basic components and electric circuits - Charge - Current - Voltage and Power- Voltageand Current Sources - Ohms Law - Voltage and Current laws - Kirchoff's Current Law - Kirchoff's Current Sources - Ohms Law - Voltage and Current division -Basic Nodal and Mesh analysis - Nodal analysis - Mesh analysis. 9+6 Superposition theorem, Thevenin's and Norton's theorems, Reciprocity, Compensation,Maximun power transfer theorems, Tellegan's and Millman's theorems, Applica										
C P A L T P H 3 0 0 3 2 0 5 COURSE OUTCOMES DOMAIN LEVEL C01 Outline and reproduce DC circuits. Cognitive Remembering, C02 State and distinguish various theorems pertaining to electric circuits. Cognitive Remembering, C03 Outline and explain AC circuits. Cognitive Remembering, Understanding C04 Understand and classify transients and resonance circuit Cognitive Understanding C05 Discuss and explain coupled circuits and networks. Cognitive Understanding UNTT I- DC CIRCUIT ANALYSIS 9+6 Basic components and electric circuits – Charge – Current – Voltage and Power – Voltageand Current Sources – Ohms Law – Voltage and Current laws – Kirchoff's Current Law –Kirchoff's voltage law – The single Node – Pair Circuit – Series and Parallel ConnectedIndependent Sources - Resistors in Series and Parallel – Voltage and Current division – Basic Nodal and Mesh analysis – Nodal analysis – Mesh analysis. 9+6 UNIT II – NETWORK THEOREM AND DUALITY 9+6 Superposition theorem, Thevenin's and Norton's theorems, Reciprocity, Compensation,Maximun power transfer – Delta – Wye Conversion – Duality – Dual circuits. 9+6										
3 0 0 3 2 0 5 COURSE OUTCOMES DOMAIN LEVEL C01 Outline and reproduce DC circuits. Cognitive Remembering, Understanding C02 State and distinguish various theorems pertaining to electric circuits. Cognitive Remembering, Understanding C03 Outline and explain AC circuits. Cognitive Remembering, Understanding C04 Understand and classify transients and resonance circuit Cognitive Understanding, Applying C05 Discuss and explain coupled circuits and networks. Cognitive Understanding, Applying C05 Discuss and explain coupled circuits and networks. Cognitive Understanding Applying C05 Discuss and explain coupled circuits and networks. Cognitive Understanding Applying Current Sources - Ohms Law - Voltage and Current laws - Kirchoff's Current Law -Kirchoff' voltage law - The single Node - Pair Circuit - Series and Parallel ConnectedIndependent Sources - Resistors in Series and Parallel - Voltage and Current division -Basic Nodal and Mesh analysis - Nodal analysis - Mesh analysis. 9+ 6 UNIT II - NETWORK THEOREM AND DUALITY 9+ 6 Superposition theorem, Thevenin's and Norton's theorems, Reciprocity, Compensation,Maximun power transfer the										
COURSE OUTCOMES DOMAIN LEVEL C01 Outline and reproduce DC circuits. Cognitive Remembering C02 State and distinguish various theorems pertaining to electric circuits. Cognitive Remembering, Understanding C03 Outline and explain AC circuits. Cognitive Remembering, Understanding C04 Understand and classify transients and resonance circuit Cognitive Understanding, Applying C05 Discuss and explain coupled circuits and networks. Cognitive Understanding, Applying C04 Understanding components and electric circuits – Charge – Current – Voltage and Power– Voltageand Current Sources – Ohms Law – Voltage and Current laws – Kirchoff's Current Law – Kirchoff's voltage law – The single Node – Pair Circuit – Series and Parallel ConnectedIndependent Sources – Resistors in Series and Parallel – Voltage and Current division –Basic Nodal and Mesh analysis – Nodal analysis – Mesh analysis. 9+ 6 UNIT II – NETWORK THEOREM AND DUALITY 9+ 6 Superposition theorem, Thevenin's and Norton's theorems, Reciprocity, Compensation,Maximun power transfer theorems, Tellegan's and Millman's theorems, Application oftheorems to DC circuits. Transfer – Delta – Wye Conversion – Duality – Dual circuits. 9+ 6 Sinusoidal Steady – State analysis – Characteristics of Sinusoids– The Complex ForcingFunction The Phasor – Phasor relationship for R- L – C – impedance and Admittance –Nodal and Mesl Analysis- Phasor Diagra										
C01 Outline and reproduce DC circuits. Cognitive Remembering C02 State and distinguish various theorems pertaining to electric circuits. Cognitive Remembering, Understanding C03 Outline and explain AC circuits. Cognitive Remembering, Understanding C04 Understand and classify transients and resonance circuit Cognitive Understanding, Applying C05 Discuss and explain coupled circuits and networks. Cognitive Understanding, Applying UNIT I- DC CIRCUIT ANALYSIS 9+6 9+6 Basic components and electric circuits – Charge – Current – Voltage and Power – Voltageand Current laws – Kirchoff's Current Law –Kirchoff's voltage law – The single Node – Pair Circuit – Series and Parallel ConnectedIndependent Sources – Nodal analysis – Mesh analysis. 9+6 Superposition theorem, Thevenin's and Norton's theorems, Reciprocity, Compensation,Maximun power transfer theorems, Tellegan's and Millman's theorems, Application oftheorems to DC circuits. Transfer – Delta – Wye Conversion – Duality – Dual circuits. 9+6 Sinusoidal Steady – State analysis – Characteristics of Sinusoids– The Complex ForcingFunction-The Phasor Phasor relationship for R– L – C – impedance and Admittance –Nodal and Mesl Analysis – Phasor Diagrams – AC Circuit Power Analysis –Instantaneous Power – Average Power - Complex Power. 9+6 Munt II – VT TANSIENTS AND RESONANCE IN RLC CIRCUITS 9+6 Basic RL										
CO2 State and distinguish various theorems pertaining to electric circuits. Cognitive Remembering, Understanding CO3 Outline and explain AC circuits. Cognitive Remembering, Understanding CO4 Understand and classify transients and resonance circuit Cognitive Understanding CO5 Discuss and explain coupled circuits and networks. Cognitive Understanding CO5 Discuss and explain coupled circuits and networks. Cognitive Understanding UNIT I- DC CIRCUIT ANALYSIS 9+ 6 Basic components and electric circuits – Charge – Current – Voltage and Power- Voltageand Current Sources – Ohms Law – Voltage and Current laws – Kirchoff's Current Law –Kirchoff' voltage law – The single Node – Pair Circuit – Series and Parallel ConnectedIndependent Sources - Resistors in Series and Parallel – Voltage and Current division –Basic Nodal and Mesh analysis - Nodal analysis – Mesh analysis. 9+ 6 UNIT II - NETWORK THEOREM AND DUALITY 9+ 6 Superposition theorem, Thevenin's and Norton's theorems, Reciprocity, Compensation,Maximun power transfer theorems, Tellegan's and Millman's theorems, Application oftheorems to DC circuits. Transfer – Delta – Wye Conversion – Duality – Dual circuits. 9+ 6 Sinusoidal Steady – State analysis – Characteristics of Sinusoids– The Complex ForcingFunction - The Phasor Phasor Diagrams – AC Circuit Power Analysis – Instantaneous Power – Average Power - Complex Power. 9+ 6										
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Step Function – Driven RL Circuits – Driven RC Circuits – RLC Circuits – Frequency Response										
Series and Parallel Resonance – Quality Factor- Synthesis of RL and RC circuits										
UNIT V – COUPLED CIRCUITS AND TOPOLOGY 9+6										
Magnetically coupled circuits – Mutual inductance – the Linear Transformer – the										
IdealTransformer – An introduction to Network Topology – Trees and General Nodal analysis										
Links and Loon analysis										
LECTURE TUTORIAL PRACTICAL TOTAL										
HOURS 45 30 0 75										
TFXT BOOKS										
1 William H Havt Ir Jack F Kemmerly Steven M Durbin "Engineering Circuit Analysis" 6th										
Fdition Tata McGraw-Hill 2006										
2 Robert I. Rovlestad "Introductory Circuit Analysis" Pearson Education 12th Edition 2010										
2. Robert E. Doylestaa, merodactory en cult marysis, i carson Education, 12° Edución, 2010										

REFERENCES

- 1. Nilsson, Riedel., "Electric Circuits", 8th Edition, Pearson Education, 2008.
- 2. Charles K. Alexander & Mathew N.O.Sadiku., "Fundamentals of Electric Circuits", 2nd Edition, McGraw-Hill, 2003.
- 3. A. Sudhakar, Shyammohan S. Palli., "Circuits and networks : analysis and synthesis" 1st Edition, McGraw-Hill, 2008.
- 4. D.R.Cunningham, . J.A. Stuller., "Basic Circuit Analysis", Jaico Publishing House, 1996.
- 5. David E.Johnson, Johny R.Johnson, John L.Hilburn., "Electric Circuit Analysis", 2nd Edition, Prentice Hall, 1997.
- 6. K.V.V.Murthy, M.S.Kamath, "Basic Circuit Analysis", Jaico Publishing House, 1999.
- 7. M.E Vanvalkenburg, "Network Analysis", 3rd Edition, PHI, 2003.
- 8. Franklin F.Kuo, "Network Analysis and Synthesis", 2nd Edition, John Wiley &Sons, 2003.
- 9. T.Nageswara Rao, "Electric Circuit Analysis", A.R Publications, Sirkali ,Tamil Nadu, 2009
- 10. Joseph A Edminister, Mahmood Nahvi, "Electric Circuits", 3rd Edition, Schaum's Outline Series, Tata McGraw Hill, 2000.

E-REFERENCES

1. www.nptel.iitm.ac.in/108102042/lec1.pdf, (NPTEL Lecture Series on Circuit Theory by 'Prof.S.C Dutta Roy', Department of Electrical Engineering IIT Delhi).

Mapping of Cos with POs:

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO1	PSO2
CO 1	3	2		1	2				2			2		
CO 2	3	2		1	2				2			2		
CO 3	3	2		1	2				2			2		
CO 4	3	2		1	2				2			2		
CO 5	2	1			1				2			2		
Total	14	9		4	9				10			10		
Scaled value	3	2		1	2				2			2		

COURS	E CODE	L	Τ	Ρ	С					
COURS	E NAME		DIGITAL ELECTRONICS		3	0	1	4		
С	Р	Α			L	Т	Ρ	Н		
3	0.9	0.1			3	0	2	5		
COURS	E OUTCO	OMES		DOMA	IN		LEV	EL		
C01	Constru	ct and ve	erify the universal building blocks,	Cognitive		Unde	rstai	ıding		
	underst	and the	digital IC families and related	Psychomo	otor	Origi	natio	n		
	hazards									
CO2	Convert	from on	e code to another code, Simplify	Cognitive		Unde	rstai	ıding,		
	boolean	expressi	ion, <i>design</i> and <i>present</i> using logic	Psychomo	otor	Origi	natic	m,		
	gates		Affective		Resp	onse				
CO3	Use Bool		Apply	/ing,	Create,					
	the outp	out of co	mbinational logic circuits	Psychomo	otor	Set				
<u> </u>				Affective		Resp	onse			
C04	Design,	constru	ct and report the functioning of	Cognitive		Creat	e,			
	sequent	ial logic (circuits.	Psychomo	otor	Origi	natic	n,		
COF	Decerit	o and di	Allective		Respo	Jise				
605	Describ	e unu ul	scuss the various memory devices	cognitive		Kenne Undo	rotor	ring, ading		
IINIT I		уганны ' слтғ с			Unue	IStal				
	NOR-	Dom	organ's							
Theore	m - Impl	ementati	ons of Logic Functions using gates -	NAND and	NOR i	molen	pent:	ations –		
Multi le	evel gate	impleme	entations- Multi output gate implem	nentations.	Digita	l IC fa	milie	es: DTL		
TTL. EC	L. MOS a	nd CMOS	S. Hazards: Static and Dynamic –Haz	ards elimir	nation			,or 2 1 L,		
UNIT I	- BINAI	RY CODE	S AND MINIMIZATION TECHNIQU	ES		-		9+9		
Binary	codes: W	eighted	codes, Binary Coded Decimal,2421,	Grav code,	Exces	s 3 cod	le an	d ASCII		
code, E	Error dete	ecting an	d correcting codes and Hamming co	de, Code co	nverte	ers				
Basic p	ostulates	s and fu	ndamental theorems of Boolean al	gebra - Pr	incipl	e of D	ualit	y - De-		
Morgan	n's Theor	em- Sta	ndard representation of logic funct	ions : Sum	of Pr	oducts	5 (SC)P) and		
Produc	t of Sum	s (POS),	Minterm and Maxterm forms - Car	nonical form	ns -Co	nversi	on b	etween		
canonio	cal form	s , Simp	olification of switching functions -	К-тар М	inimiz	zation,	Dor	ı't care		
conditi	ons and N	Minimiza	tion Techniques.							
UNIT III - COMBINATIONAL CIRCUITS9+6										
Combinational Logic circuits: Adders and Subtractors - Serial adder/ Subtractor - Paralle										
adder/ Subtractor- Carry look ahead adder- BCD adder- Magnitude Comparator- Multiplexer/										
Demultiplexer- Encoder / Decoder – Parity generator and Parity checker. Implementation of										
combin	ational lo	ogic usin	g MUX, ROM, PAL and PLA					0.0		
	v - SEQU							9+9		
Flip flo	ps SR, JK	, T, D an	d Master slave – Characteristic table	e and equat	tion – A	Applica	ation	table –		
Edge t	Lage triggering -Level friggering -Realization of one hip hop using other hip hops -									
Asynch	ronous /	ite Mo	ore and Mealy Design of Sunchron	ous count	ounte	r -Clas	SIIIC	ation of		
table 9	tial circu Stato min	imizatio	n State assignment. Register shift	rogistors	IS: Su	real ch	gi ali ift ro	I- State		
Shift Re	ogister co	unters	in State assignment- Register - Sillit	registers-	Univer	i sai sil	iitie	5131CI -		
Design	of funda	mental m	node and nulse mode circuits-primit	ive state/fl	ow ta	hle – №	linin	lization		
of nrim	of primitive state table –state assignment – Excitation table – Excitation map- cycles									
or prim	inve stat		State assignment Encitation table	Linertation	map	5,0105				

UNI	V - MEMORY DEVICES9+0										
Class	ification of memories: RAM organization - Static RAM Cell-Bipolar RAM cell	l –									
MOS	40SFET RAM cell – Dynamic RAM cell, ROM organization , PROM ,EPROM , EEPROM, EAPROM.										
Prog	rammable Devices : Programmable Logic Array (PLA), Programmable Array Logic (PAL	L),									
SPLI	, GAL, CPLD and Field Programmable Gate Arrays (FPGA)										
LIST	OF EXPERIMENTS										
1.	Verify the truth table of logic gates.										
2.	a)Design and implement Binary to gray code converter.										
	b)Design and implement gray to binary code converter.										
3.	a)Design and implement Excess 3 to BCD code converter.										
	b)Design and implement BCD to Excess 3 code converter.										
4.	Design, construct and verify the truth table of half adder, Full adder, Half subtractor and										
	Full subtractor.										
5.	Design and implement 4 bit adder and subtractor.										
6.	Design and implement odd/even parity checker/generator.										
7.	Design and implement multiplexer and demultiplexer.										
8.	Design and implement Encoder and Decoder.										
9.	Construct and verify 4 bit ripple counter.										
10.	Design and implement binary synchronous up counter.										
11.	I. Design and implement binary synchronous down counter.										
12.	12. Design and implement shift register.										
	LECTURE TUTORIAL PRACTICAL TOTA	۱L									

	LECTURE	TUTORIAL	PRACTICAL	TOTAL
HOURS	45	0	30	75
TEXT BOOKS				

BOOKS

1. M. Morris Mano, "Digital Design", Prentice Hall of India Pvt. Ltd., New Delhi, 2003.

- 2. John .M Yarbrough, "Digital Logic Applications and Design", Vikas Publishing House, New Delhi, 2002.
- 3. M.Morris Mano, Michael D.Ciletti, "Digital Design: With an Introduction to Verilog HDL", 5th Edition, Pearson Education, 2012.

REFERENCES

- 1. S. Salivahanan and S.Arivazhagan, "Digital Circuits and Design", 2nd Edition, Vikas Publishing House, New Delhi, 2004.
- 2. Charles H.Roth. "Fundamentals of Logic Design", Thomson Publication, 2003.
- 3. Donald P.Leach and Albert Paul Malvino, "Digital Principles and applications, 5th Edition, Tata McGraw Hill, New Delhi, 2003.
- 4. R.P.Jain, "Modern Digital Electronics", 3rd Edition, Tata McGraw Hill, New Delhi, 2003.

E- REFERENCES

- 1. http://www.nptelvideos.in/2012/12/digital-circuits-and-systems.html
- 2. http://web.iitd.ac.in/~shouri/eel201/lectures.php
- 3. http://nptel.ac.in/courses/117106086/1
- 4. http://ceit.aut.ac.ir/~arabzadeh/Parand/Logic/Books/Roth%20Fundamentals%20of%20L ogic%20

Design%207th%20c2014%20txtbk.pdf

Mapping of COs with POs:

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO1	PSO1
CO 1	3	2		2	2							1		
CO 2	2	2		3	2							1		
CO 3	2	2		3	2				2			1		
CO 4	2	2		3	2				2			1		
CO 5	2	2			2							1		
Total	13	10		8	10				2			5		

COURS	E CODE		XEC304	L	Т	Р	С		
COURS	E NAME		ELECTRONIC DEVICES AND CIRCUI	TS	3	1	1	5	
С	Р	Α			L	Т	Р	Т	
3	0.9	0.1			3	2	2	7	
COURS	E OUTCO	OMES		DOM	AIN		LEV	EL	
CO1	Describ	e, predic	<i>t, show</i> and <i>practice</i> semiconductor	Cognitiv	e	Ren	nemb	ering,	
	diodes.			Psychon	notor	Und	ersta	anding	
				Affective	e	Set,	Resp	onse	
CO2	Explain	, predict,	show and report the operation of	Cognitive Understan				anding	
	various	special d	iodes and BJT	Psychon	notor	Set,	Resp	onse	
				Affective	9				
CO3	Underst	tand, pre	edict, show and report field effect	Cognitiv	e	Und	ersta	anding,	
	transist	ors and p	oower control devices	Psychon	notor	App	lying	5	
				Affective	9	Set,	Resp	onse	
CO4	Underst	tand, cal	culate, design,	Cognitiv	re	Und	ersta	anding,	
	constru	<i>ct</i> and <i>jus</i>	<i>tify</i> transistor biasing and various	Psychon	notor	App	lying	5,	
	types of	amplifie	rs.	Affective	5	Crea	ite,		
						Mec	hani	sm	
COF	F ord at the			Comitio		Valu	le se	l 	
C05	Explain	and and	<i>Hyze</i> reedback mechanisms and	Lognitiv	e	0na	ersta	anding,	
	uesiyn,	ussembi	e and verify the functioning of	Affective		Ana	iyziii sto	g,	
	oscillato	or S.		Affective Create				cm	
						Valu	114111	5111 +	
IINIT I	- FI FCT		OMPONENTS AND SEMICONDUCTO	R DIODE	5	vait		9+6+6	
	comnone	nts and i	passive components - Energy Band st	ructure o	f PN in	nctio	<u>ו</u> ו _ F	orward	
hiasing	and Re	verse hi	asing of PN junction – Current Cor	nnonent	in a F	N inr		n = V-I	
charact	eristic of	f a diode	- Derivation of diode equation – Exi	pression f	for dyn	amic	resis	tance –	
Calcula	tion of tr	ansition	and diffusion capacitance Switchin	g charact	eristic	s of di	ode	– Effect	
of tem	perature (on PN iu	nction diode – Zener breakdown – Ava	alanche b	reakdo	wn –	Zene	r diode	
as volta	age regula	ator.							
UNIT I	I - DIOI	DE APPL	ICATIONS, SPECIAL DIODES AND BI	POLAR JU	JNCTI	DN		9+6+6	
TRANS	ISTORS			•					
Half-wa	ave, full-v	wave and	l bridge rectifiers – Analysis for DC v	/oltage , l	DC cur	rent, 1	ms v	voltage,	
rms cu	rrent , rip	ople volt	age and efficiency of half wave and fu	ll wave r	ectifier	– Тур	es of	filters:	
C, LC, a	nd π filte	ers – Clip	ppers – Clampers - Varactor diode –	Backward	l diode	– Tur	nnel	diode –	
IMPAT	T diode	– CCD -	- Gunn diode and Schottky diode -	Constru	ction	of PN	P an	d NPN	
transis	tors – BJ	T currer	nt components – Emitter efficiency –	Transpo	ort fact	or – I	Large	e signal	
current	t gain –	Early ef	ffect – Punch through effect – Inpu	ut and o	utput	chara	cteri	stics of	
transis	tor confi	iguration	is – Ebers–Moll model – Hetero	junction	transi	stor -	- Sw	<i>itching</i>	
charact	characteristics of Transistor.								
UNIT III - FIELD EFFECT TRANSISTORS AND POWER CONTROL DEVICES 9+6+6									
Constru	uction a	nd Chai	racteristics of JFET – Parameters	of JFE	ſ _ (onstr	uctio	on and	
charact	ceristics (of D-MOS	FET and E- MUSFET – Characteristic	cs and eq		nt circ		of UJT –	
intrinsi	c stand o	ff ratio, l	JJT relaxation oscillator – PNPN diode	– SCR– I	3B.I. – 1	RIAC	– DI.	AC.	
UNIT I	V -TRAN	SISTOR	BIASING AND CLASSIFICATION OF A	MPLIFIE	RS			9+6+6	
Faithfu	l amplific	ation - Lo	bad line and quiescent point analysis -	Stability	factor -	Diffe	ent	types of	
biasing	circuits -	- Single s	tage amplifiers – multi stage amplifiers	s – Direct	coupli	ng – R	С соі	ıpling –	
Transfo	Transformer coupling – power amplifiers – Class A, Class B, Class C amplifiers - Tuned amplifiers.								

UNIT V-FEEDBACK AMPLIFIERS AND OSCILLATORS

The four basic feedback topologies and the type of gain stabilized by each type of feedback -Analysis of feedback amplifiers - Nyquist criterion for stability of feedback amplifiers -Barkhausen Criterion - Mechanisms for start of oscillation and stabilization of amplitude - RC phase shift Oscillator - Wienbridge Oscillator - Analysis of LC Oscillators, Colpitts, Hartley, Clapp, Miller and Pierce oscillators.

LIST	OF EXPERIMENTS										
1.	V-I characteristics of	PN junction di	ode and Zener	diode.							
2.	Design and implement	ntation of Half	wave and full v	vave rectifiers.							
3.	Design and implementation of clippers and clampers.										
4.	Input and Output characteristics of Bipolar Junction Transistor Configuration (CE, CB, CC).										
5.	Drain and Transfer c	haracteristics of	of JFET.								
6.	Characteristics of UJ	Г.									
7.	Characteristics of SC	R.									
8.	Design and implementation of Fixed bias and voltage divider bias.										
9.	Design and implement	ntation of Sour	ce follower.								
10.	Design and implement	ntation of the c	lass A and Clas	s B power amplifier	rs to measure the						
	frequency response.										
11.	Design and implement	ntation of the c	lass C tuned an	nplifier to measure	the frequency						
	response										
12.	Design and implement	ntation of RC O	scillator using	transistor.							
13.	Design and implement	ntation of Hart	ley and Colpitts	s Oscillators using t	ransistor.						
		LECTURE	TUTORIAL	PRACTICAL	TOTAL						
	HOURS	45	30	30	105						
TEX	T BOOKS										

- Robert L. Boylestad and Louis Nashelsky, "Electronics devices and Circuit Theory", 11th 1. Edition, UBS Publishers, New Delhi, 2013.
- 2. Jacob Millman and Christos C.Halkias, "Electronic Devices and Circuits" 3rd Edition, Tata McGraw Hill, New Delhi, 2010.
- David A. Bell, "Electronic devices and circuits", Prentice Hall of India, 2004. 3.

S.Salivahanan, "Electronics devices and circuits". 2nd Edition, Tata McGraw Hill, 2008. 4.

REFERENCES

1. J.B Gupta. "Electronic Devices and Circuits", Revised 1st Edition, S.K.Kataria & Sons, 2013.

2. Floyd, "Electron Devices", 5th Edition, Pearson Education, Asia, 2001.

- 3. A. S. Sedra and K.C Smith, "Microelectronics Circuits", 5th Edition, Oxford University Press, 2004.
- 4. V.K. Mehta & Rohit Metha, "Principles of Electronics", 11th Edition, S.Chand & Company, 2008.
- 5. J. D. Irwin, "Basic Engineering Circuit Analysis", 7th Edition, Prentice Hall, 2002.
- 6. A.P.Godse, U.A.Bakshi, "Electronic Circuits", 1st Edition, Technical Publication, Pune, 2010.

E- REFERENCES

- 1. http://www.rtna.ac.th/departments/elect/Data/EE304/Electronic%20Devices%20and%2 0Circuit%20Theory.pdf
- 2. http://nptel.ac.in/courses/117103063/ (Prof. Chitralekha Mahanta, NPTEL, Basic Electronics, IIT-Guwahati)
- 3. http://nptel.ac.in/video.php?subjectId=117103063 (Prof. Gautam Barua, NPTEL, Basic Electronics, IIT-Guwahati)
- 4. http://nptel.ac.in/courses/117101106/ (Prof. A N chandorkar, NPTEL, Analog Electronics, IIT-Bombay)

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO1	PSO2
CO 1	1	1		2	1	2	1		1	1		1		
CO 2	2	3		2	2	2	1		1	1		1		
CO 3	1	1		2	2	2	1		1	1		1		
CO 4	2	3		2	2	2	1		1	1		1		
CO 5	2	3		2	2	2	1		1	1		1		
Total	8	11		10	9	10	5		5	5		5		
Scaled value	2	3		2	2	2	1		1	1		1		

Mapping of COs with POs:

COURSE CODE	XMS305				L	Т	Ρ	С	
COURSE NAME	MATERIALS SCIENCE				3	0	0	3	
C P A	_				L	Τ	Р	Η	
3 0 0			I		3	0	0	3	
COURSE OUTCO	ME:			Domain		Le	evel		
CO1 Recal	l and distinguish various crysta	l structures.	С	ognitive	R A	Remembering Analyzing			
CO2 Know micro	about the impacts of defects at structure scales.	the atomic a	nd Co	ognitive	R U	Remembering Understanding			
CO3 Descr Mater	ibe the various Ceramic, Electri ials.	ognitive	R A	emen nalyzi	iberi ing	ing,			
CO4 Descr mater	ognitive	R A	emen nalyzi	nberi ing	ing,				
CO5 Recog and N	nize and Describe various Mag ano Materials.	netic Materia	lls Co	ognitive	R	emen	ıberi	ing	
UNIT I -Crystal	Structure							9	
Atomic structure	e and inter-atomic bonding; St	tructure of c	rystalline	solids;	Latti	ces, u	nit d	cells;	
Crystal systems,	Bravais lattices; Indexing of	f directions	and plan	es, nota	ations	s, Inte	er-pl	anar	
spacings and ang	les, co- ordination number, pac	king factors.							
UNIT II-Defects	in Crystals							9	
Point defects; Di	slocations, Types of dislocation	ns, Burgers v	vector and	l its rep	reser	itatio	n; Pl	anar	
defects, stacking	faults, twins, grain boundaries.								
UNIT III -Ceram	nic, Electrical & Electronic Ma	terials						9	
Ceramic Materi	als:Introduction, ceramic struc	tures, silicat	e structu	res, proc	cessin	g of d	cerar	nics;	
Properties, glass	es; Composite Materials- Intro	duction, class	sification,	concret	e, me	tal-m	atrix	and	
ceramic –matrix	composites. Electrical & E	lectronic P	roperties	of Ma	ateri	als: 1	Elect	rical	
Conductivity, El	ectronic and Ionic Conductiv	vity, Intrinsi	c and Ex	trinsic	Semi	con	ducti	ivity,	
Semiconductor D	evices, Dielectric Properties, Pi	ezo-electrici	ty.				<u> </u>	0	
UNIT IV-Mecha	nical Properties of Materials							9	
Concepts of stre	ss and strain, Stress-Strain diag	grams; Prope	erties obta	ained fro	om th	e Ten	sile	test;	
Elastic deformat	tion, Plastic deformation. Imp	oact Propert	ies, Strai	n rate o	effect	s and	i Im	ipact	
behavior. Hardne	ess of materials.	1					<u> </u>	0	
UNIT V-Magnetic Materialsand Nano Materials 9									
Magnetic Materials: Introduction, Magnetic fields or quantities, types of magnetism,									
Dara Magnetic m	nagnetic materials, soft magnet	ic materials,	п magnet	ic mater	iais, l	rerrit	es, Fo	erro,	
sintoring nano n	atticles of Alumina and Zircon	in Silicon co	no materi	ai prepa	natio	n, pur	inca	uon,	
electronic and of	her important nano materials	ia, sincon ca	i blue, lidi	100p, 11a	110-11	agnet	.10, 11	an0-	
		LECTURE	TUTORI	AL PR	ACT	CAL	TO	TAL	
	HOURS	45	0		0		4	45	

Te	xt Books:
1.	Askeland D.R., & P. P. Fullay (2007), The Science and Engineering of Materials – 7 th Cengage
	Learning Publishers.
2.	William D. Callister, Jr (2008), Callister"s Materials Science and Engineering, (Adopted by R.
	Balasubramaniam) Wiley-Eastern
Re	ference books :
1.	A.S. Edelstein and R.C. Cammarata Ed.(1998), Nano Materials: Synthesis, Properties and
	Applications, Inst. Of Physics Publishing, UK.
2.	Raghavan V (2007), Materials Science and Engineering - A First Course, Prentice Hall, India
3.	James F. Shackelford (1996), Introduction to Materials Science for Engineers, Prentice Hall,
	India

CO Vs GA Mapping

	GA1	GA2	GA3	GA4	GA5	GA6	GA7	GA8	GA9	GA10	GA11	GA12
CO1	3	3		0			0			0		
CO2	3	0		0			0			3		
CO3	3	0		0			3			0		
CO4	3	3		3			0			0		
CO5	3	0		0			0			0		
Total	15	6		3			3			3		
Scaled	3	2		1			1			1		

COURSE CODEXEP306LTS.SC								C		
COUR	RSE NA	ME	ENTREPRENEURSHIP DI	EVELOPMEN	Г		2	0	1	2
С	Р	Α					L	Τ	S.S	H
3	0	1					2	0	1	3
Cours	se Outo	ome			I	Doma	in	 	evel	L
		aniso o	nd describe the personal t	raite of an		Affoctiv		Docoi	ving	
COI	entre	ynise a preneu	in describe the personal t			² ogniti	ve ve	Inde	rstand	1
C02	Dete	rmine t	he new venture ideas and	analyse the		20giiiti 20giiti	ive	Under	stand	ι linσ
002	feasi	bility re	eport.	unuiyse the		5051110	ve	Analy	zing	
CO3	Deve	lop the	business plan and <i>analyse</i>	the plan as a	n /	Affectiv	ve	Recei	ving	
	indiv	idual o	r in team.	•	(Cogniti	ive	Analy	zing	
CO4	Desc	ribe va	rious parameters to be take	en into	(Cogniti	ive	Under	stand	ling
	consi	deratio	on for launching and manag	ing small bus	iness.					
C05	Desc	ribe Te	echnological management a	and Intellectu	al (Cogniti	ive	Under	stanc	ling
	Prop	erty Rig	ghts							
There	e are 6 (Cs and 2	2 As for 3:0:1							
UNIT	I - ENT	'REPRE	ENEURIAL TRAITS AND F	UNCTIONS						9
Defini	ition of	Entre	preneurship; competencie	es and traits	of an ent	repren	eur;	factors	affe	cting
Entre	preneu	rship	Development; Role of F	amily and	Society ;	Achie	evem	ent M	otiva	tion;
Entre	preneu	rship a	s a career and national dev	velopment;						
UNIT	II- NEV	V PROI	DUCT DEVELOPMENT AN	D VENTURE	CREATIO	N				9
Ideati	on to C	oncept	development; Sources and	Criteria for S	election o	f Prodi	ıct; n	narket		
assess	sment ;	Feasibi	ility Report ;Project Profile	; processes in	volved in	startin	g a n	ew ver	ture;	
legal f	tormali	ties; Ov	vnership; Case Study.							
UNIT	III- EN	TREPR	ENEURIAL FINANCE							9
Finan	cial fo	recastir	ng for a new venture; F	inance mobil	lization; I	Busine	ss pl	an pr	epara	tion;
Sourc	es of I	Financia	ng, Angel Investors and V	enture Capit	al; Gover	nment	sup	port ir	i sta	rtup
prom	otion.									
UNIT	IV- LA	UNCHI	NG OF SMALL BUSINESS A	IND ITS MAN	IGEMENT			-		9
Opera	itions I	lanning	g - Market and Channel Se	election - Grov	wth Strate	egies -	Prod	luct La	unchi	ng –
Incub	ation, I	Monitor	ring and Evaluation of Bus	siness - Preve	enting Sic	kness	and	Rehabi	litatic	n of
Business Units.										0
Tech	v-IEC		WGI MANAGEMENI, IPK P	UKIFULIU F	ond husin			f Corre	KE	y nt in
rechi	orting	Tochno	logy Development and	IDP protocti	anu Dusin	ess; R	ole o urchi	n Dor	nine volopr	nu mont
Traini	ing and	Other	Sunnort Services		on, Endt	.prene	ui 3111	h Der	eropi	nent
ITam	<u>5</u> unu	Seller	54pp01000110001	LECTURE	TUTORI	AL P	RAC	TICAL	ТО	TAL
		F	IOURS	30	15		1)	4	+5
L				~~	10	I		-	'	

TEXT BOOKS

- 1. Hisrich, 2016, *Entrepreneurship*, Tata McGraw Hill, New Delhi.
- **2.** S.S.Khanka, 2013, *Entrepreneurial Development*, S.Chand and Company Limited, New Delhi.

REFERENCE BOOKS

- 1. Mathew Manimala, 2005, *Entrepreneurship Theory at the Crossroads, Paradigms & Praxis*, Biztrantra ,2nd Edition.
- 2. Prasanna Chandra, 2009, *Projects Planning, Analysis, Selection, Implementation and Reviews*, Tata McGraw-Hill.
- 3. P.Saravanavel, 1997, *Entrepreneurial Development*, Ess Pee kay Publishing House, Chennai.
- 4. Arya Kumar,2012, *Entrepreneurship: Creating and Leading an Entrepreneurial Organisation*, Pearson Education India.
- 5. Donald F Kuratko, T.V Rao, 2012, *Entrepreneurship: A South Asian perspective*, Cengage Learning

India.

6. Dinesh Awasthi, Raman Jaggi, V.Padmanand, *Suggested Reading / Reference Material for Entrepreneurship Development Programmes* (EDP/WEDP/TEDP), EDI Publication, Entrepreneurship Development Institute of India, Ahmedabad. Available from:

http://www.ediindia.org/doc/EDP-TEDP.pdf

E-REFERENCES

- 1. Jeff Hawkins, " Characteristics of a successful entrepreneur", ALISON Online entrepreneurship courses, "https://alison.com/learn/entrepreneurial-skills
- **2.** Jeff Cornwall, "Entrepreneurship -- From Idea to Launch", Udemy online Education, https://www.udemy.com/entrepreneurship-from-idea-to-launch/

MAPPING COURSE OUTCOME WITH GRADUATE ATTRIBUTES:

	GA1	GA2	GA3	GA4	GA5	GA6	GA7	GA8	GA9	GA10	GA11	GA12
CO1									3	3	3	1
CO2			1	2	3	2	1	1	1	2	3	
CO3						1		2	3	3		2
CO4						1	1	2	3		3	3
CO5						1	1	3				3
Total			1	2	3	5	3	8	10	8	9	9
Scaled			1	1	1	2	1	2	3	2	2	2

COU	RSE C	ODE	XGS307	L	Τ	Р	SS	C		
COU	RSE N	AME	INTERPERSONAL COMMUNICATION	0	0	0	2	0		
C	Р	Α		L	Т	Р	SS	H		
0.4	0.4	1.2		0	0	0	2	2		
COU	RSE C	UTCO	AES:	Domain						
C01	l c	Recogn commu	ze culture and a need for interpersonal nication.	Cognitive	Ren	neml	pering	5		
CO2	<i>Լ</i> է	Demon: Detween	s trate on the need for effective communication In two people.	Cognitive	Unc	lerst	andin	g		
CO3	l S	Explain ocializa	on family and social relationships and need for ation.	Cognitive	Unc	lerst	andin	g		
C04	I r	P ractic epair c	the IP principles as to how to reduce and onflict in interpersonal relationships.	Psychomotor	Gui Res	ded pons	se			
C05	N V	<i>Makeus</i> various	<i>e</i> to use effective and appropriate language at interpersonal situations to avoid conflict.	Cognitive	App	lyin	B			
UNIT	1 - U	NIVERS	ALS OF INTERPERSONAL COMMUNICATIONS.					5		
Axion inter	ns of perso	interpe nal con	rsonal Communication; culture in interpersonal c munication	ommunication a	and t	he se	elf in			
UNIT	TII -A	PPREH	ENSION AND ASSERTIVENESS					5		
Aggr inter	essive perso	eness an nal con	nd assertiveness; perception in interpersonal com nmunication.	munication; list	enin	g in				
UNIT	TII -V	ERBAI	AND NON VERBAL MESSAGES					5		
Relat	ionsh	ip and	involvement; relationship maintenance and repair	r.				1		
UNITIV -POWER IN INTERPERSONAL RELATIONSHIP										
Conflict in interpersonal relationship; friends and relatives; primary and family relationships.										
UNIT	- V- S	DCIALI	ZATION,					10		
Need	for s	ocializa	tion and benefits of socialization among students.							
					Tota	l Ho	urs	30		

TEXT BOOKS

- 2. Kathleen S. Verderber, Inter-Act: Interpersonal Communication Concepts, Skills and Contexts, Rudolph F. Verderber, 2000
- **3.** Clifford Whitcomb, Effective Interpersonal and Task Communication Skills for Engineers, Atlantic Publishers.2010

Mapping COs with GAs:

	GA1	GA2	GA3	GA4	GA5	GA6	GA7	GA8	GA9	GA10	GA11	GA12
CO1										2		
CO2										2		
CO3				2						1		
CO4												1
CO5										1	2	
Total				2						6	2	1
Scaled				1						2	1	1

^{1.} *DeVito*, *Joseph*, The *Interpersonal Communication* Book, 13th Edition - , Published by *Longman* Pub Group, Updated in its *13th edition*,2000

COURSE CODE		DE	XEC308	L	Т	Р	С	
COUR	SE NAM	ИЕ	IN-PLANT TRAINING - I	0	0	0	1	
С	Р	Α		L	Т	Р	Н	
1	1	1						
COUR	SE OUT	ГСОМЕ	S	DO	MAIN	L	EVEL	
CO1	Relat	t e class	room theory with workplace practice	Cogni	itive	Understand		
CO2	Comp busin	oly with less pra	a Factory discipline, management and actices	Affec	tive	Resp	ond	
CO3	Dem	onstrat	teamwork and time management.	Affec	tive	Valu	е	
CO4	Desc pract	ribe an ical ski	d <i>Display</i> hands-on experience on lls obtained during the programme.	Psych	iomotor	r Perceptio Set		
CO5	Sumi docu	narize ments a	the tasks and activities done by technical and oral presentations.	Cogni	itive	Evalı	uate	
Note:								
Revise Simps Krathy	ed Bloo on's Ta wohl's '	т Тахо xonom Гахопо	nomy of the Cognitive Domain y of the Psychomotor Domain my of the Affective Domain					

Mapping COs with GAs:

	GA1	GA2	GA3	GA4	GA5	GA6	GA7	GA8	GA9	GA10	GA11	GA12
CO1	2											
CO2							1	3			1	
CO3									3	1	3	1
CO4		1	2	1	3							3
CO5				3						3		1
Total	2	1	2	4	3	0	1	3	3	4	4	5
Scaled	1	1	2	1	1	0	1	1	1	1	1	1

IV SEMESTER

COURSE CODEXRP401LTPC									
COUR	RSE NAME		RANDOM PROCESS			2	1	0	3
С	Р	Α				L	Τ	P	Н
3	0	0				2	2	0	4
COUR	SE OUTCO	OMES			DOM	IAIN	LEV	VEL	
C01	Define bathering their State	isic conce istics of e	epts of probability theory and to one dimensional distribution	Find	Cogr	nitive	Rei	nem	bering
CO2	<i>Apply</i> the random v regressio	e concept ariables n equatio	s of probability on two dimension to <i>Find</i> correlation coefficients an on.	nal nd	Cogr	nitive	Rei Apj	nem olyin	bering, Ig
CO3	<i>Demonst</i> Stationary telegraph	<i>rate</i> the y, Marko process	concepts and properties of v, Poisson and Rando	om	Cogr	nitive	Un	derst	tanding
CO4	CO4State and Explain the concepts of auto correlation and cross correlation and to Find power and cross spectral density.CognitiveRemembering Understanding								
CO5	<i>State</i> the <i>time</i> signative s	principle als and to <i>systems</i> .	es of continuous and discrete- o Find the response of <i>linear</i> & <i>tir</i>	ne-	Cogr	nitive	Rei	nem	bering
UNIT	I - Rand	lom vari	ables						9
Discre Binon distril	ete and Co nial, Poiss butions.	ontinuou son, Geo	s random variables – Moments ometric, Uniform, Exponential,	– Mon , Gam	nent ; ma,	gener: Weibi	ating ull a	func nd	tions – Normal
UNIT	II- Two-D	imensio	nal Random Variables						9
Joint Linea rando	distributio r regressi om variable	ns – Mar on .Cent es).	ginal and Conditional distribution ral limit theorem (for indepen	ons – C ndent	ovari and	ance - identi	- Corı cally	elati dist	ion and ributed
UNIT	III - Rand	lom Pro	cesses						9
Classi proce	fication – : ss.	Stationar	y process – Markov process - Po	oisson p	proce	ss – R	ando	m tel	legraph
UNIT	IV - Corre	elation a	nd Spectral Densities						9
Auto- densi	correlatior ty – Cross-	n functio spectral	ons – Cross-correlation function density – Properties – Wiener-Kh	ns – Pr ninchin	roper e rela	ties – ition, 1	Pow Pow	ver s em.	spectral
UNIT	V- Linear	Systems	s with Random Inputs						9
Linea input	r time inv s – Auto-co	ariant sy prrelation	ystem – System transfer function and Cross-correlation functions	on – Li of inp	near ut and	syste: d outp	ms w out – V	ith r Vhite	random e noise.
				LECT	URE	TUT	ORIA		TOTAL
				30)		30		60
TEXT	BOOKS								
1.] 2. 3.] Rando	Peebles, P. Fata McGra Veerarajai 3rd editio Kandasam om Process	Z., "Proba aw Hill, 4 n .T, Prob n, (2008 y.P, Thila ses", S.Ch	ability, Random Variables and Ra th edition, New Delhi, (2002). bability, "Statistics and Random P). ngavathy.K,Gunavathy.K, " Probab and & Company Ltd, (2008).	ndom : Process Dility, R	Signa es", T ando	l Prino ata M m Var	ciples cGrav iables	", v Hill s and	l, l
	-								

REFERENCES

- 1. Yates, R.D. and Goodman, D.J., "Probability and Stochastic Processes", John Wiley and Sons, 2nd edition, (2005).
- 2. Stark, H. and Woods, J.W., "Probability and Random Processes with Applications to Signal Processing", Pearson Education, Asia, 3rd edition, (2002).
- 3. Miller,S.L. and Childers, D.G., "Probability and Random Processes with Applications to Signal Processing and Communications", Academic Press, (2004).
- 4. Hwei Hsu, "Schaum's Outline of Theory and Problems of Probability, Random

5. Variables and Random Processes", Tata McGraw Hill edition, New Delhi, (2004).

E REFERENCES

1. www.nptel.ac.in, Advanced Engineering Mathematics , Prof. Somesh Kumar Department of Mathematics, Indian Institute of Technology, Kharagpur.

Mapping COs with GAs:

	GA1	GA2	GA3	GA4	GA5	GA6	GA7	GA8	GA9	GA10	GA11	GA12
CO 1	3											1
CO 2	3											1
CO 3	3	2								1	1	2
CO 4	3	2								1	1	1
CO 5	3	2			1					1	1	2
Total	15	6	0	0	1	0	0	0	0	3	3	7
Scalad	2	2			1					1	1	2
Scaled	3	Z			1					1	1	2

COURS	E COE)E	XEC402			L	Т	Р	С		
COURS	E NAN	ИЕ	SIGNALS AND SYSTEM	15		3	0	0	3		
С	Р	Α				L	Т	Р	Н		
3	0	0				3	0	0	3		
COURS	E OUT	ГСОМ	1ES			DOM	AIN	LE	EVEL		
CO1	Desc	cribe a	and c<i>lassify</i> the signals & s	systems		Cognit	ive	Reme	nbering		
								Under	standing		
CO2	Find	and <i>c</i>	analyze the properties of c	ontinuous time	e signal	Cognit	ive	Remen	nbering,		
<u> </u>	USIN Find	g Fou	rier and Laplace Transform	ll,		Cognit	ivo	Analyz	Ing		
05	nerf	ormar	and yze the continuous the continuous the second Fourier and Laplace	Transform		Cogint	.1VC	Analyz	ing,		
CO4	Find	and <i>c</i>	apply the properties of disc	crete time sign	al using	Cognit	ive	Remen	nbering,		
	Four	ier ar	nd Z Transform and <i>explai</i>	<i>n</i> sampling the	orem.	U		Applyi	ng,		
	Understanding										
CO5	Solv	e,ana	lyze and determine the pe	erformance of I	Discrete	Cognit	ive	Applyi	ng,		
	Time	e LTI s	system in Fourier and Z Tra	ansform.				Analyz	ing,		
		COLD		ND CVCTEMC				Evalua	ting		
	- CLA	551F	ICATION OF SIGNALS A	ND SYSTEMS	a atamala (Char	9		
	lous 1	time	signais (CI signais) -	Discrete tim	e signais	UI SIE	gnais J	- Step), Ramp,		
Puise,II	npuis lie cie	e, Sii mala	Deterministic Pandon	ciassification	OILI all	u DI s	signai	S - Pel	ma and		
DT cyct	iic sig	11a15, Tacci	fication of systems	n Signais, Elle	ic Linoar (ei sigli 2. Nopli	dis -	Time u	enis anu		
Time_in	varia	10551 nt Ca	usal&Noncausal Stable	alic & Dynam & Unstable	IC, LIIICAI (x NOIIII	mear,	Time-v			
	- AN		IS OF CONTINUOUS TIN	AF SIGNAL					9		
Fourier	seri		nalysis-spectrum of Co	ntinuous Tir	ne (CT) sig	mals-	Fouri	er and	Lanlace		
Transfo	rms i	n CT S	Signal Analysis - Propert	ies.		511013	louin	ci ana	цариес		
UNIT I	II - LI	NEAF	R TIME INVARIANT- CO	NTINUOUS T	IME SYSTI	EMS			9		
Differer	ntial F	Couat	ion-Block diagram repr	esentation-im	nulse resp	onse. c	onvol	ution i	ntegrals-		
Fourier	and I	apla	ce transforms in Analysis	s of CT system	19 albe 1 esp 18.	01100, 0	011101	action n	ico Bi uno		
UNIT IV	/ - AN	ALYS	SIS OF DISCRETE TIME	SIGNALS					9		
Baseba	nd Sa	mplir	ng of CT signals- Aliasing	z. Reconstruct	tion of CT s	signal f	rom E) T signa	als DTFT		
and pro	perti	es, Z-1	transform & properties.	,		-8		8			
UNIT V	- LIN	EAR '	TIME INVARIANT-DISC	RETE TIME S	SYSTEMS				9		
Differer	ice E	auati	ons-Block diagram rep	resentation-I	mpulse res	sponse	- Co	nvoluti	on sum-		
Discret	e Foui	rier a	nd Z Transform Analysis	of Recursive	& Non-Rec	ursive	syster	ns.			
				LECTURE	TUTORIA	AL P	<u>RACT</u>	ICAL	TOTAL		
			HOURS	45	0		0		45		
TEXT B	OOK	S									
1. P.Rar	nakris	shna	Rao, "Signals and System	ns", Tata McGr	aw Hill Pul	olicatio	ns, 20	08.			
2. B.P.L	athi, "	Princ	ciples of Linear Systems a	and Signals", 2	2 nd Edition,	Oxford	Univ	ersity	Press,		
2009.											
REFER	ENCE	S									
1. R.E Z	eimer	, W.H	I.Tranter. and . R.D.Fanni	in, "Signals &	Systems - C	ontinu	ous ai	nd Disci	·ete",		
Pears	on Ed	ucatio	on, 2009.								
2. John	Alan S	Stulle	r, "An Introduction to Sig	gnals and Syst	tems", Thoi	nson L	earnii	1g , 200	7.		
3. M.J.I	Rober	ts, "Si	ignals & Systems Analysi	is using Trans	form Meth	ods & N	1ATL	AB", Tat	a		
McG	raw H	ill, 2()07.		• -						
4. Allar	1 V.Op	penh	eim, S.Wilsky and S.H.Na	awab, "Signals	and Syster	ns", Pe	arson	Educat	ion,		
India	ın Rer	orint,	2007.								

E-REFERENCES

- 1. http://nptel.ac.in/courses/117104074 (Prof.K.S.Venktesh, "NPTEL, Signals and Systems", IIT- Kanpur)
- 2. http://tutorialspoint.com/signals_and_systems/index.htm
- 3. http://ocw.mit.edu/resources/res-6-007-signals-and-systems-spring-2011/lecture-notes/
- 4. https://docs.google.com/viewer?a=v&pid=sites&srcid=ZGVmYXVsdGRvbWFpbnxvZWNmc m9ud H BhZ2V8Z3g6M2IyMzlkZDg3Yzk0YzY0Zg
- 5. https://www.princeton.edu/~cuff/ele301/files/lecture2_2.pdf
- 6. http://highered.mheducation.com/sites/0070667551/student_view0/index.html

Mapping of COs with POs:

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO1	PSO2
CO 1	3	2		2	2	1						1		
CO 2	2	3		2	1	1						1		
CO 3	3	3		2	2	1						1		
CO 4	3	2		3	1	1						1		
CO 5	3	3		2	2	1						1		
Total	14	13		11	8	5						5		
Scaled	3	3		2	2	1						1		

COU	RSE COI	DE	XEC403	L	Т	Р	C				
COU	RSE NAI	ME	LINEAR INTEGRATED CIRCUITS	3	0	1	4				
С	Р	Α		L	Т	Р	Н				
3	0.9	0.1		3	0	2	5				
COU	RSE OU'	ГСОМ	ES	DOM	AIN	LE	VEL				
C01		Infe	r the Current sources, DC and AC	Cogniti	ve	Unders	tanding				
C02		Fvnl	ain Apply Analyze Construct and Report	Cogniti	VA	Undors	tanding				
002		thel	inear and non-linear applications of an	Coginti	ve	Annlvii	nanunig, 1σ				
		oper	ation amplifier.			Analyz	ing.				
			1	Psycho	motor	Mechai	nism,				
				Affectiv	ve	Respon	ise				
C03		Desc	rribe and distinguish, constructandreport	Cogniti	ve	Remen	ıbering,				
		vario	ous types of wave form generators and PLL.			Unders	tanding.				
				Psycho	motor	Mechai	nism,				
<u> </u>		Class	aifer and designs and structure days and the second	Affectiv	ve	Respon	ISE				
L04		tupo	s of active filters and Voltage, regulators	Cogniti	ve	Analyz	ing,				
		type	s of active inters and voltage regulators			Mechai	nig, nism				
						Respor	ise				
C05		Disc	us s the working principle of data converters,	Cogniti	ve	Unders	tanding				
		func	tion of specific ICs	C			C				
UNIT	Г I – ОР-	AMP F	UNDAMENTALS & CHARACTERISTICS			9	+0+0				
Basic	cs of Op	eratio	nal Amplifiers: Current mirror and current sou	irces, Cu	irrent s	ources a	as active				
loads	s, Voltag	ge sou	rces, Voltage References, BJT Differential am	plifier v	vith act	tive load	ls, Basic				
infor	mation	about	op-amps – Ideal Operational Amplifier - Generational Amplifier - Generational	al opera	tional a	mplifier	stages -				
Char	nternai actoristi	cs. Ide	al on-amp characteristics-Non ideal characteri	stics- D(' charac	toristics	– Innut				
hias	current-	Innut	offset voltage- Input offset current- Thermal drif	ft- AC ch	aracteri	stics- Fr	equency				
respo	onse- Fr	eauen	cv compensation- Slew rate.		aracteri	50105 11	equeiley				
UNIT	r II-OP-	AMP A	PPLICATIONS			9	+0+12				
Basic	c op-amj	o circu	its: Inverting & Non-inverting voltage amplifier	rs - Volta	age follo	ower - S	umming,				
scali	ng & ave	raging	amplifiers - AC amplifiers.								
Line	ar Appl	ication	s: Instrumentation Amplifiers-V-to-I and I-to-V	conver	ters-Dif	ferentia	tors and				
Integ	grators.	Non-li	near Applications: Precision Rectifiers – Wave	e Shapin	g Circu	its (Clip	per and				
Clam	pers) –	Log ai	id Antilog Amplifiers – Analog voltage multipli	er circu	it and i	ts applic	cations –				
Hold		rrans-	conductance Ampimer (OTA) - comparators ar	iu its ap	plicatio	ns – san	ipie and				
	Γ III-WA	VEFO	RM GENERATORS AND PLL			q	+0+12				
Wave	eform G	enerat	ors: Sine-wave Generators – Square / Triangle	/ Sawto	oth Way	/e gener	ators. IC				
555 '	Гimer: М	lonost	able operation and its applications – Astable operation	eration a	nd its a	pplicatio	ons. PLL:				
Oper	ation o	f the	Basic PLL-Closed loop analysis of PLL-Vol	tage Co	ntrolled	d Oscilla	ator-PLL				
applications.											
UNIT	r IV-AC	TIVE F	ILTERS & VOLTAGE REGULATOR			9	+0+6				
Filter	rs: Com	pariso	n between Passive and Active Networks-Ac	tive Ne	twork	Design	– Filter				
Appr	oximati	ons-De	sign of LPF, HPF, BPF and Band Reject Filters -	State Va	ariable	Filters –	All Pass				
Filter	rs – Swit	ched (apacitor Filters.	Dogula	tora uci	ng ()n a	mn IC				
Regu	lators (7	11ators 78xx. 7	9xx, LM 317, LM 337. 723)-Switching Regulator	s.	LOIS USI	ng op-a	mp – IC				
67 1	2 p g u l	atio	n 2015-Curriculum & Syllabus								
U4 F	. e g u I	αιιυ	n 2015-Curricurum@syridDus								

UNIT V-DATA CONVERSION DEVICES AND SPECIAL FUNCTION ICs

9+0+0

Digital to Analog Conversion: DAC Specifications – DAC circuits – Weighted Resistor DAC-R-2R Ladder DAC-Inverted R-2R Ladder DAC Monolithic DAC Analog to Digital conversion: ADC specifications-ADC circuits-Ramp Type ADC-Successive Approximation ADC-Dual Slope ADC-Flash Type ADC- Monolithic ADC.

Special function ICs: Frequency to Voltage converters, Audio Power amplifier, Video Amplifier, Isolation Amplifier, Opto-couplers and fibre optic IC.

iboiu	tion implifier) opto couplets and here opticital
LIST	OF EXPERIMENTS
1	Design and test Inverting, Non inverting and Differential amplifiers.
2	Design and test Integrator and Differentiator.
3	Design and test Instrumentation amplifier.
4	Design and test Active lowpass, high pass and bandpass filter.
5	Design and test Active lowpass, high pass and bandpass filter using MultiSIM
6	Design and test Astable, Monostable multivibrators and Schmitt Trigger using op-amp.
7	Design and test Phase shift and Wien bridge oscillator using op-amp.
8	Design and test Astable and monostable using NE555 Timer.
9	Design and test Astable and monostable using NE555 Timer with MultiSIM
10	Design and test Frequency Multiplier using PLL with MultiSIM.
11	Design and test DC power supply using LM317 and LM723.
12	Study of SMPS control IC SG3524 / SG3525.

		LECTURE	TUTORIAL	PRACTICAL	TOTAL
	HOURS	45	0	30	75
TEXT BOOKS					

- 1. Roy Choudhury and Shail Jain, "Linear Integrated Circuits", 4thEdition, New Age International Publishers, 2010.
- 2. Ramakant A.Gayakwad, "Op-Amps and Linear Integrated Circuits", Prentice Hall, 2012.

REFERENCES

- 1. Robert F.Coughlin, Frederick F. Driscoll, "Operational-Amplifiers and Linear Integrated Circuits", 6th Edition, Prentice Hall, 2001.
- 2. Sergio Franco, "Design with Operational Amplifiers and Analog Integrated Circuits", 3rd Edition, Tata McGraw Hill, 2002.

E-REFERENCES

- 1. http://www.nptel.ac.in/courses/Webcourse-contents/IIT-ROORKEE/Analog%20circuits/index.htm
- 2. http://nptel.ac.in/video.php?subjectId=108106068
- 3. http://freevideolectures.com/Course/2915/Linear-Integrated-Circuits

Mapping of COs with POs:

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO1	PSO2
CO 1	3	3	2		1	1						1		
CO 2	3	2	2	1	2	2	1					1		
CO 3	2	3	1	1	1	1	1					1		
CO 4	2	2	1	1	1	3	2					1		
CO 5	3	2										1		
Total	13	12	6	3	5	7	4					5		
Scaled value	3	3	2	1	1	2	1					1		

COURSE CODE XEC404						Τ	Р	С	
COUR	RSE NA	ME	COMMUNICATION THEORY		3	1	1	5	
PRER	EQUIS	ITES	XMA401		L	Т	Р	Н	
С	Р	Α			3	2	2	7	
3	0.9	0.1							
COUR	RSE OU	TCOM	ES	E	DOMA	IN		LEVEL	
CO1Describe and reproduce Amplitude modulationCognitiveRe								nember,	
Schemes. Psychomotor							Gui	ded	
							Response		
CO2	Desc	r ibe an	d <i>reproduce</i> Frequency Modulation	Cognitive			Remember,		
	Schei	nes.		Psy	vchom	otor	Guided		
							Res	sponse	
CO3	Defin	e and e	explain various noise sources and their	Cog	gnitiv	е	Remember,		
	effect	in AM	and FM systems				Understand		
CO4	Desc	r ibe an	d <i>reproduce</i> Pulse modulation schemes.	Cog	gnitiv	е	Rei	nember,	
				Psy	chor	otor	Gui	ded	
				Res	sponse				
CO5	Expla	<i>in</i> and	<i>solve</i> problems related to maximizing	Cog	Cognitive Understa			derstand	
	infor	mation	flow through a communication channel.				Ap	oly	
UNIT	I AM	IPLITU	DE MODULATION SYSTEMS					9+6+8	
Review of Spectral Characteristics of Periodic and Non-periodic signals: Generation a							ration and		

Review of Spectral Characteristics of Periodic and Non-periodic signals; Generation and Demodulation of AM, DSBSC, SSB and VSB Signals; Comparison of Amplitude Modulation Systems; Frequency Translation; FDM; Non – Linear Distortion.

UNIT II ANGLE MODULATION SYSTEMS

Phase and Frequency Modulation; Single tone, Narrow Band and Wideband FM; Transmission Bandwidth; Generation and Demodulation of FM Signal. Superheterodyne Radio receiver and its characteristic;

UNIT III NOISE THEORY

Review of Probability, Random Variables and Random Process; Guassian Process; Noise – Shot noise, Thermal noise and white noise; Narrow band noise, Noise temperature; Noise Figure. SNR; Noise in DSBSC systems using coherent detection; Noise in AM system using envelope detection and its FM system; FM threshold effect; Pre-emphasis and De-emphasis in FM; Comparison of performances.

UNIT IVCONVERSION OF ANALOG WAVEFORMS INTO CODED PULSES	9+6+6									
Sampling Theory -Pulse-Amplitude Modulation - Quantization and its	Statistical									
Characterization - Pulse-Code Modulation - Noise Considerations in PCM Systems - Prediction-										
Error Filtering for Redundancy Reduction - Differential Pulse Code Modulation	on -Delta									
Modulation - Line Codes										

UNIT V INFORMATION THEORY

Discrete Messages and Information Content, Concept of Amount of Information, Average information, Entropy, Information rate, Source coding to increase average information per bit, Shannon-Fano coding, Huffman coding, Lempel-Ziv (LZ) coding, Shannon's Theorem, Channel Capacity, Bandwidth- S/N trade-off, Mutual information and channel capacity, rate distortion theory, Lossy Source coding.

9+6+8

9+6+8

9+6

LIST	OF EXPERI	MENTS											
1	AM transi	mitter design using	g Kit and SciLab/M	latlab® simulatior	1.								
2	DSB FC, D	SB SC, SSB SC gene	eration and spectr	um plotting by Mu	ltiSim software								
2	Character	ristics of AM receiv	er (Selectivity & S	ensitivity) using K	it and SciLab/Matlab®								
3	simulatio	n											
4	Character	istics of FM receiv	er (Selectivity & Se	ensitivity) using K	it and Scilab/Matlab®								
	simulatio	n Lo ii ii											
5	Sampling	and Quantization											
6	Pulse code modulation												
7	Line coding and decoding												
8	Time Divi	sion Multiplexing											
9	9 Delta Modulation												
10	10 Differential PCM												
	LECTURE TUTORIAL PRACTICAL TOTAL												
HOU	HOURS 45 30 30 105												
ТЕХТ	TEXT BOOKS												
1.5	Simon Havk	cin. "Communicatio	on Svstems". 4 th Ed	ition. John Wilev &	& Sons. 2001.								
2.	Herbert Ta	ub & Donald L. S	Schilling, "Principle	es of Communicat	ion Systems",3 rd Edition								
	Tata McGra	w Hill, 2008.	<i>с,</i> 1		, ,								
	REFERENC	ES											
1.	Dennis Roo	ldy & John Coolei	n, "Electronic Com	nmunication", 4 th	Edition, Prentice Hall of								
	India, 1995												
2.	Bruce Carls	on , "Communicati	ion Systems", 3 rd E	dition, Mc Graw H	ill, 2002.								
3.	B.P.Lathi,"N	Aodern Digital a	nd Analog Comm	unication System	s", 3 rd Edition, Oxford								
	University	Press, 2007.	_										
4.	R.P Singh a	nd S.D.Sapre, "Com	imunication System	ms – Analog and D	igital", Tata McGraw Hill,								
_	2 nd Edition,	,2007.	1. "										
5.	John G. Pro	bakis, Masoud Sale	ehi, "Fundamental	s of Communication	on Systems", 2 nd Edition								
Prentice Hall, 2002.													
1	E- REFERENCES												
1.	1. http://nptel.ac.in/courses/117102059/ (NPTEL, Communication Engineering, Prof.												
	Surondro D	racad Donartmont	17102059/ (NPTE	L, Communication	Engineering, Prof.								
1	Surendra P	rasad, Department	17102059/ (NPTE) t of Electrical Engin	L, Communication neering Indian Ins	Engineering, Prof. titute of Technology,								
2	Surendra P Delhi).	rasad, Department	17102059/ (NPTE) t of Electrical Engine pheshti/communic	L, Communication neering Indian Ins	Engineering, Prof. titute of Technology, Carlson%20-								

Mapping of COs with POs:

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO	PSO
													1	2
CO 1	1	2	1	0	0	1	0	0	0	1	0	1	2	3
CO 2	1	2	1	0	0	1	0	0	0	0	0	1	2	3
CO 3	2	2	0	0	0	0	0	0	0	0	0	1	2	3
CO 4	0	3	0	0	0	0	0	0	0	0	0	1	2	3
CO 5	3	1	0	0	0	0	0	0	0	1	0	1	2	3
Total	7	10	2	0	0	2	0	0	0	2	0	5	10	15
Scaled	2	2	1			1				1		1	2	3
value														

COU	RSE	E CODE	XEC405			L	Т	Р	C			
COU	RSE	E NAME	ELECTRO MAGNETIC FIELDS AND TRANSMI	SSION LINES		3	1	0	4			
PRE	REQ	UISITES	XMA101,XMA201, XEC302			L	Τ	Р	Η			
С	Р	Α				3	2	0	5			
2.9	0	0.1										
COURSE OUTCOMES Domain												
C01	CO1 Understand, apply vector calculus to static electric Cognitive Understand											
f ield and analyze field potentials Appl												
	Anal											
CO2 <i>Explain, apply</i> vector calculus to steady state magnetic Cognitive Und								Understanding				
		f ield and	analyze field potentials		Ар	Applying,						
					Analyzing							
CO3		Understa	nd, analyze the relation between the fields	Cognitive	Understanding,			g,				
		under tim	e varying situations.		An	aly	zing	5				
C04		<i>Discuss</i> t	he propagation of signals through	Cognitive	Un	der	sta	ndin	g,			
		transmiss	ion lines and <i>determine</i> and <i>report</i> the	Affective	Ev	alua	ate					
		transmiss	ion parameters.		Re	spo	nse					
C05		Analyze s	ignal propagation at Radio frequencies and	Cognitive	An	aly	zing	5,				
		determin	<i>letermine</i> and <i>practice</i> the parameters Affective E									
					Re	spo	nse					
IINI'	ТΙ_	FLFCTRC	STATICS					0)+6			

Vector Algebra, Coordinate Systems, Vector differential operator, Gradient, Divergence, Curl, Divergence theorem, Stokes theorem, Coulombs law, Electric field intensity, Point, Line, Surface and Volume charge distributions, Electric flux density, Gauss law and its applications, Gauss divergence theorem, Absolute Electric potential, Potential difference, Calculation of potential differences for different configurations. Electric dipole, Electrostatic Energy and Energy density.

UNIT II - STEADY MAGNETIC FIELDS

Biot -Savart Law, Magnetic field Intensity, Estimation of Magnetic field Intensity for straight and circular conductors, Ampere"s Circuital Law, Point form of Ampere"s Circuital Law, Stokes theorem, Magnetic flux and magnetic flux density, The Scalar and Vector Magnetic potentials, Derivation of Steady magnetic field Laws.

UNIT III - TIME VARYING FIELDS AND MAXWELL'S EQUATIONS

Fundamental relations for Electrostatic and Magnetostatic fields, Faraday"s law for Electromagnetic induction, Transformers, Motional Electromotive forces, Differential form of Maxwell's equations, Integral form of Maxwell's equations, Potential functions, Electromagnetic boundary conditions, Wave equations and their solutions, Poynting"s theorem, Time harmonic fields, Electromagnetic Spectrum.

UNIT IV - TRANSMISSION LINE THEORY

Different types of transmission lines – Definition of Characteristic impedance – The transmission line as a cascade of T-Sections - Definition of Propagation Constant. General Solution of the transmission line – The two standard forms for voltage and current of a line terminated by an impedance – physical significance of the equation and the infinite line – The two standard forms for the input impedance of a transmission line terminated by an impedance - meaning of reflection coefficient – wavelength and velocity of propagation. Waveform distortion – distortion less transmission line - The telephone cable - Inductance loading of telephone cables. Input impedance of lossless lines - reflection on a line not terminated by Z₀ - Transfer impedance reflection factor and reflection loss – T and \prod Section equivalent to lines.

9+6

9+6

9+6

UNIT V - THE LINE AT RADIO FREQUENCIES

Standing waves and standing wave ratio on a line – One eighth wave line – The quarter wave line and impedance matching – the half wave line. The circuit diagram for the dissipation less line – The Smith Chart – Application of the Smith Chart – Conversion from impedance to reflection coefficient and vice-versa. Impedance to Admittance conversion and vice-versa – Input impedance of a lossless line terminated by impedance – single stub matching and double stub matching.

	LECTURE	TUTORIAL	PRACTICAL	TOTAL
HOURS	45	30	0	75

TEXT BOOKS

- 1. G.S.N.Raju, "Electromagnetic Field Theory and Transmission Lines", Pearson Education, New Delhi, 2005.
- 2. Gottapu Sasibhushana Rao, "Electromagnetic Field Theory and Transmission Lines", 1st edition, Wiley Publications, 2012.
- 3. Matthew N. O. Sadiku, "Elements of Electromagnetics", 4th Edition,Oxford University Press, 2009.

REFERENCES

- 1. W. H.Hayt Jr, J.A.Buck, "Engineering Electromagnetics", 8th Edition, McGraw Hill, New York, 2012.
- 2. Edward Conrad Jordan and Keith George Balmain, "Electromagnetic Waves and Radiating Systems", 2nd Edition, Prentice Hall, 1968.
- 3. Kraus and Fleisch, "Electromagnetic with Applications", 5th Edition, McGraw Hill, 1999.
- 4. R. F. Harington, "Time Harmonic EM Fields", 2nd Edition, McGraw Hill, 2001.

E-REFERENCES

- 1. http://nptel.ac.in/courses/117101056 (Prof.R.K.Shevgaonkar, NPTEL:Transmission Lines and E.M. Waves)
- 2. http://www.amanogawa.com/archive/transmissionA.html

Mapping of COs with POs:

	PO	P01	P01	P01								
	1	2	3	4	5	6	7	8	9	0	1	2
CO 1	3	3	1		2							2
CO 2	3	3	1		2							2
CO 3	3	3	1		2							2
CO 4	3	3	1		2							2
CO 5	3	3	1		2							2
Total	15	15	5		10							10
Scaled	3	3	1		2							2
value												

0- No Relation 1 - Low Relation , 2 - Medium Relation, 3- High Relation

9+6

CO	URS	E CODE	XUM406		L	Т	Р	С	
CO	URS	E NAME	ECONOMICS FOR ENGINEERS		3	0	0	3	
С	Ρ	Α		L	Т	Р	Η		
3	0	0			3	0	0	3	
CO	URS	E OUTCO	in	Leve	el				
CO	1	Underst	Cognitive Re			Remembering			
		engineer	ring						
CO	2	Interpre	e t Break-even analysis	Cognit	ive	Und	ersta	nding	
CO	3	Illustrat	evalue engineering procedure	Cognit	ive	Und	ersta	nding	
CO	4	Underst	Understanding						
CO	5	<i>Explain</i> depreciation Cognitive Understandi							
UNIT I - INTRODUCTION TO ECONOMICS									

Flow in an economy, Law of supply and demand, Concept of Engineering Economics – Engineering efficiency, Economic efficiency, Scope of engineering economics- types of costing, element of costs, preparation of cost sheet and estimation, Marginal cost, Marginal Revenue, Sunk cost, Opportunity cost

UNIT II-BREAK-EVEN ANALYSIS & SOCIAL COST BENEFIT ANALYSIS

Margin of Safety, Profit, Cost & Quantity analysis-Product Mix decisions and CVP analysis, Profit/Volume Ratio (P/V Ratio), Application of Marginal costing, Limitations **Social Cost Benefit Analysis**: compare different project alternatives, Calculate direct, indirect and external effects; Monetizing effects; Result of a social cost benefit analysis.

12

10

07

08

UNIT III -VALUE ENGINEERING & COST ACCOUNTING:

Value engineering – Function, aims, Value engineering procedure - Make or buy decision Business operating costs, Business overhead costs, Equipment operating costs

UNIT IV - REPLACEMENT ANALYSIS

Replacement analysis –Types of replacement problem, determination of economic life of an asset, Replacement of an asset with a new asset.

UNIT V - DEPRECIATION

Depreciation- Introduction, Straight line method of depreciation, declining balance method of depreciation-Sum of the years digits method of depreciation, sinking fund method of depreciation, Annuity method of depreciation, service output method of depreciation.

		arp ar momon o	a oprooration	
	LECTURE	TUTORIAL	PRACTICAL	TOTAL
HOURS	45	0	0	45
TEXT BOOKS				
1. Sp Gupta, Ajay Sharma & Satish Ahuja,	"Cost Accounti	ing", V K Global I	Publications,	
Faridabad, Haryana, 2012				
2. S.P.Jain & Narang, "Cost accounting – P	Principles and P	Practice", Kalyan	i Publishers,	
Calcutta, 2012				
3. Panneer Selvam, R, "Engineering Econo	omics", Prentic	e Hall of India L	td, New Delhi,	
2001.				
4. William G.Sullivan, James A.Bontadelli	& Elin M.Wicks	s, "Engineering I	Economy",	
Prentice Hall International, New York,	2001.			

REFERENCES

- 1. Luke M Froeb / Brian T Mccann, "Managerial Economics A problem solving approach" Thomson learning 2007
- 2. Truett & Truett, "Managerial economics- Analysis, problems & cases " Wiley India 8th edition 2004.
- 3. Chan S.Park, "Contemporary Engineering Economics", Prentice Hall of India, 2002.
- 4. Donald.G. Newman, Jerome.P.Lavelle, "Engineering Economics and analysis" Engg. Press, Texas, 2002

	GA 1	GA2	GA3	GA4	GA5	GA6	GA7	GA8	GA9	GA10	GA11	GA12
CO 1	2					1	1				1	1
CO 2	2	3		1		2					2	1
CO 3	2			2		1	1	1		2	1	1
CO 4	3	1		1		1					3	1
CO 5	2			1		2	1				1	2
Total	11	4	0	5	0	7	3	1	0	2	8	6
Scaled	3	1	0	1	0	2	1	1	0	1	2	1

Mapping of COs with GAs:

COUF	RSE CO	DDE	XGS407				L	Τ	Р	SS	С	
COUF	RSE N.	AME	TECHNICAL COMMU	NICATION			1	0	0	2	1	
С	Р	Α					L	Τ	Р	SS	Н	
1.8	0.8	0.4					1	0	0	2	3	
	- T					D	OM/	AIN		LE	VEL	
CO 1	Ide	<i>ntify</i> t	he features of a technic	al project repo	ort							
	and	l Know	vledge on the linguistic	competence to	o Co	ogni	itive	1	ł	Remem	bering	
<u> </u>	wr	te a te	chnical report									
CO 2	Int	egrate	e both technical subject	skill and	C	ogni	itive	!	(Create		
	lan	guage	skill to write a project.		<u> </u>							
CO 3	Cor	ifiden	ce to present a project i	ffect	tive		I	Respons	se			
<u> </u>	mli								•			
CO 4 The learner <i>identifies</i> and absorbs the												
		lloarn	s how to mark the street	d Co	logni	itive	!	F	Remem	bering		
	in a	i icai ii i sente	s now to mark the stres	lu								
CO 5 <i>Enables</i> the speaker speaks clearly and fluently												
with confidence and it trains the learner to listen Psychomotor Perception												
	act	ively a	nd critically			Syci	10111	0001	1	creept		
UNIT	'I- B	ASIC F	PRINCIPLES OF GOOD	TECHNICAL V	VRITI	NG					9	
Style	in tec	hnical	writing, out lines and a	bstracts, langu	lage us	sed i	in te	chni	cal w	riting:	technical	
word	s, jarg	ons et	С									
Unit	II -SP	ECIAL	TECHNIQUES								9	
used	in te	chnical	l writing: Definition, d	lescription of	mecha	anis	m, I	Desc	riptic	on of a	process,	
Classi	ificati	ons, di	vision and interpretation	on								
Unit	<u>III -RI</u>	EPORT	T/ PROJECT								9	
Layou	it the	forma	ts: chapters, conclusion	n, bibliography	y, anne	exur	e an	id glo	ossar	y, Grap	hics aids	
etc - F	reser		of the written project	$\frac{10-15}{CE}$	es						0	
Deadi	IV -50	n facto	OF ENGLISH LANGUA	GE;	alrima	min	a ir	form		ooning	9	
roadi	ng 10	i interesti interesti Interesti interesti inte	toning listoning for cor	ext, scanning,	SKIIII	111111	g , п	lierr	ing n	leanng	, chucai	
reading, active listening, listening for comprehension etc.												
Readi	ing fo	r facts	s meanings from cont	ext scanning	skimr	min	σ ir	ferr	ing n	neaning	r critical	
readi	ng, ac	tive lis	tening, listening for cor	nprehension e	etc.		B, 11			leanne	, errerear	
	Ŭ,		<u> </u>	LECTURE	SELF	STU	JDY	P	RAC	ГICAL	TOTAL	
			HOURS	15		30			()	45	
TEXT	BO0	KS										
1. Go	rdon 1	H. Mill	s, Technical Writing – A	April, 1978, Ox	ford U	Jniv	Pres	SS				

2. Barun K. Mitra, Effective Technical Communication: A Guide for scientists and Engineers. Author, Publication: Oxford University press. 2007

Software for lab: English Teaching software (Young India Films)

Mapping of COs with GAs:

	GA 1	GA2	GA3	GA4	GA5	GA6	GA7	GA8	GA9	GA10	GA11	GA12
C01										2		
CO2										2		
CO3				2						1		
CO4												1
CO5				2						1	2	1
Total				4						6	2	2
Scaled value				1						2	1	1
V SEMESTER

CO	URS	SE CODE	XMA501	L		Т	Р	С	
CO	URS	SE NAME	NUMERICAL METHODS	2		1	0	3	
С	Ρ	Α		L		Т	Р	Н	
3	0	0		2		2	0	4	
				D	OM	IAIN	LEV	/EL	
CO	1.	<i>Solve</i> algeb Eigen value	praic and transcendental equations and to s of a matrix by Power method.	o Find Co	ogn	itive	Rer Apj	nen olyi	nbering ng
CO	2.	<i>Interpret</i> a methods	and Approximate the data using Interpo	olation Co	ogn	itive	Un	ders	standing
CO	3	<i>Solve</i> the N <i>Apply</i> the	umerical Differentiation and Integration <i>an</i> Trapezoidal and Simpson's rules.	nd to Co	ogn	itive	Арј	olyi	ng
CO-	4.	<i>Solve</i> the finusing single	rst order and second order differential equa step and multistep methods.	ations Co	ogn	itive	Арј	olyi	ng
CO	5	<i>Apply</i> Finit boundary v heat-flow e	e difference methods to <i>Solve</i> two-point lin value problems and to <i>Solve</i> One dimension quation and wave equation.	near Co nal	ogn	iitive	Арј	olyi	ng
UN	IT I	- Solution	of Equations and Eigenvalue Problems						12
Sol Rap Jor Gau	utio ohso dan <u>iss-</u> IT I	n of algebra on method- methods – Jordan meth I-Interpola	aic and transcendental equations - Fixed Solution of linear system of equations - (Iterative methods of Gauss-Jacobi and G od – Eigen values of a matrix by Power met tion And Approximation	point iter Gauss Elin Gauss-Seide thod.	atio nin el -	on me ation - Mat	thoc met rix I	l – hod nve	Newton- -Gauss- rsion by 12
Inte Inte inte	erpo erpo erpo	olation with olation with olation	equal intervals - Newton's forward an unequal intervals - Lagrange interpolati	nd backwa ion – Nev	ard vto	diffe n's di	renc vide	e fo d d	ormulae- ifference
UN	IT	III- Numeri	cal Differentiation And Integration						12
App Tra poi Sin	pez pez nt psc	kimation of oidal, Simps Gaussian qu on's rules.	derivatives using interpolation polynomi son's 1/3 and Simpson's 3/8 rules – Rombe uadrature formulae – Evaluation of dou	ials - Nun erg's meth ıble integi	ner od ·als	ical in - Two s by 7	ntegi poi Frap	ratio nt a ezo	on using nd three idal and
UN	<u>IT I</u>	V - Initial V	alue Problems for Ordinary Differential	Equation	ns	· ·			12
Sin ord Mil	gle : ler l ne's	step-methoc Runge-Kutta and Adams	ls - Taylor's series method - Euler's method method for solving first and second orde -Bashforth predictor-corrector methods for	d - Modifie er equation r solving fi	d E 1s - rst	uler's · Mult order	met i-ste equ	hod p m atio	- Fourth nethods - ons.
UN	IT V	/-Boundary	Value Problems in Ordinary and Partial	l Different	ial	Equa	tion	S	12
Fin diff rec din	ite ere tang nens	difference nce techniqu gular domain sional wave	methods for solving two-point linear bout ues for the solution of two dimensional La n – One dimensional heat-flow equation by equation by explicit method.	oundary v aplace's an v explicit ar	valu d F nd i	ie pro Poisso implic	oblei n's e it me	ns qua ethc	- Finite ations on ods - One
				LECTURE		TUTO	RIA	L	TOTAL
				30		3	U		60

TEXT BOOKS

Grewal, B.S. and Grewal, J.S., "Numerical methods in Engineering and Science", 6th Edition, Khanna Publishers, New Delhi, (2004).

Sankara Rao, K. "Numerical methods for Scientists and Engineers', 3rd Edition, Prentice Hall of India Private Ltd., New Delhi, (2007).

REFERENCES

- 1. Chapra, S. C and Canale, R. P. "Numerical Methods for Engineers", 5th Edition, Tata McGraw-Hill, New Delhi, (2007).
- 2. Gerald, C. F. and Wheatley, P. O., "Applied Numerical Analysis", 6th Edition, Pearson Education Asia, New Delhi, (2006).
- 3. Brian Bradie, "A friendly introduction to Numerical analysis", Pearson Education Asia, New Delhi, (2007)

4. Jain M.K., Iyengar S.R.K, Jain R.K, "Numerical Methods problems and solutions", Revised Second Edition (2007).

E REFERENCES

www.nptel.ac.in

Elementary Numerical Analysis Prof. Rekha P. Kulkarni. Department of Mathematics, Indian Institute Of Technology, Bombay.

Mapping of COs with GAs:

	GA1	GA2	GA3	GA4	GA5	GA6	GA7	GA8	GA9	GA10	GA11	GA12
CO 1	3									1		1
CO 2	3									1		1
CO 3	3									1		1
CO 4	3	2			1					1	1	1
CO 5	3	2			1					1	1	1
Total	15	4	0	0	2	0	0	0	0	5	2	5
Scaled	3	1			1					1	1	1
value												

0- No Relation 1 - Low Relation, 2 - Medium Relation, 3- High Relation

COUR	SE CODE	XEC502		L	Т	P	С			
COUR	SE NAME	Computer Commun	ication Netw	vorks	3	0	0	3		
PRER	EQUISITES	XEC404			L	Τ	P	Η		
C:P:A		3:0:0			3	0	0	3		
COUR	SE OUTCOMES	:		Dom	ain		Le	evel		
C01	Outline and o	c lassify the types of ne	etworks, med	ia Cogniti	ve	Rer	nemb	ering	3,	
	and topologie	es.				App	olying	5		
<u>CO2</u>	Explain the a	<u>ctivities of Data link L</u>	ayer	Cogniti	ve	Unc	lersta	erstanding		
CO3	<i>Illustrate</i> the	e concepts of switching	g and differen	it Cogniti	ve	Und	lersta	andin	ıg	
<u> </u>	routing techn	iiques.	(Caraciti		TT -	1			
L04	Explain the a	Cogniti	ve	Und	ierstä	anain	lg			
C05	Explain the a	Cogniti	vo	Apr	lying	<u>г</u>				
				Cogniti	ve	Ар	nyme	5	9	
Comp	$\frac{1 - DATA COM}{Onents}$ – Direc	tion of Data flow $-r$	networks – C	omponents	and C	atego	ries -	- tvn	es of	
Conne	ections – Topolo	ogies – Protocols and S	Standards – IS	SO / OSI mod	el – T	ransn	nissia	n Me	es or dia –	
Coaxia	al Cable – Fiber	Optics – Modems – RS	232 Interfaci	ng sequences		1 411011			/ulu	
UNIT	II -DATA LINK	LAYER		0 1					9	
Error	- detection an	d correction – Parity	– LRC – CRC	– Hamming	code	– Flo	w Co	ontro	land	
Error	control: stop	and wait – Go back	N ARO – s	elective rep	eat A	RO- s	lidin	g wi	ndow	
techni	iques – HDLC.		· ·	•		·				
LAN: I	Ethernet IEEE 8	02.3, IEEE 802.4, and	IEEE 802.5 –	IEEE 802.11	-FDD	I, SON	ET –	Bridg	ges.	
UNIT	III-NETWORK	LAYER							9	
Intern	etworks - Pacl	xet Switching and Dat	tagram appro	oach – ARP.	RARP	and	I IP a	ddre	ssing	
methc	ods – Sub nettin	g – Routing – Distance	e Vector Rout	ing – Link Sta	ite Ro	uting	– Roi	iters.		
UNIT	IV -TRANSPOF	T LAYER		0		0			9	
Duties	s of transport la	aver – Multiplexing –	Demultiplexi	ng – Sockets	– Use	r Dat	agran	n Pro	otocol	
(UDP)	– Transmissio	n Control Protocol (T	CP) – Congest	tion Control -	- Qual	ity of	servi	ices (QOS)	
– Inter	grated Services	•	ý (j		•					
UNIT	V- APPLICATI	ON LAYER							9	
Doma	in Name Space	(DNS) – SMTP, FTP, H	TTP, WWW –	Security – Ci	yptog	graph	<i>y</i> .	1		
			LECTURE	TUTORIAL	PR	ACTI	CAL	TO	ΓAL	
		HOURS	45	0		0		4	45	
TEXT	BOOKS		•	•						
1.	Behrouz.A.Ford	ouzan, "Data Communi	ication and N	etworking", T	Tata M	IcGrav	<i>N</i> Hill	, 200	4.	
RE	FERENCES			-						
1.	James .F.Kuro	use & W.Rouse, "Comj	puter Networ	king: A Top	down	Appr	oach	Feat	uring	
	the Internet",	Pearson Education, 20	00.							
2.	Larry L.Peters	on & Dotor & Davia "(Computer Net	tworks" The	11		~	_		
		oll & reter.s.Davie, (somputer ne	works, inc	Morg	gan Ka	autma	ann S	Series	
1 .	3 rd Edition, 20	03.			More	gan Ka	autma	ann S	Series	
3.	3 rd Edition, 20 Andrew S. Tan	03. nenbaum, "Computer	Networks", 4	th Edition, PH	Morg	gan Ka)3.	autma	ann S	Series	
3. 4.	3 rd Edition, 20 Andrew S. Tan William Stallin	03. Inenbaum, "Computer ngs, "Data and Comput	Networks", 4 er Communic	th Edition, PF cation", 6 th Ec	Morg II, 20(lition,	gan Ka)3. Pears	aufma son E	ann S ducat	Series tion,	
3. 4.	3 rd Edition, 20 Andrew S. Tan William Stallin 2000. Kevin Fall Kar	on & Peter S.Davie, 03. Inenbaum, "Computer ngs, "Data and Comput	Networks", 4 er Communic	th Edition, PF cation", 6 th Ec	Morg II, 20(lition,	gan Ka)3. Pears	aufma son E	ann S ducat	Series tion,	

E-REFERENCES

1. http://nptel.ac.in/courses (Prof.Sujoy Ghosh, NPTEL:Computer Networks).

Mapping of COs with POs:

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO 1	PSO 2
CO 1	1	2		1		1			1			1	2	2
CO 2	1	2		3	2	1			1			2	1	2
CO 3	2	1		3	2	1			2			1	3	2
CO 4	1	1		2	2	1						1	3	3
CO 5	1	1		2	2	1			1			2	2	2
Total	6	7		11	8	5			5			7	11	11
Scaled value	2	2		3	2	1			1			2	3	3

0- No Relation 1 - Low Relation, 2 - Medium Relation, 3- High Relation

COURS	E CODE		XEC503		L	Т	Р	C	
COURS	ENAME		OBJECT ORIENTED PROGRAMMI	NG AND DATA	3	0	1	4	
			STRUCTURES						
PREREC	QUISITE	S	XCP202		L	Τ	Р	Η	
С	Р	Α			3	0	2	5	
2.875	0.875	0.25							
COURS	E OUTCO	MES:		Domain		Lev	vel		
CO1	Explai	n the co	oncepts of overloading,	Cognitive	Und	erstai	nding	3	
	Demo	nstrate	the usage of modularity, classes	Psychomotor	Guid	ed Re	espoi	nse	
	and sc	ope of t	he class members and build						
	progra			1.					
C02	Discus	s the as	spects of polymorphism and	Cognitive	Und	erstai	nding	5,	
<u> </u>	inheritance and <i>construct</i> programs. Psychomoto							~	
LUS	otruct	stunu a	ind <i>implement</i> various intear data	Developmentor	Ann	erstar	Ium	5,	
	Struct	ures		rsycholilotoi	Applying Guided Response				
C04	Under	stand.	implement and build programs	Psychomotor	Understanding				
001	for va	rious n	on linear data structures.	Cognitive	Applying				
	,			Psychomotor	Guided Response				
CO5	Discus	s differ	ent searching and sorting	Cognitive	Und	ersta	nd ir	ıg	
	technie	ques an	d build programs.	Psychomotor	Guid	ed Re	espoi	nse	
UNIT I-	INTROI	DUCTIO	DN				9+(0+6	
Object	oriented	progr	amming concepts – objects – cla	isses – method	ls an	d me	essag	jes –	
Abstrac	tion and	encaps	sulation – inheritance – abstract cla	isses – polymor	phisn	ı. Inti	odu	ction	
to C++ -	classes	- acces	s specifiers – function and data mem	ibers – default a	rgum	ents -	- fun	ction	
overloa	ding – fr	nend fu	inctions – const. and volatile funct	tions - static m	embe	rs –	Obje	cts –	
pointers	s and obj	ects – c	onstant objects – nested classes – lo	cal classes.					
List of I	zvnorim	ontei							
	Design (ds with default	aro	iment	te fr	riond			
1. I f	functions (For example design matrix and vector classes with							nd a	
	miand free	, (rui	a do matrix voctor multiplication	ciasses with Std	ut al	locati	011, <i>d</i>	inu a	
					.]	1:	I	A	
Z. 1	mpiemei	it com	plex number class with necessar	y operator ove	overloading and type				
		AMMI	nas integer to complex, double to co	inplex, complex	10 00	uble	ο ο μ	0+6	

Constructors – default constructor – Parameterized constructors – Constructor with dynamic allocation – copy constructor – destructor – operator overloading – overloading through friend functions – overloading the assignment operator – type conversion – explicit constructor.

List of Experiments:

- 1. Implement Matrix class with dynamic memory allocation and necessary methods. Give proper constructor, destructor, copy constructor, and overloading of assignment operator.
- 2. Overload the new and delete operators to provide custom dynamic allocation of memory.

UNIT III - FUNCTION IN C++				9+0+6
Function and class templates - Exception	on handling -	- try-catch-thr	ow paradigm –	exception
specification – terminate and Unexpected	functions – U	ncaught excep	tion.	-
List of Experiments:				
1. Develop a template of linked-list cla	ass and its me	ethods.		
2. Develop a program to implement	t swapping	of two numbe	ers using the c	oncept of
function template.				
3. Develop a program to demonstrate	the exception	n handling mee	chanisms	
UNIT IV - INHERITANCE AND POLYMOR	RPHISM			9+0+6
Inheritance – public, private, and protect	ted derivation	ns – multiple i	nheritance - vi	rtual base
class – abstract class – composite objects	- Polymorph	ism - Runtim	e polymorphism	– virtual
functions – pure virtual functions – RTTI	– typeid – d	lynamic castin	g – RTTI and te	mplates –
cross casting – down casting.				
List of Experiments:				
1. Compile time polymorphism				
Operator overloading				
Function overloading				
2. Run time polymorphism				
Inheritance				
Virtual functions				
Virtual base classes				
Templates				
UNIT V - FILE HANDLING				9+0+6
Streams and formatted I/O - I/O mani	pulators - fi	le handling -	random access	s - object
serialization - namespaces - std namespace	e - ANSI Strin	g Objects - sta	ndard template	ibrary.
List of Experiments:	2			
1. File handling with Sequential acces	S			
2. File handling with Kandolli access	LECTURE	TUTORIAL	PRACTICAL	TOTAL
	LLCTORL	TOTORINE		TOTAL
HOURS	45	0	30	75
TEXT BOOKS				
1. B. Trivedi, "Programming with A	ANSI C++",	Oxford Unive	rsity Press, 20	13, ISBN:
0198083963, 9780198083962.	,		-	
2. Paul Deitel, Harvey Deitel, "C++ Hov	w to Program	", Sixth Edition	n, Prentice Hall, I	2011,
ISBN-13: 978-0132662369, ISBN-1	<u>0: 01326623</u>	61.		

REFERENCES
1. Balagurusamy E., "Object oriented programming with C++", Fifth Edition, Third Reprint,
Tata McGraw–Hill Education 2011.
2. Ira Pohl, "Object Oriented Programming using C++", Pearson Education, Second Edition,
Reprint 2007.
3. B. Stroustrup, "The C++ Programming language", Third edition, Addison-Wesley
Professional, 4 th edition 2013, ISBN-10: 0321563840, ISBN-13: 978-0321563842.
E –REFERENCES
1. http://spoken-tutorial.org/tutorial-
search/?search_foss=C+and+Cpp&search_language=
2. http://www.nptel.ac.in
3. http://www.learncpp.com/
4. http://vlab.co.in

Mapping of COs with POs:

	GA1	GA2	GA3	GA4	GA5	GA6	GA7	GA8	GA9	GA10	GA11	GA12
C01	3	3	3	2	1	1	1	1	1	0	0	1
CO2	2	1	1	1	1	1	1	1	1	0	0	1
CO3	2	2	2	1	1	1	1	1	1	0	0	1
CO4	1	1	1	1	0	0	0	0	0	0	0	1
CO5	1	1	1	2	2	1	1	2	2	0	0	1
Total	9	8	8	7	5	4	4	5	5	0	0	5
Scaled	2	2	2	2	1	1	1	1	1	0	0	1

0- No Relation 1 - Low Relation , 2 - Medium Relation, 3- High Relation

COUL	COURSE CODE XEC504 L T P C												
COUR	<u>KSE C</u>			XEC504			T	Р 1	C				
	KSE N			DIGITAL SIGNAL PROCESSING		3 T			5				
PRER			22	XMA201,XEC402		L	1	P	Н 7				
L	P	A				3	2	Ζ	/				
3	0.9	0.1	1										
COUF	RSE O	UTC	OM	ES	Doma	in		Lev	el				
C01	1	Find,	ana	<i>lyze</i> and <i>practice</i> , Discrete Fourier Transform	Cognitiv	е	Rem	lemb	ering				
	t	o sigr	nal j	processing.			Ana	lyzin	g				
					Psychom	notor	Mec	Mechanism					
					Affective	9	Responding						
CO2	1	Define	e, C l	Cognitiv	е	Rem	lemb	ering,					
	1	ength	ı eff			Und	ersta	anding					
	I	oroces	ssin	g modules in hardware.	Development		Eval	uati	ng				
					Affortive		Mec	hanı	sm,				
<u> </u>		Evelo	in	Annly Analyza construct and	Cognitive	; ^	Kes	pone	ung				
0.05	CO3 Explain, Apply, Analyze, construct and Co							luinc	anung				
	1	epoi	l III	Culgital Intel S.			Δn2	lynie Ivzin	ς, σ				
					Psychom	notor	Mec	hani	s sm				
					Affective	9	Resi	oond	ing				
C04	1	Expla	in, A	Apply, Analyze, construct and	Cognitiv	е	Und	ersta	anding				
	1	epor	t FI	R digital filters.	0		Арр	lying	5,				
							Ana	lyzin	g				
					Psychom	notor	Mec	hani	sm				
					Affective	2	Responding						
C05		ofin	0 0	ategorize Multirate signal processing	Cognitiv	0	Und	Undorstanding					
005	1	<i>icji</i> nt	נ, נו	acyonize Multilate Signal processing	Coginer	C	Ana	lvze	manig,				
UNIT	'I - D	ISCR	ETI	E FOURIER TRANSFORM				9	9+6+9				
Intro	ductio	on to	DS	P and its applications – Efficient computation	of DFT, P	ropert	ies of	DF	Γ, FFT				
algori	ithms	– Ra	adix	z-2, Radix-4 FFT algorithms – Decimation in T	ime – Dee	cimati	on in	Free	quency				
algori	ithms	–Use	e of	FFT algorithms in Linear Filtering and correla	tion. Conv	volutio	on -o	verla	p save				
and o	verla	p add	l me	ethod.									
LINUT				ADD I PACTH PPPCTC AND DICITAL CLONAL	DDOCEC	CODC							
UNII	II - I	'INI I	EV	VORD LENGTH EFFECTS AND DIGITAL SIGNAL	L PROCES	2082			9+6+7				
Quan	tizati	on no	oise	- derivation for quantization noise power - ove	r flow err	or – tr	uncat	tion	error –				
co-eff	ficien	t qua	ntiz	ation error - limit cycle oscillation – signal scali	ing – anal	ytical	mode	lof	sample				
and h	oldo	perat	tion	S.									
Intro	Introduction to DSP architecture – Harvard architecture - Dedicated MAL unit - Multiple ALUS,												
					. 01 114532	20057	ana (.54A)+6+7				
	ltore	Ma	anit	uda raspansa Dhasa raspansa graun dalay	Docign of	Low	Dace B		rworth				
filters		– Mag	gint s) -	Rilinear transformation – prewarning impulse i	nvariant f	LOW F Techni	ass D niie -	Real	ization				
struct	tures	for II	r) R Fi	ilters, direct-cascade and parallel form.	iivariant		que	ncai	12001011				
UNIT	' IV -]	DIGIT	ΓAL	FIR FILTERS DESIGN				Ģ	9+6+7				
Ampl	itude	and	pha	ase responses of FIR filters – Linear phase filte	ers – Win	dowin	g tec	hnia	ues for				
desig	design of Linear phase FIR filters – Rectangular, Hamming, Hanning,Blackman,Kaiser windows –												
frequ	requency sampling techniques, Realization structures for FIR												

UNIT V - MULTI RATE SIGNAL PROCESSING

Multi rate Signal Processing: Sampling rate reduction: decimation by integer factors, Sampling rate increase: interpolation by integer factors, sampling rate conversion by non integer factors. Applications of Multi rate Signal Processing.

LIST OF EXPERIMENTS

USING MATLAB®/SCILAB®

Generation of signals(Analog & Digital) (Using SciLab) 1. Sine Wave generation (Using TMS320C5X) 2. 3. Sampling and effect of aliasing (Using SciLab) Sampling of input signal and display (Using TMS320C5X) 4. Linear and circular convolution of two sequences. (Using SciLab) 5. Linear convolution of two sequences (Using TMS320C5X) 6. Calculation of DFT and IDFT of a signal. (Using SciLab) 7. Calculation of FFT and IFFT of a signal. (Using SciLab) 8. Calculation of DFT &FFT(Using TMS320C5X) 9. Design of IIR filters. (Using SciLab) 10. Implementation of IIR filter (Using TMS320C5X) 11. 12. Design of FIR filters. (Using SciLab) 13. Implementation of FIR filter (UsingTMS320C5X)

	LEC	TURE	TUTORIAL	PRACTICAL	TOTAL
HOU	IRS	45	30	30	105

TEXT BOOKS

- Alan V. Oppenheim, Ronald Schafer, "Discrete Time signal Processing", Pearson Education, 3rd Edition, 2010.
- 2. John G Proakis, Dimtris G Manolakis, "Digital Signal Processing Principles, Algorithms and Application", 4th Edition, PHI, 2007,
- 3. Louis Scharf, "Statistical Signal Processing", Pearson Education, 1991.
- 4. B.Venkataramani& M. Bhaskar, "Digital Signal Processor Architecture, Programming and Application", TMH, 2002.

REFERENCES

- Avtarsingh, S.Srinivasan, "DSP Implementation using DSP Microprocessor with Examples from TMS32C54XX", Thomson / Brooks Cole Publishers, 2003
 S.Salivahanan, A.Vallavaraj, Gnanapriya, "Digital Signal Processing", McGrawHill TMH,
- 2000.3. Johny R.Johnson Introduction to Digital Signal Processing", Prentice Hall, 1984.
- 4. S.K.Mitra, "Digital Signal Processing- A Computer based approach", Tata McGraw Hill, New Delhi, 1998.

E-REFERENCES

- 1. http://nptel.ac.in/courses/117102060/ (Prof: S. C. Dutta Roy, "Digital Signal Processing, Nptel online courses", Department of Electrical Engineering, Indian Institute of Technology, Delhi)
- http://nptel.ac.in/courses/Webcourse- contents/IIT-KANPUR/Digi_Sign_Pro/ui/About-Faculty.html (Prof. Govind Sharma, "Digital Signal Processing, Nptel online courses", Department of Electrical Engineering, Indian Institute of Technology, Kanpur)

Mapping of COs with POs:

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO	PSO 2
													1	
CO 1	3	3	1	2	2	2	-	-	1	1	1	2	-	1
CO 2	3	2	2	2	3	2	-	-	1	1	1	2	-	1
CO 3	3	3	2	2	2	2	-	-	1	1	1	2	-	1
CO 4	2	2	2	2	2	2	-	-	1	1	1	2	-	1
CO 5	2	2	2	0	1	0	-	-	0	0	0	2	-	1
Total	13	12	9	8	10	8	-	-	4	4	4	10	-	5
Scaled	3	3	2	0	3	2	-	-	0	1	1	2	-	1

0- No Relation 1 - Low Relation , 2 - Medium Relation, 3- High Relation

CC	URS	E CODE		L	Т	Р	С					
CC	URS	E NAME	TOTAL QUALITY MANAG	EMENT			3	0	0	3		
С	Р	А					L	Т	Р	Η		
3	0	0					3	0	0	3		
CC	URS	E OUTCO	MES			Dom	ain	Level		-		
CC)1	<i>List</i> and	<i>Explain</i> the basic concepts	of total quality	7	Cogn	itive	Reme	nber	ing		
		concepts	and its limitation	1 5		0		Under	stand	ding		
CC)2	Analyze	and <i>Explain</i> the Customer	satisfaction, Er	nployee	Cogn	itive	Analyz	zing,			
		involven	nent, supplier selection and	appraise the				Evalua	ating			
		perform	ance by TQM principle						_			
CC	CO 3 <i>Explain</i> and <i>Apply</i> the Statistical Process Control Tools Cognitive Understanding											
Appling												
CC)4	<i>Select</i> ar	nd <i>Explain</i> the different TQ	M tools and the	eir	Cogn	itive	Reme	nber	ing,		
		significa	nce					Under	stand	ding		
CC)5	Explain	the importance aspects of d	lifferent quality	у	Cogn	itive	Under	stand	ding		
		systems.										
UN	I TIV	- INTRO	DUCTION							9		
De	efinit	ion of qu	ality – Dimensions of qua	ality – Quality	⁷ planning	– Qu	ality o	costs –	Ana	lysis		
tee	chnic	jues for q	uality costs – Basic concep	ts of Total Qua	ality Manag	gemen	it – His	storical	revi	ew –		
Pr	incip	les of TQ	M – Leadership – Concept	ts – Role of se	enior mana	ageme	nt – Q	uality	Coun	cil –		
Qu	lality	statemen	its – Strategic planning – De	eming philosop	hy – Barrie	ers to	TQM in	npleme	entat	ion		
TIN										0		
		I-IQM PI	AINCIPLES	n of quality (·	omala	into	Coursiaa		9		
	Ston	ier satisia	ction – Customer perceptio	n oi quanty – (Justomer c	ompia	unus –	Service	qua	ition		
	d ro	word D	lon – Employee mvolvem	ent – Motivati onofits – Cont	inuous pr		imnro	uns, re	cogn F T	luran		
an tri		= PDSA c	vycle – 55 – Kaizen – Sunr	lier nartnersh	in – Partn	oring		rcing _	r = j	nlier		
Se	lectio	$n = Sunn^{1}$	lier rating – Relationshin de	evelonment – F	Performance	re mes	sures	– Rasic	conc	rents		
_ (Strate	pov – Perf	ormance measure	evelopment i	ci ioi inanc		154105	Dusie	cont	.epts		
III			STICAL PROCESS CONTRO	L (SPC)						9		
Th		ven tools	s of quality – Statistical t	fundamentals	- Measure	es of	centra	l tend	encv	and		
die	sners	tion – Pon	ulation and sample – Norm	nal curve – Cor	ntrol charte	s for v	ariable	es and a	attrih	nites		
– F	Proce	ess capabi	lity – Concept of six sigma –	New seven ma	anagement	tools		o una c		aces		
U		V -TOM T	OOLS							9		
Be	nchr	narking –	Reasons to benchmark – B	enchmarking i	orocess – ()uality	7 Funct	tion De	plovr	nent		
(0	FD)	– House	of quality – OFD process	– Benefits –	Taguchi q	uality	loss f	unction	1 – 1	Гotal		
Pr	oduc	tive Main	tenance (TPM) – Concept –	Improvement	needs – FM	1EA –	Stages	of FME	A.			
				-			U					
UN	UNIT V -QUALITY SYSTEMS 9											
Ne	ed fo	or ISO 900	0 and other quality system	s – ISO 9000:2	000 quality	y syste	em – El	ements	5 –			
Im	plen	nentation	of quality system – Docume	entation – Qual	ity auditin	g – TS	16949) – ISO (1400	0 –		
Со	ncep	t, require	ments and benefits.									
				LECTURE	TUTORIA	I.	PR A C	τιςδι	ТО	ΤΔΙ		
			HUIBS	45	-		INAU	-		<u>171</u> 45		
TF	XT F	BOOKS	10000	15					<u> </u>	10		
11)ale I	H. Besterf	iled. et. Al. "Total Quality M	anagement" N	ew Delhi I	Pearso	n Edua	ration	$\ln c 2$	007		
2.1	ame	s R. Evans	and William M. Lidsav "Th	e Management	t and Contr	ol of (Juality	". 5 th Ec	litior	1.		
So	uth-V	Nestern 2	2002.	e management		51 01 (Lunity	,5 10		-,		

REFERENCES

1. Feigenbaum, A.V., "Total Quality Management", McGraw Hill, 1991.

2. Oakland, J.S., "Total Quality Management", Butterworth Heineman, 1989.

3. Narayana V. and Sreenivasan, N.S., "Quality Management – Concepts and Tasks", New Age International, 1996.

4. Zeiri, "Total Quality Management for Engineers", Wood Head Publishers, 1991.

E- REFERENCES

1. http://nptel.ac.in/faq/110101010/Prof.IndrajitMukherjee,IIT,Bombay and Prof.Tapan P.Bagchi, IIT, Kharagpur.

	C01	CO2	CO3	CO4	CO5	Total	Scaled total
GA1	2	1	2	1	1	7	2
GA4	1	1	2	2	1	7	2
GA5	1	1	2	2	1	7	2
GA6	1	1	2	1	2	7	2
GA7	1	1	1	1	1	5	1
GA8	1	1	1	2	2	7	2
GA9	1	1	1	-	1	4	1
GA10	1	1	1	2	2	7	2
GA12	1	1	-	-	2	4	1

COs Vs GA mapping

COURSE CODEXGS507LTS.SC												
COUF	RSE I	NAME	BUSINESS COMMUNICATION			1	0	1	0			
PRER	REQU	JISITES]	L	Т	S.S	Н			
C	P	Α				1	0	2	2			
1	1	0				T	U	2	3			
COUF	RSE (DUTCOM	ES:	Dom	ain		Lev	vel				
CO1		To choo of busin	se and apply different styles to various forms ess communication.	Cogn	itiv	е	Rer Und	nemb dersta	ering anding			
CO2		Identify writing commu	the proper tone of language required in and speaking in business nication.	Cogn	itiv	e	Uno	dersta	anding			
CO3		Display features commu	knowledge on grammar and other linguistic in writing various forms of business nication.	Cogn	itiv	e	Und	dersta	anding			
C04	C04To distinguish between letters and memos and various forms of Business CommunicationImage: Communication											
C05	CO5Apply: Learn how to write business reports, minutes, proposals.CognitiveUnderstanding											
Units	5 I - I	NTRODI	ICTION TO BUSINESS COMMUNICATION						5			
Mode	ern d	evelopm	ents in the style of writing letters memos and r	eport	s: bl	ock	lette	rs, se	mi			
block	lette	ers, full b	lock letters, simplified letters etc.,									
Units	; II- U	JSE OF I	ANGUAGE						5			
Memo Advai	os/m ntage	inutes/t es of writ	elephone memos/ letters/ assignments art of ten and spoken communication.	writin	ıg E∙	-mai	l etc.					
Units	; III-	GRAMM	AR						5			
The u	se of & oth	f active a ner eleme	nd passive voice; the use of grammar, propriet ents of language used in these writings.	у, ассі	urac	:y , e	xacti	ness ,	the			
Units	IV-	TYPES O	FREPORT						5			
The fo	orma	t of vari	ous types of Reports/ projects etc.,									
Units	5 V- E	BUSINES	S WRITING						10			
Writi	ng B	usiness r	eports, proposals and minutes.									
						Self	f Stu	dy	Total			
				HOU	RS	3	0		30			
Text	Boo 1. 2.	ks and F John Sea Edition <u>William</u> Ltd.; 20	Reference Books: aly, Writing and Speaking Author:, Oxford Univ 2009. <u>s K S</u> , Communicating in Business (8th Edition) 12	ersity) Enga	Pre Ige I	ess, N Leari	lew I	Delhi India	Third Pvt.			
	3. John Sealy, Writing and Speaking, Oxford University Press, New Delhi Third Edition											

3. John Sealy, Writing and Speaking, Oxford University Press, New Deini Third Ed 2009.

Mapping of Course :

	GA1	GA2	GA3	GA4	GA5	GA6	GA7	GA8	GA9	GA10	GA11	GA12
CO1										2		
CO2										2		
CO3				2						1		
CO4												
CO5										1		
Total				2						6		
Scaled				1						2		
Value				T						2		

3-High Relation, 2-Medium Relation, 1-Low Relation, 0-No Relation

COUR	SE COD	E	XEC508		L	Τ	Р	С
COURS	SE NAM	E	In-plant Training/ Internship pro	gramme	0	0	0	1
С	Р	Α						
2/1	2/1	2/1						
COUR	SE OUT	COMES:		Doma	in		Le	evel
C01	Relate	e classro	oom theory with workplace practice	Cognitive Unders				nding
CO2	Сотр	ly with	Factory discipline, management and	Affective		Resp	ond	ing
	busine	ess prac	tices.					
CO3	demo	nstrates	s teamwork and time management	Affective		Valu	e	
CO4	Descr	<i>ibe</i> and	Display hands-on experience on	Psychom	otor	Perc	eptio	on , Set
	practi	cal skills	s obtained during the programme.					
CO5	Sumn	<i>narize</i> tl	ne tasks and activities done by	Cognitive	è	Eval	uate	
	techni	ical docu	ments and oral presentations.					
All CO.	s are eq							
Note:								
Revise	d Bloon	n Taxon	omy of the Cognitive Domain					

Simpson's Taxonomy of the Psychomotor Domain Krathwohl's Taxonomy of the Affective Domain

Table 1	: Man	ning	COs	with	B.T	'ech	GAs
Tuble 1	· map	ping	005	vv i ci i	D.1	CUII	un 15

	GA1	GA2	GA3	GA4	GA5	GA6	GA7	GA8	GA9	GA10	GA11	GA12
C01	2											
CO2							1	3			1	
CO3									3	1	3	1
CO4		1	2	1	3							3
CO5				3						3		1
Total	2	1	2	4	3	0	1	3	3	4	4	5
Scaled	1	1	2	1	1	0	1	1	1	1	1	1
l												

3-High Relation, 2-Medium Relation, 1-Low Relation, 0-No Relation

VI SEMESTER

COURSE CODEXEC602LTPC													
COURS	E NAM	Έ	DIGI	TAL CO	MMUN	ICATION			3	0	0	3	
PRERE	QUISIT	ſES	XEC4	04,XEC	303				L	Т	Р	Η	
С	Р	Α							3	0	0	3	
3	0	0											
COURS	E OUT	COMES:						D	omai	n	l	Level	
C01	Desc	ribe var	ious m	nethods	to miti	gate the effe	cts of	Cog	nitiv	е	Reme	mber	ing
	noise	and ISI	in bas	eband j	oulse tr	ansmission.							-
CO2	Expla	in and	comp	are vari	ous digi	ital modulat	ion	Cog	nitiv	e	Unde	rstand	ling,
	techn	iques	-								Evalu	ate	-
CO3	Desc	ribe and	l apply	v variou	is error	control tech	iniques	Cog	nitiv	e	Reme	mber	ing,
	for re	ducing	bit err	ors in d	igital co	ommunicatio	on.				Apply	ing	_
CO4	Expla	in and i	illustr	<i>ate</i> Spr	ead Spe	ectrum		Cog	nitiv	е	Unde	stanc	ling
	Comr	nunicati	ion.	•	-								U
C05	05 <i>Explain</i> Multiple Access Schemes Cognitive Understanding												
UNIT I	INIT I - COMMUNICATION THROUGH BANDLIMITED CHANNELS 9 Instance Sector Instance Sector												
Matche	Atched Filter- Error Rate due to noise –Inter symbol Interference- Nyquist's criterion for												
Distorti	Distortion less Base band Binary Transmission- Correlative level coding –Baseband and Mary												
PAM tra	PAM transmission – Equalization – Linear, DFE and MLSE methods–Eye patterns												
UNIT II	UNIT II-DIGITAL MODULATION 9												
Introduction – Geometric Representation of Signals -Conversion of the Continuous AWGN													
Channe	l into a	a Vector	Chan	nel - Op	timum	Receivers U	sing Cohe	rent	Deteo	ctio	n- Pro	babili	ty of
Error- l	Pass ba	and Trai	nsmiss	sion mo	del- Ge	eneration, De	etection, S	ignal	spac	e di	iagram	, bit e	error
probab	ility an	d Powe	r spec	tra of A	ASK,BPS	SK, QPSK,QA	M, FSK an	d M	SK sc	hem	nes – D	iffere	ntial
phase s	hift ke	ying – C	lompa	rison of	Digital	modulation	systems u	using	a sin	gle	carrie	r – Ca	rrier
and syn	nbol sy	nchroni	zation	l .	-		-			-			
UNIT I	II-ERR	OR CON	ITROL	CODIN	IG								9
Discret	e mem	oryless o	channe	els – Lir	near blo	ck codes - C	yclic codes	s - Co	nvolu	itioi	nal cod	es –	
Maximu	ım li	kelihood	d de	coding	of	convolution	al codes	-Vite	rbi	Alg	orithm	i, Ti	rellis
codedM	Iodulat	ion, Tur	·bo cod	des, Inti	oductio	on to LDPC c	odes			-			
UNIT IV	V-SPRE	EAD SPE	ECTRU	M COM	IMUNIC	CATION							9
Pseudo	- noise	sequer	nces –	a notio	n of sp	read spectr	um – Dire	ct se	quen	ce s	spread	spect	trum
with co	herent	: binary	phase	e shift l	keying	- RAKE Red	ceiver, Sig	nal s	pace	Din	nensio	nality	and
process	sing ga	in –Pro	babilit	ty of e	ror –	Frequency -	-hop spre	ad s	pectr	um	-Pseu	doran	dom
Sequen	ce Gen	eration ,	,Maxin	num Le	ngth Se	quences, Go	old Sequen	ces,	Bark	er S	equen	ces , T	'ime-
Hoppin	g Sprea	ad Spect	rum S	ystem v	vith Pse	eudorandom	Pulse Pos	ition	Selec	ctio	n.		
UNIT V	-MUL	FIPLE A	CCESS	TECH	NIQUES	5							9
Introdu	ction-	Freque	ency I	Division	Multi	ple Access-	Time Div	ision	Mul	tipl	e Acc	ess-	Code
Divisio	Division Multiple Access-Single-Carrier CDMA-Multi-Carrier CDMA-Orthogonal Frequency												
Divisio	n Mult	iple Acc	cess-Si	ngle-Ca	rrier F	DMA-Space	Division	Mult	iple .	Acc	ess- Ca	ase St	udy:
Multipl	e Acces	s Schen	ne in tl	he 3GPI	PLTE Ce	ellular Šyste	m		-				-
^						LECTURE	TUTORI	AL	PR	АСТ	ICAL	TO	TAL
				ŀ	IOURS	45	0			()	4	ł5
TEXT B	BOOKS								<u> </u>				
1. 5	Simon l	Haykins	, "Com	munica	tion Sy	stems", 4 th E	dition, Joh	n Wil	ey &	Son	s, Repi	int 20)08.
2. V	Wesoło	wski, "	Introd	uction	to Digi	ital Commu	nication S	ystei	ns", ∣	Johr	n Wile	y & S	Sons,
-	2. Wessiowski, introduction to Digital communication systems , joint whey & sons, 2009.												

REFERENCES John Proakis, Massoud Salehi, "Digital Communications", 5th Editions, McGraw Hill Education India, 2014. John R.Barry, Edward A. Lee, David G.Messerschmitt, "Digital Communication", 3rd Edition, Kluwer Academic Publishers, 2004. E REFERENCES http://freevideolectures.com/Course/2311/Digital-Communication(NPTEL, Digital Communication, Prof. Bikash Kumar Dey,IIT Bombay) http://www.nptel.ac.in/syllabus/117105077/ (NPTEL, Digital Communication, Prof. SaswatChakrabarti, Prof. R.V. Rajakumar,IIT Kharagpur)

Mapping of COs with POs:

	P 0 1	PO 2	PO 3	PO 4	РО 5	PO 6	PO 7	PO 8	PO 9	PO1 0	P01 1	P01 2	PS 01	PS 0 2
CO 1	1	3								1		2	2	3
CO 2	1	3										1	2	3
CO 3	1	3								1		1	2	3
CO 4	1	2										1	2	3
CO 5		2										1	2	3
Total	4	13	0	0	0	0	0	0	0	2		6	10	15
Scaled	1	3	0	0	0	0	0	0	0	1	0	2	2	3

3-High Relation, 2-Medium Relation, 1-Low Relation, 0-No Relation

COURSE CODEXEC603LTPC													
COURS	SE NAI	ИЕ	ANTENNAS AND WAVE PROPAGATIO	N	3	0	1	4					
PRERI	EQUISI	TES	XEC405		L	Τ	Р	Η					
С	Р	Α			3	0	2	5					
3	0.9	0.1		1									
COURS	SE OUT	ГСОМЕ	j	Domain		Le	vel						
C01	Desc	ribe, exp	olain, determine, measure and report	Cognitive	Re	mem	beri	ng,					
	the p	aramete	ers of antennas.	Psychomotor	Un	derst	andi	ng,					
				Affective	Eva	aluat	e						
					Gui	ded	1.						
					Res	spon	ding						
<u> </u>	Evol	nin clas	sife identify magging and practice	Cognitivo	Res	spone mom	uing borir						
LU2	dipol	IIII, Clus	sijy, identijy, medsure and procise	Developmentor	Kei	doret	oern ondi	ig, ng					
	uipoi	es, allay	/s and loop antennas.	Affective	Δn-	alveo	Cuic	lig, lod					
				meetive	Responding								
			Responding										
C03	CO3 Describe, apply, measure and report antennas for Cognitive												
CO3Describe, apply, measure and report antennas for wideband applications.Cognitive PsychomotorRemend Apply													
		1		Affective	Gui	ided	0						
					Res	spone	ding						
					Res	spon	ding						
CO4	Explo	ain, rela	<i>te, measure</i> and <i>perform</i> the radiation	Cognitive	Un	derst	andi	ng,					
	from	apertur	es and lens antennas.	Psychomotor	Ap	plyin	g						
				Affective	Guided								
					Responsing								
005	0.11			0	Res	spon	ding						
C05	Outii	neand e	xplain the methods of wave	Cognitive	Rei	nem	berir	ig,					
UNIT		agation a	and associated parameters.		Un	uerst		ng					
Concer	$\frac{1}{1} - \frac{1}{1} + \frac{1}$	etor no	tential Modification for time varying retained	urded case Field	6 26	socia	tod w	vith					
Hertzi	an din	ole Po	wer radiated and radiation resistance	of current el	s ass smer	nt R	adiat	tion					
resista	nce of	element	ary dipole with linear current distributio	n.	JIIICI	IC. IX	aula	.1011					
Definit	tions:	Radiatio	n intensity. Directive gain. Directivity.	Power gain. Be	am	Widt	h. B	and					
Width.	Gain	and rad	iation resistance of current element. Hal	f-wave dipole a	nd f	oldec	d dip	ole.					
Recipr	ocity p	rinciple	. Effective length and Effective area. Relat	tion between gai	n eff	ectiv	re len	ıgth					
and ra	diation	n resista:	nce.										
UNIT I	I - ELE	ECTRIC	DIPOLES, ANTENNA ARRAYS AND LOOI	P ANTENNAS			9+0)+9					
Radiat	ion fro	om half-	wave dipole and quarter-wave monopol	le. Assumed cur	rent	dist	ribut	tion					
for wi	re ante	ennas. U	se of capacity hat and loading coil for	short antennas.	Ant	enna	Arra	ays:					
Electri		from t	wo and three element arrays. Uniform	linear array. M	etho	d of	patt	ern					
multip	licatio	n. Binor diation	from small loop and its rediction resist.	r antennas abo	ve g	roun	Ia. Lo	oop					
circum	Ids: No		to a wavelength and resultant circul	ance. Raulation	on	$\frac{1}{2}$ a $\frac{10}{2}$	עטי ו _ר ח	ical					
antenr	nerenc	e equal mal and	avial mode operation		011	ax15.	nei	Ital					
UNIT	III TR		NG WAVE ANTENNAS AND SPECIAL AN	TENNAS			9+0-	+6					
Radiat	ion fro	m a tra	velling wave on a wire. Analysis of Bhor	nbic antenna. D	esigr	 ۱ of I	Rhom	1bic					
antenr	nas. Co	upled A	intennas: Self and mutual impedance of	f antennas. Ya	gi a	nten	nas.	Log					
period	ic ante	enna. Re	ason for feeding from end with shorter	dipoles and nee	d for	• trar	ispos	sing					
the lin	es.	-	0					0					
	1	a + i a	2015 Cunniquium e Seille b										
90 K (egul	a t i o n	2015-Curriculum&Syllab	u s									

Antenna for Special Applications: Sleeve antenna, Turnstile antenna, Spiral antenna, Helical antenna, Reconfigurable antenna, Dielectric antennas, Electronic band gap structures and applications. Microstrip antennas

UNIT IV APERTURE AND LENS ANTENNAS

Radiation from an elemental area of a plane wave (Huygen's Source). Radiation from the open end of a coaxial line. Radiation from a rectangular aperture treated as an array of Huygen's sources. Equivalence of fields of a slot and complementary dipole. Relation between dipole and slot impedances. Method of feeding slot antennas. Thin slot in an infinite cylinder. Field on the axis of an E-Plane sectoral horn. Radiation from circular aperture. Beam Width and Effective area. Reflector type of antennas (dish antennas). Dielectric lens and metal plane lens antennas. Luneburg lens. Spherical waves and Biconical antenna.

UNIT V WAVE PROPAGATION

Propagation-Sky wave propagation: Structure of the ionosphere. Effective dielectric constant of ionized region. Mechanism of refraction. Refractive index. Critical frequency. Skip distance. Maximum usable frequency. Fading and Diversity reception. Space wave propagation: Reflection from ground for vertically and horizontally polarized waves. Reflection characteristics of earth. Resultant of direct and reflected ray at the receiver. Duct propagation. Ground wave propagation: Attenuation characteristics for ground wave propagation. Calculation of field strength at a distance.

LIST OF EXPERIMENTS

USING ANTENNA TRAINER KITS / MATLAB

- 1. Radiation pattern of Monopole, Dipole and half wave dipole antennas.
- 2. Radiation pattern of Linear array antenna and Circular array antenna.
- 3. Radiation pattern of Linear array of isotropic antennas.
- 4. Radiation pattern for End fire antenna array.
- 5. Radiation pattern for Binomial antenna array.
- 6. Radiation pattern for Broadside antenna array.
- 7. Radiation pattern of Loop antenna.
- 8. Radiation pattern of Yagi-Uda antennas.
- 9. Radiation pattern of Rectangular aperture antenna.
- 10. Radiation pattern of Travelling wave antenna.
- 11. Radiation pattern of a Horn antenna.
- 12. Design of Microstrip Patch Antenna.

		LECTURE TUTORIAL PRACTICAL TOTAL										
	HOURS	45	0	30	75							
TEXT	воок											
1.	Balanis, "Antenna Theory ", 2 nd Editi	ion, John Wile	y & Sons, 200	3.								
2.	Edward C.Jordan and Keith G.Balmain, "Electromagnetic Waves and Radiating Systems"											
Pren	itice Hall of India, 2006											
REFE	RENCES											
1.	John D.Kraus and Ronalatory Marhe	fka, "Antenna	s For All Appli	cations", 3 rd Ed	lition,							
	Tata McGrawHill, 2003.											
2.	R.E.Collins, "Antennas and Radio Pro	pagation ", M	lcGraw-Hill, 19	987.								

- 3. Constantine. A.Balanis "Antenna Theory Analysis and Design", Wiley Student Edition, 2006.
- 4. Rajeswari Chatterjee, "Antenna Theory and Practice" Revised Second Edition, New Age International Publishers, 2006.

9+0+9

9+0+0

- 5. S. Drabowitch, "Modern Antennas", 2nd Edition, Springer Publications, 2007.
- 6. Robert S.Elliott "Antenna Theory and Design" Wiley Student Edition, 2006.
- 7. H.Sizun "Radio Wave Propagation for Telecommunication Applications", First Indian Reprint, Springer Publications, 2007.

E- RE	FERENCES	
1.	http://nptel.ac.in/courses/117101056/48 (NPTEL: Prof R.K.Shevgaonkar,	
	Transmission Lines and E.M. Waves)	

Mapping of COs with POs:

	PO	P01	P01	P01	PS	PS								
	1	2	3	4	5	6	7	8	9	0	1	2	01	02
CO 1	3	1		2	2							1		1
CO 2	3	1		2	2							1		1
CO 3	3	1		2	2							1		1
CO 4	3	1		2	2							1		1
CO 5	2	1		1	1							1		1
Total	14	5		9	9							5		5
Scaled	3	1		2	2							1		1

0- No Relation 1 - Low Relation , 2 - Medium Relation, 3- High Relation

COURSE	CODE	XEC604	KEC604								
COURSE	NAME	MICROPROCESSORS AND		3	1	1	5				
		MICROCONTROLLERS									
PREREQ	UISITES	XEC303		L	Т	Ρ	Н				
C P	Α			3	2	2	7				
3 0.9	9 0.1		_								
COURSE	OUTCO	MES	Don	nain		Level					
C01	Des	cribe,understand, show and practicethe	Cognit	ive	Re	mem	bering				
	con	cepts of microprocessor 8085.	Psycho	moto	r Un	ders	tanding				
			Affecti	ve	Set						
CO2	Des	cribe,understand ,show and practicethe	Cognit	ive	Re	mem	bering,				
	con	cepts of microprocessor 8086.	Psycho	moto	r Un	ders	tanding				
			Affecti	ve	Set	Set					
					Re	Responding					
CO3	Und	erstand, analyze ,integrate ,assemble	Cognit	ive	Un	ders	tanding,				
	and	<i>report</i> peripherals devices with	Psycho	omoto	r An	alyzi	ng,				
	mic	oprocessors.	Affecti								
					Gu	ided					
					Re	spon	se				
					Re	spon	ding				
C04	Des	cribe,understand ,show and practicethe	Cognit	ive	Re	mem	bering,				
	con	cepts of microcontroller 8051.	Psycho	omoto	r Un	ders	tanding				
			Affecti	ve	Set		•-				
					Re	spon	ding				
C05	Des	cribe ,understand and assemble using PIC	Cognit	ive	Re	mem	bering,				
	mic	ocontroller.			Un	ders	tanding				
UNIT I -											
8085 ar	chitectur	e-Instruction set _addressing modes- timi	ng diag	ram -	assen	hlv	language				
program	ming-coi	inters- time delays- interrupts-memory inte	rfacing l	/0 de	vices.	ibiy	language				

UNIT II - 8086 MICROPROCESSOR.

8086 architecture- 8086 addressing modes- instruction set - Interrupt-8086 assembly language programming.

UNIT III -INTERFACING PERIPHERALS PROGRAMMABLE I/O DEVICES APPLICATIONS AND DESIGN.

9+6+6

Memory Interfacing and I/O interfacing – Parallel communication interface – Serial communication interface -Peripheral Devices- Programmable Peripheral Interface (Intel 8255A)- Programmable Interval timer (Intel 8253)-Programmable Interrupt Controller (Intel 8259A)- Programmable Keyboard/Display Interface (Intel 8279)- D/A and A/D Interface -Timer – Keyboard /display controller – Interrupt controller – DMA controller interface.

UNIT IV- REAL TIME CONTROL AND APPLICATION.

9+6+6

8051 architecture- instruction set and addressing modes- assembly language programming -I/O pins- port and circuits- Special Function Registers(SFRs) -external memory -counters and timers-serial data I/O interrupts interfacing to external memory and 8255-Interrupts- serial communication-8051 interfacing LCD- ADC & DAC- Stepper motors and keyboard.



9+6+6

UNI	T V - EMBEDDED MICROCONTROI	LERS.			9+6+6								
Intro	oduction- PIC Microcontroller - Arc	hitecture- ins	struction sets-	Timer – PWM	– RTC- On								
chip	ADC/DAC.												
LIST	OF EXPERIMENTS												
1.	Programs for 8/16 bit Arithmetic o	perations Usi	ng 8085.										
2.	Programs for Sorting and Searching	g Using 8085.											
3.	Parallel Communication between tw 8085.	wo MP Kits us	sing Mode 1 and	1 Mode 2 of 825	5 with								
4.	Interfacing and Programming of Stepper Motor 8085/8086.												
5.	Interfacing and Programming 8279), 8259, and 8	253with 8085/	/8086.									
6	Programs for String manipulation of	operations Us	ing 8086.										
7.	Programming using Arithmetic, Log microcontroller.	gical and Bit N	Ianipulation In	structions of 8()51								
8.	Interfacing ADC and DAC using 805	51.											
9.	Serial Communication between two	o MP Kits usin	ıg 8051.										
10.	Communication between 8051 Mic	rocontroller k	kit and PC.										
11.	Interfacing and Programming of DC	C Motor using	8051.										
12.	Programming for seven segment display using PIC microcontroller.												
•		LECTURE	TUTORIAL	PRACTICAL	TOTAL								
	HOURS	45	30	30	105								
TEX	T BOOKS												
1.	D. V. Hall, "Micro processors and In	terfacing", 2 ⁿ	^d Edition, Tata	McGrawHill, 20	06.								
2.	Ramesh S. Goankar, "Microprocess 8085", 5 th Edition, Prentice Hall,201	or Architectu 14.	re, Programmir	ng and Applicati	ions with								
3.	Kenneth. J. Ayala. "The 8051 Micros Publishing, 2010	controller", 21	nd Edition, Penra	am Internationa	ıl								
4.	Dr. Ramesh Gaonkar, "The Z80 Mic	roprocessor,	Architecture, In	nterfacing, Prog	ramming								
5.	A.P.Godse and D.A.Godse. "Micronr	ocessor and N	licrocontroller	o. ".1 st Edition. Te	chnical								
	Publications, 2010.	und l		,,									
6.	Muhammad Ali Mazidi , Rolin McK	inley, Danny (Causey, "PIC Mi	crocontroller a	nd								
	Embedded Systems", 1st Edition, P	earson Educa	tion, 2015.										
REF	ERENCES												
1.	A.K.Ray and K.M.Bhurchandani, "Ao TMH, 2006.	dvanced Micro	oprocessors an	d Peripherals",:	2 nd Edition,								
2.	K.UmaRao,AndhePallavi, "The 8051 Microcontrollers, Architecture and programming and												
	Applications", Pearson Education, 2009.												
3.	Liu and G.A.Gibson, "Micro Comput	er System 80	86/8088 Famil	y Architecture.									
4	D	DIT											
4	Programming and Design ,2 ^{nu} Edit	ion, PHI, 1986		2005									

E -**REFERENCES**

- 1. https://www.youtube.com/watch?v=liRPtvj7bFU
- 2. https://inspirit.net.in/books/academic/8085%20Microprocessor%20-%20Ramesh%20Gaonkar.pdf
- 3. https://inspirit.net.in/books/academic/8085%20Microprocessor%20-%20Ramesh%20Gaonkar.pdf
- 4. http://www.vssut.ac.in/lecture_notes/lecture1423813120.pdf
- 5. http://www.vssut.ac.in/lecture_notes/lecture1423813120.pdf
- 6. http://www.vssut.ac.in/lecture_notes/lecture1423813120.pdf
- 7. http://www.vssut.ac.in/lecture_notes/lecture1423813120.pdf

Mapping of COs with POs:

	PO	P01	P01	P01	PSO	PSO								
	1	2	3	4	5	6	7	8	9	0	1	2	1	2
CO 1	3	2		2	1	1	1					1		
CO 2	2	2		2	1	1	1					1		
CO 3	3	3		3	2	2	2					1		
CO 4	3	3		2	3	1	1			1		1		
CO 5	3	3		3	3	2	2			1		1		
Total	14	13		12	10	7	7			2		5		
Scaled	3	3		3	3	1	1			1		1		
value														

0- No Relation 1 - Low Relation , 2 - Medium Relation, 3- High Relation

COUR	SE COE]	Ĺ	Т	Р	С				
COUR	RSE NAM	/IE	CONTROL SYSTEM	15			3	1	0	4	
PRER	EQUISI	TES	XMA101, XMA201,	XBE103, XEC3	02,XEC40	2 1	Ĺ	Т	Р	Η	
С	Р	Α	3:0:0			:	3	2	0	5	
3	0	0									
COUR	SE OUT	COME	5			Do	mai	n]	Leve	l
C01	Outlin	eand ex	xplain the mathemat	cical modeling	of	Cognitive Remembering,					
	electri	cal and	mechanical systems			Understar					ding
CO2	Descr	ibe and	apply Time domain	analysis met	hods	Cogr	hitiv	e	Reme	mbe	ring,
	and <i>ir</i>	iterpre	t the stability of the	systems.					Apply	ing,	
									Under	rstan	ding
CO3	Descr	ibe and	apply Frequency do	main analysi	S	Cogr	hitiv	e	Reme	mbe	ring,
	metho	ods and	interpret the stabi	lity of the syst	ems.				Apply	ring,	
									Under	rstan	ding
CO4	Explai	in, solve	e and <i>justify</i> compen	sation techniq	ues and	Cogr	hitiv	e	Under	rstan	ding,
	contro	ollers							Apply	ing,	
									Evalu	ate	
C05	Outlin	e and il	l lustrate various ele	ctrical and me	chanical	Cogr	hitiv	e	Reme	mbe	ring,
	systen	ns throu	igh control systems.						Under	rstan	ding
UNIT	I - CON	TROL	SYSTEM MODELLIN	G							9+6
Syster	m conce	ept, diff	erential equations a	ind transfer fu	inctions. I	Model	lling	of e	electri	c sys	stems,
transl	ational	and ro	otational mechanica	l systems, Si	mple elec	trom	echa	nica	ıl syst	ems.	Block
diagra	am repr	esentat	ion of systems – Blo	ck diagram re	duction m	ethoo	ls –	Clos	ed loo	p tra	ansfer
functi	on, dete	erminat	ion of signal flow gra	iph. Mason's g	ain formul	а – Ех	kamj	ples.			
UNIT	II - TIM	IE DOM	AIN ANALYSIS								9+6
Test	signals	– time	e response of first	order and s	econd or	der s	vste	ms	– tim	e do	main
specif	ications	s – type	es and order of sys	tems – genera	alised erro	or co	effic	ients	s – ste	eady	state
errors	s – conc	epts of s	stability – Routh-Hui	witz stability	– root locı	1S.				5	
UNIT	III - FR	EQUEN	ICY DOMAIN ANALY	/SIS							9+6
Intro	luction	– corre	lation between tim	e and freque	icv resno	nse -	sta	hility	v anal	vsis	using
Bode	nlots F	olar nl	ots Nichols chart a	nd Nyauist st	ability crit	erion	- 6	lain	maroi	n – 1	nhase
margi	n	olui pi		ila Hyquist su	ionity cin			am	inai 51		phase
UNIT	IV - CO	MPENS	ATORS								9+6
Realiz	ation o	f basic	compensators – ca	scade comper	sation in	time	doı	nair	n and	freq	uency
doma	in and f	eedbacl	k compensation – de	sign of lag, lea	d, lag-lead	com	oens	ator	using	Bod	e plot
and R	oot locu	ıs. Intro	duction to P, PI and	PID controller	S.				0		
UNIT	V - C	ONTRO	L SYSTEM COMPO	DNENTS AND	APPLICA	ATION	0 1	F C	ONTR	OL	9+6
	SY	STEMS									
Stepp	er moto	ors – AC	C servo motor – DC s	servo motor –	Synchros	– ser	isor	s an	d enco	ders	– DC
tacho	genera	tor – A(C tacho generator – I	Hydraulic con [.]	troller – P	neum	atic	con	troller	· – T	ypical
applic	cation o	f contro	ol system in industry	- Aviation- Hi	gh precisi	on ma	achi	nes-	CNC r	nach	ines -
Disk d	lrives										
				LECTURE	TUTORI	AL	PF	RACT	ΓICAL	TC)TAL
			HOURS	45	30			0)		75
-	TEXT B	OOKS									
1. I	1. Katsuhiko Ogata, "Modern Control Engineering", 5 th Edition, Prentice Hall of India, 2009.										
2. 1	I.J Nagra	ath & M.	. Gopal, "Control Syst	em Engineerii	ng", 5 th Ed	ition,	New	v Age	e Inter	natio	onal ,
	2011.										

REFERENCES	
1. Benjamin.C.Kuo, "Automatic Control Systems", 7th Edition, Prentice Hall of India, 20)10.
2. Richard C. Dorf, Robert H. Bishop, "Modern control systems", 12 th Edition, Prentic	ce Hall,
Z011. F - REFERENCES	
1. http://nptel.ac.in/downloads/112104158/	
2. http://webx.ubi.pt/~felippe/texts/contr_systems_ppt07e.pdf	
3. http://ocw.mit.edu/courses/aeronautics-and-astronautics/16-30-feedback-contro	ol-
systems-fall-2010/lecture-notes/MIT16_30F10_lec03.pdf	
4. http://www.electrical4u.com/compensation-in-control-system-lag-lead-compensa	ation/
5. http://www.electrical4u.com/bode-plot-gain-margin-phase-margin/	
6. https://www.youtube.com/watch?v=zGr_LS60ToE	
7. https://www.youtube.com/watch?v=QJNAZ86rKlk	
8. https://www.youtube.com/watch?v=RMwSnHRMjOY	
9. http://nptel.ac.in/courses/Webcourse-contents/IIT%20Kharagpur /Industrial%	
20Automation%20control/pdf/L(SS)%20(IA&C)%20((EE)NPTEL).pdf	
10. http://www.bput.ac.in/lecture_notes/Control_System.pdf	

	PO	P01	P01	P01	PS	PS								
	1	2	3	4	5	6	7	8	9	0	1	2	01	02
CO 1	3	2		1		1	1					1		
CO 2	3	2		1		2	2					2		
CO 3	3	2		1		2	2					2		
CO 4	3	2		1		2	2					2		
CO 5	3	2		1		1	1					1		
Total	15	10		5		8	8					8		
Scaled	3	2		1		2	2					2		
value														

Mapping of COs with POs:

0- No Relation 1 - Low Relation , 2 - Medium Relation, 3- High Relation

COU	RSI	L	Т	Р	С								
COU	RSI	E NAME	ENVIRONMENTAL STUDIES		3	0	0	0					
С	Р	Α			L	Т	Р	H					
2.5	0	0.5			3	0	0	3					
COU	RSI	E OUTCO	MES	DOMAIN	LI	LEVEL							
C01		Describe	the significance of natural resources and	Cognitive	Re	emen	nber	ing,					
	e	explain a	nthropogenic impacts.		U	iders	stand	ling					
<u> </u>	CO2 <i>Illustrate</i> the significance of ecosystem and Cognitive Understanding												
002	biodiversity for maintaining ecological balance												
CO3	Ĩ	dentify	the facts , consequences , preventive	Cognitive	Re	emen	nber	ing,					
	r	neasures	of major pollution and <i>Recognize</i> the	C	Af	fecti	ve	<u> </u>					
	Ċ	lisaster p	henomenon										
CO4	ŀ	Explain	the socio- economics, policy dynamics	Cognitive	Ap	oplyi	ng						
	а	ind pract	<i>ice</i> the control measures of global issues for										
COF	S	ustainab	le development.	Comitivo	11.	daw	tan	dina					
C05	ľ	concent t	e the impact of population and <i>apply</i> the	Cognitive		naers	stan(ng	ling					
UNI	<u>г</u> . Г	INTROD	IICTION TO ENVIRONMENTAL STUDIES AN	JD ENERGY	 /	ргуг	iig	9					
Defi	nitio	on, scope	and importance – Need for public awareness	5 – Forest r	esou	rces:	Use	and					
over	-exp	ploitation	n, deforestation, case studies. Timber extract	tion, minin	g, da	ms a	ind t	heir					
effec	ts c	on forests	s and tribal people – Water resources: Use an	nd over-uti	lizati	on o	f sur	face					
and	gro	und wat	er, floods, drought, conflicts over water, da	ms-benefits	s and	d pro	obler	ns –					
Mine	eral	resource	es: Use and exploitation, environmental effe	ects of extr	racti	ng ai	nd u	sing					
mine	eral	resource	es, case studies – Food resources: World foo	d problems	s, ch	ange	s cai	used					
by a	agri	culture	and overgrazing, effects of modern agr	iculture, f	ertili	zer-j	jesti	cide					
rene	wał	is, water	non-renewable energy sources use of alte	rnate ener	mg e	sourc	sy ne 'es	case					
stud	ies	– Land r	esources: Land as a resource, land degradat	ion, man in	duce	ed la	ndsl ⁱ	ides.					
soil	ero	sion and	d desertification – Role of an individual	in conserv	/atio	n of	nat	ural					
reso	urc	es – Equi	table use of resources for sustainable lifestyle	es.									
UNI	<u>Г - I</u>	I ECOSY	STEMS AND BIODIVERSITY					9					
Cond	cept	of an	ecosystem - Structure and function of a	an ecosyst	em	– Pr	odu	cers,					
cons	um	ers and	decomposers – Energy flow in the ecosyste	m – Ecolog	gical	succ	essi	on –					
Food	Food chains, food webs and ecological pyramids – Introduction, types, characteristic												
Dosc	Desert ecosystem (d) Aquatic ecosystems (nonds, streams, lakes, rivers, oceans, estuaries)												
– In	troc	luction t	o Biodiversity – Definition: genetic species	s and ecos	vstei	n di	vers	itv -					
Cons	Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.												
					- 5 -								
	-												

UNIT - III ENVIRONMENTAL POLLUTION

12

Definition – Causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards – Soil waste Management: Causes, effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution – Pollution case studies – Disaster management: flood, earthquake, cyclone and landslide.

UNIT -IV SOCIAL ISSUES AND THE ENVIRONMENT

Urban problems related to energy – Water conservation, rain water harvesting, watershed management – Resettlement and rehabilitation of people; its problems and concerns, Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, Wasteland reclamation – Consumerism and waste products – Environment Production Act – Air (Prevention and Control of Pollution) Act – Water (Prevention and control of Pollution) Act – Water (Prevention and control of Pollution) Act – Issues involved in enforcement of environmental legislation – Public awareness.

UNIT -V HUMAN POPULATION AND THE ENVIRONMENT

Population growth, variation among nations – Population explosion – Family Welfare Programme – Environment and human health – Human Rights – Value Education - HIV / AIDS – Women and Child Welfare – Role of Information Technology in Environment and human health – Case studies.

LECTURE	TUTORIAL	TOTAL
45	0	45

TEXT BOOKS

- 1. Miller T.G. Jr., Environmental Science, Wadsworth Publishing Co, USA, 2000.
- 2. Townsend C., Harper J and Michael Begon, Essentials of Ecology, Blackwell Science, UK, 2003
- 3. Trivedi R.K and P.K.Goel, Introduction to Air pollution, Techno Science Publications, India, 2003.
- 4. Disaster mitigation, Preparedness, Recovery and Response, SBS Publishers & Distributors Pvt. Ltd, New Delhi, 2006.
- 5. Introduction to International disaster management, Butterworth Heinemann, 2006.
- 6. Gilbert M.Masters, Introduction to Environmental Engineering and Science, Pearson Education Pvt., Ltd., Second Edition, New Delhi, 2004.

REFERENCE BOOKS

- 1. Trivedi R.K., Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol. I and II, Enviro Media, India, 2009.
- 2. Cunningham, W.P.Cooper, T.H.Gorhani, Environmental Encyclopedia, Jaico Publ., House, Mumbai, 2001.
- 3. S.K.Dhameja, Environmental Engineering and Management, S.K.Kataria and Sons, New Delhi, 2012.
- 4. Sahni, Disaster Risk Reduction in South Asia, PHI Learning, New Delhi, 2003.
- 5. Sundar, Disaster Management, Sarup & Sons, New Delhi, 2007.
- 6. G.K.Ghosh, Disaster Management, A.P.H.Publishers, New Delhi, 2006.

E RESOURCES

- 1. Bharat Raj Singh , 2015, Global Warming: Causes, Impacts and Remedies , InTech
- 2. Richard C. J. Somerville , The Forgiving Air: Understanding Environmental Change , 1998, University of California Press
- 3. Benny Joseph, Environmental Studies, 2005, Tata McGraw Hill.

9

6

	GA1	GA2	GA3	GA4	GA5	GA6	GA7	GA8	GA9	GA10	GA11	GA1 2	
CO1	3											1	
CO2	2					2	1			1		1	
CO3	2	1	3			3	1		2	1		1	
CO4	1	1	2			3	2	3				1	
CO5	2	1	1			3						1	
	10	3	6			11	4	3	2	2		5	
Scaled Value	2	1	2			3	1	1	1	1	1	1	

Mapping of COs with POs

0- No Relation 1 - Low Relation , 2 - Medium Relation, 3- High Relation

COU	RSE	COD	E	XGS608	L	Т	Р	SS	С			
COU	RSE	NAM	E	ACADEMIC WRITING	0	0	0	2	0			
С	Р		Α		L	Τ	Р	SS	Н			
1.2	0.4		0.4		0	0	0	2	2			
COU	RSE	OUT	COMES	:	DOMAI	N	LE	VEL				
C01		<i>Knov</i> writi	wledge o ing para	on the need for going beyond grammar in agraphs and essays	Cognitiv	re	Re	meml	bering			
CO2		<i>Integ</i> prod para	<i>grate</i> all uction graph.	the written language elements into the of a cohesive whole called a	Cognitiv	re	Un	derst	anding			
CO3		Practice the discourse features that connects sentences and paragraphs.CognitiveUnderstand										
CO4		<i>Synti</i> para	<i>hesize</i> la graphs	anguage and ideas to develop sentences , and essays	Cognitiv	re	Gu Re	ided spond	ling			
CO5		Prod	<i>uce</i> cor	rect, proper, and fluent pieces of writing	Psychon	notor	An	alyziı	ıg			
Unit	;								Hours			
Ι		TYP Defin para cont	ES OF P nition o graph, o rast par	PARAGRAPHS f a paragraph, writing different types of para descriptive paragraph, process paragraph, c ragraph etc.	graphs: d comparisc	efinit on and	ion l		5			
II		DISC Cohe	COURSE esion, co	E FEATURES: bherence (connectives) etc; précis writing, su	ummarizii	ng			5			
III		VAR Discu	IOUS T ursive, a	YPES OF ESSAYS argumentative, cause & effect, chronological	etc;				5			
IV		USE Essa	OF LA ys acco	NGUAGE rding to the type of essays					5			
V		Essa	y Writi	ng practice					10			
		Writing practice (SS): 30 hrs Total : 30 Hrs										
TE 1 . [2 . V 1	 TEXT BOOKS 1. D. H. Howe and G. MC Arthur, <i>Advance with English</i>, Oxford University Press, 1993 2. Wren and Martine, <i>High School English Grammar and Composition</i>, S, Chand and Company, 1999. 											

- **3.** Raymond Murphy, *Intermediate English Grammar*, Ii Ed., , Cambridge University Press, New Delhi,1994
- **4.** Bikrim K. Das, *Functional Grammar and Spoken and written communication in English*, Orient Black swan, Hyderabad.Reprinted 2011,

Mapping of COs with GAs:

	GA 1	GA2	GA3	GA4	GA5	GA6	GA7	GA8	GA9	GA10	GA11	GA12
CO1				2					1	2		3
CO2	1									3		
CO3		1		2						2		2
CO4												1
CO5										1	2	
Total	1	1		4					1	8	2	6
Scale	1	1		1					1	2	1	2

0- No Relation 1 - Low Relation , 2 – Medium Relation, 3- High Relation

VII SEMESTER

COURS	L	Т	Р	C							
COURS	E NA	ME	EMBEDDED SYSTEMS AND VLS	SI DESIGN	3	0	1	4			
PRERE	QUIS	ITES	XEC303, XEC604		L	Τ	Ρ	Η			
С	Р	Α			3	0	2	5			
3	0.9	0.1		-							
COURS	E OU	TCOMES		Domain		Level					
C01		<i>Describe, u</i> <i>report</i> emb developme	Inderstand, construct and bedded system design and nt	Cognitive Psychomotor Affective	R U A M R	emen nders pplyi lecha espoi phen	nber stand ng nism nding ome	ing, ling, u g to na			
CO2		<i>Describe, u the</i> softwar processor i	Inderstand, react and perform re and hardware concept of n real time environment.	Cognitive Psychomotor Affective	R U S R a	emen nders et espoi phen	nber stand nding ome	ing, ling g to na			
CO3		<i>Define, seld</i> <i>identify</i> the systems.	e ct ,compare, reproduce and e peripherals in embedded	Cognitive Psychomotor Affective	R U E G R R P	Rememberin Understandi Evaluate Guided Response Receiving					
CO4		<i>Outline, ex</i> techniques CMOS techn <i>the</i> design	<i>plain</i> the IC fabrication and Design rules pertaining to nology. <i>construct and report</i> of logic gates .	Cognitive Psychomotor Affective	R U M R a	emen nders lecha espoi phen	nber stanc nism nding ome	ing, ling 1 g to na			
CO5	Cognitive Psychomotor Affective	A M R a	nalyz lecha espoi phen	e, Cr nism nding ome	eate I g to na						
UNIT I - INTRODUCTION TO EMBEDDED SYSTEMS AND DESIGN ANALYSIS 9+6+0											
Complex systems and microprocessors – Embedded system design process – Formalism for system design-ARM processor – Architecture, Instruction sets and programming. CPU: Programming input and output – Coprocessor – Memory system mechanism– Memory devices – I/O devices – Component interfacing – Design with microprocessors – Development and Debugging – Program design – Model of programs – Assembly and											

Linking - Basic compilation techniques - Analysis and optimization of execution time,

power, energy, program size – Program validation and testing.

UNIT II PROCESSES, OPERATING SYSTEMS AND EMBEDDED SOFTWARE 9+6+6

Multiple tasks and processes - Context switching - Scheduling policies - Interprocess communication mechanisms - Performance issues-Programming embedded systems in assembly and C - Meeting real time constraints -Multi-state systems and function sequences. Embedded software development tools –Emulators and debuggers.

UNIT III - DEVICES AND BUSES FOR DEVICES NETWORK

I/O devices - device I/O types and examples - synchronous - Iso-synchronous and asynchronous communications from serial devices - examples of internal serial communication devices – UART and HDLC – parallel port devices – sophisticated interfacing features in devices/ports - timer and counting devices - '12C', 'USB', 'CAN' and advanced I/O serial high speed buses – ISA, PCI, PCIX, CPCI and advanced buses.

UNIT IV - CMOS TECHNOLOGY

An overview of Silicon semiconductor technology, Basic CMOS technology: well, P well, Twin tub and SOI Process. Interconnects, circuit elements: Resistors, capacitors, Electrically alterable ROMs, bipolar transistors, Latch up and prevention.

Lavout design rules, physical design: basic concepts, CAD tool sets, physical design of logic gates: Inverter, NAND, NOR, Design Hierarchies.

UNIT V - SPECIFICATION USING VERILOG HDL

9+6+6

Basic Concepts: VLSI Design flow, identifiers, gate primitives, value set, ports, gate delays, structural gate level and switch level modeling, Design hierarchies, Behavioral and RTL modeling: Operators, timing controls, Procedural assignments conditional statements, Data flow modeling and RTL. Structural gate level description of decoder, equality detector, comparator, priority encoder, D-latch, D-ff, half adder, Full adder, Ripple Carry adder, Programming of PALs, ASIC design flow.

9+6+6

9+6+6

LIST OF EXPERIMENTS									
EMBEDDED SYSTEMS AND VLSI DESIGN									
1	Write a program to blink LED using ARM Development board and Write a program to								
	read and write a data into EEPROM using I2C using ARM Development Board.								
2	Write a program for Interfacing to Input/Output Devicesusing ARM Development								
	board.								
3	Write a pr	ogram for serial con	mmunication arch	itecture on ARM ar	chitecture				
4	Study and	Implementation (p	orting) of Process	creation using fork	system call in				
_	Embedded	Linux on ARM Pro	cessor.						
5	Study and	Implementation (p	orting) of Synchro	nization of two	7				
	threads to	access resources us	sing semaphore in	Embedded Linux i	snvironment on				
6	processor.								
7	Display the text III 2 X10 LCD USING FPGA. Study of simulation and synthesis for Logic Catos								
, 0	Study of simulation and synthesis for Logic Gales								
0	Study of simulation and synthesis, place, root and back annotation for FPGAs								
9	Study and implementation of schematic entry and Verilog code simulation of pipelined								
	serial and	parallel adder to ad	id/subtract 8 num	ber of size, 12 bit e	ach in 2's				
10	Implement	lli. tation of LEDs blink	ving controlled by	switches using Ver	ilog codos for				
10	Combinati	onal circuits.	ang controlled by	switches using ver	ling coulds for				
11	Implement	tation of LEDs blink	king controlled by	switches using Ver	ilog codes for				
	Sequential	circuits.							
10	Mini nucio	at an EDCA							
12	mini proje	CUON FPGA.							
		LECTURE	TUTORIAL	PRACTICAL	TOTAL				
HOU	JRS	45	0	30	75				
TEX	ТЕХТ ВООК								
1.	. Frank Vahid and Tony Givargis, "Embedded System Design", 3 rd Edition, Wiley India,								
	2002.								
2.	Arnold S. Berger "Embedded Systems Design", 1st Edition, Taylor & Francis, 2002.								
3. 4	Kajkamai "Embedded Systems", 2 nd Edition, Tata McGraw Hill, 2008.								
4 E	A. PUCKNEII and Kamran Esnragnian, Basic VLSI Design, 3 ¹⁴ Edition, PHI, 1995.								
з. 6	5. K. Lai KISHOLE, V.S.V. FLADHAKAL, VLSI DESIGH, J.K. INTERNATIONAL PVI.LU, 2010.								
10 11 12 HOU TEX 1. 2. 3. 4. 5. 6.	Implement Combinati Implement Sequential Mini proje IRS T BOOK Frank Vahic 2002. Arnold S. Be Rajkamal "E A. Pucknell K. Lal Kisho Neil H.E V	tation of LEDs blink onal circuits. tation of LEDs blink circuits. ct on FPGA. LECTURE 45 and Tony Givargis erger "Embedded Sy Smbedded Systems' and Kamran Eshrag re, V.S.V. Prabhakar Veste, David Mon	ting controlled by ting controlled by TUTORIAL 0 , "Embedded Syste ystems Design", 1 ^s ', 2 nd Edition, Tata ghian, "Basic VLSI r, "VLSI Design", I.I ey Harris, "CMO	switches using Ver switches using Ver PRACTICAL 30 em Design", 3 rd Edit McGraw Hill, 2008 Design", 3 rd Edition K. International Pvt S VLSI Design", 3	ilog codes for ilog codes for TOTAL TOTAL tion, Wiley India, Francis, 2002. 3. h,PHI,1995. t.Ltd, 2010. rd Edition, Pearson				

- Education, 2005. Neil weste and Kamran Eshraghian "Principles of CMOS VLSI Design – A Systems Perspective", 2nd Edition, Pearson Education, Reprint 2010.

REFERENCES

- 1. David Kleidermacher, Mike Kleidermacher, "Embedded Systems Security: Practical Methods for Safe and Secure Software and Systems Development", PHI, 2012.
- 2. Chattopadhyan, "Embedded System Design", 3rdEdition, PHI,2013.
- 3. M.J.S.Smith: "Application Specific integrated circuits", Pearson Education, 1997.
- 4. Wayne Wolf, "Modern VLSI Design", Pearson Education, 2003.
- 5. Bob Zeidmin "Introduction to verilog", Prentice Hall, 1999.
- 6. J.Bhaskar, "Verilog HDL Primer", Prentice Hall, 1999.
- 7. E. Fabricious, "Introduction to VLSI design", McGrawHill, 1990.
- 8. C. Roth, "Digital Systems Design Using VHDL", Thomson Learning, 2000.

E - REFERENCES

- 1. http://web.cs.mun.ca/~paul/transistors/node3.html
- 2. http://www.csee.umbc.edu/~cpatel2/links/315/lectures/chap3_lect09_processing2.p df
- 3. http://www.aicdesign.org/scnotes/2002notes/Chapter02-2UP(8_13_02).pdf
- 4. www.verilog.com
- 5. http://www.ece.umd.edu/class/enee359a/verilog_tutorial.pdf
- 6. https://www.vidyarthiplus.com/vp/attachment.php?aid=24159
- 7. https://www.vidyarthiplus.com/vp/attachment.php?aid=20222
- 8. http://ic.sjtu.edu.cn/ic/dic/wp-content/uploads/sites/10/2013/04/CMOS-VLSI-design.pdf

Mapping of COs with POs:

	P01	PO	P01	P01	P01	PS	PS							
		2	3	4	5	6	7	8	9	0	1	2	01	02
CO 1	3	3		2	1	1	2					1		
CO 2	2	2		2	2	1	1					1		
CO 3	3	3		3	2	2	2					1	2	2
CO 4	1	2		1	1							1		
CO 5	2	2		2	3	2	1					1		
Total	11	12		10	9	6	6					5		
Scaled	3	3		2	2	2	2					1	1	1
value														

0- No Relation 1 - Low Relation , 2 – Medium Relation, 3- High Relation

COURSE CODE			XEC703	L	Т	Р	С		
COURSE NAME			MICROWAVE ENGINEERING AND	3	1	1	5		
			OPTICAL COMMUNICATION						
PREREQUISITES		ISITES	XEC405	L	Τ	Р	Н		
С	P A			3	2	2	7		
3	1	0							
COU	RSE C	UTCOM	ES	Domain	Level				
C01	D	escribe,	demonstrate and analyse the	Cognitive	Remembering,				
	p	aramete	rs of passive microwave components.	Psychomot	Understanding,				
				or Analyzi		zing			
<u> </u>		o o o wih o	accomble domenstrate measure	Comitivo	Remembering				
	CO2 Describe, assemble, demonstrate, measure		Cognitive	Understanding					
0		nu unuiy	d construct microwave bonch	Analyzing			zing		
	50	Juices al	iu constituct interowave bench.	Psychomot	Percention				
				or	M	echa	nism		
C03	0	utline. a	ssemble and distinguish various	Cognitive	Understanding,		standing.		
	Se	emicond	uctor devices.		Remembering,				
				Psychomot	Guided Response				
				or					
CO4 <i>Explain, assemble, measure and analyse</i> transmission characteristics of optical fibe		<i>ssemble, measure and analyse</i> the	Cognitive	Uı	ıder	standing,			
		ansmiss	ion characteristics of optical fibers.		Analyzing				
				Psychomot	Perception,				
00 F				or	M	Mechanism			
C05	E	xplain, i	dentify and measure the	Cognitive	Understanding				
	l) ci	aracter	istics of optical sources and	Psychomot	Pe M	Perception,			
LINIT	detectors. Or Mechanism								
UNIT I - MICROWAVE FASSIVE COMPONENTS 9+0+0							0+0		
Micr	owav	e freque	ncy range, significance of microwave	frequency rai	nge	- ar	oplications of		
micr	owav	es. Scat	tering matrix -Concept of N port s	scattering ma	trix	re	presentation.		
Prop	erties	of S ma	atrix- S matrix formulation of two-point	rt junction Mi	icro	way	ve junctions -		
Tao junctions Magia Tao Dat race Corners hands and twists Directional courless									
two hole directional couplers. Forritor, important microwave preparties and emplications									
Termination Curator Isolator Circulator Attenuator Dhase sharger C Matrix for									
- remination - Gylator - Isolator - Grundion - Attenuator - Phase Changer - 5 Matrix 10									
UNIT II - MICKUWAVE TUBES AND MEASUREMENTS 9+6+6									
Microwave tubes- High frequency limitations - Principle of operation of Multicavity									
Klystron, Reflex Klystron, Traveling Wave Tube, Magnetron. Microwave measurements:									
Measurement of power, wavelength, impedance, SWR, attenuation, Q and Phase shift.									
UNIT III - MICROWAVE SEMICONDUCTOR DEVICES	9+6+6								
--	---	--	--	--	--	--	--		
Microwave semiconductor devices- operation - characteristics and application of BJTs and FETs -Principles of tunnel diodes - Varactor and Step recovery diodes - Transferred Electron Devices -Gunn diode- Avalanche Transit time devices- IMPATT and TRAPATT devices. Parametric devices -Principles of operation - applications of parametric amplifier .Microwave monolithic integrated circuit (MMIC) - Materials and fabrication techniques									
UNIT IV - TRANSMISSION CHARACTERISTICS OF OPTICAL FIBERS AND COMPONENTS	9+6+6								
Introduction, Ray theory transmission- Total internal reflection-Acc Numerical aperture – Skew rays – Electromagnetic mode theory of optio EM waves – modes in Planar guide – phase and group velocity – cylind fibers. Attenuation – Material absorption losses in silica glass fibers – Linear Scattering losses - Fiber Bend losses – Intra and inter Modal Dispersion Dispersion – Polarization- non linear Phenomena. Optical fiber co alignment and Joint Losses – Fiber Splices – Fiber connectors – Connectors – Fiber Couplers.	eptance angle – cal propagation – lrical fibers – SM c and Non linear n – Over all Fiber onnectors, Fiber Expanded Beam								
UNIT V - SOURCES AND DETECTORS, FIBER OPTIC RECEIVER	9+6+6								
Optical sources: Light Emitting Diodes - LED structures - surface and edg	e emitters, mono								

and hetero structures - internal - quantum efficiency, injection laser diode structures comparison of LED and ILD Optical Detectors: PIN Photo detectors, Avalanche photo diodes, construction, characteristics and properties, Comparison of performance, Photo detector noise -Noise sources, Signal to Noise ratio, Detector response time. Fundamental receiver operation, Pre amplifiers, Error sources – Receiver Configuration – Probability of Error – Quantum limit.

LIST OF I	LIST OF EXPERIMENTS									
1.	Gunn I	Diode – Ch	aracteristics							
2.	Reflex	Klystron -	Mode characteri	stics						
3.	VSWR,	Frequenc	y and Wave Leng	th Measurement						
4.	Directi	ional Coup	ler – Directivity a	nd Coupling Coeff	ficient – S – parameter					
	measu	rement			-					
5.	E-Plar	ne T, H-Pla	ne T and Magic T,	Isolator and Circ	ulator – S - parameter					
	measu	rement	_		-					
6.	Attenu	ation and	Power measurem	ient						
7.	Radiat	ion Patter	n and Gain of Ante	ennas.						
	OPTIC	AL EXPER	IMENTS:							
1.	Numer	rical Apert	ure Determinatio	n for Fibers						
2.	Attenu	ation Mea	surement in Fiber	rs						
3.	Mode	Characteri	stics of Fibers							
4.	Fiber (Optic Analo	og and Digital Lin	ks						
5.	Measu	rement of	Connector and Be	ending Losses.						
6.	DC cha	racteristic	s of LED and PIN	Photo Diode.						
		LECTU	TUTORIAL	PRACTICAL	TOTAL					
		RE								
HOURS		45	30	30	105					
TEXT BO	TEXT BOOKS									
1. Samu	iel Y. Lia	o, "Microv	vave Devices & Ci	rcuits", Prentice H	Iall of India, 2006.					
2. John	M. Senic	or, "Optical	Fiber Communic	ation", 2nd Editio	n, Pearson Education, 2007.					
3 Gerd I	Keiser, "(Optical Fib	er Communicatio	n", 3 rd Edition, Mo	cGraw Hill, 2000.					

REFERENCES

- 1. Robert E.Collin, "Foundations of Microwave Engineering", Mc Graw Hill, 1992.
- 2. Annapurna Das and Sisir K Das, "Microwave Engineering", Tata McGraw Hill, 2004.
- 3. D.M.Pozar, "Microwave Engineering", John Wiley & Sons, 2006.
- 4. John Gowar, "Optical Communication Systems", Prentice Hall of India, 2001.
- 5. Rajiv Ramaswami, Kumar Sivarajan, Galen Sasaki, "Optical Networks: A Practical Perspective", 3rd Edition, Morgan Kaufmann, 2010.
- 6. Govind P. Agrawal, "Fiber Optic Communication Systems", 3rd Edition, John Wiley &Sons, 2004.
- 7.

E-REFERENCES

- 1. http://www.nptel.ac.in/downloads/117101054/
- 2. http://www.microwaves101.com
- 3. http://www.lightwaveonline.com

Mapping of COs with POs:

	P01	P0 2	P0 3	PO 4	P0 5	P0	P0 7	P0 8	PO 9	P01	P01	P01 2	PSO 1	PSO 2
00.4	0	2	3	T	J	0	/	0	,	U	1	2	1	4
CO 1	3	Z		Z	1	1						2		
CO 2	1	2		2	2	2						2		
CO 3	3	1		2	3	1						2		
CO 4	2	2		3	1	1						2	3	
CO 5	2	1		3	1	1						2	3	
Total	11	8		11	8	6						10	6	
Scaled	2	2		3	2	2						2	2	
value														

COURSE CODE			XUM706	L	Т	Ρ	С
COURSE	E NAME		CYBER SECURITY	0	0	0	0
С	Р	Α		L	Т	Р	Η
3	0	0		3	0	0	3

COURSE OUTCOME:

CO1: Cog Rem Able to *understand* the Cyber Security Policy, Laws and Regulations

CO2: Cog Und Able to discuss the Cyber Security Management Concepts

CO3: Cog Und Able to *understand* the Cyber Crime and Cyber welfare

CO4: Cog Und Able to *discuss* on issues related to Information Security Concepts

CO5: Cog Und Able to *understand* various security threats

UNIT I INTRODUCTION

Cyber Security – Cyber Security policy – Domain of Cyber Security Policy – Laws and Regulations – Enterprise Policy – Technology Operations – Technology Configuration -Strategy Versus Policy – Cyber Security Evolution – Productivity – Internet – E commerce – Counter Measures – Challenges

9

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UNIT IICYBER SECURITY OBJECTIVES AND GUIDANCE

Cyber Security Metrics – Security Management Goals – Counting Vulnerabilities – Security Frameworks – E Commerce Systems – Industrial Control Systems – Personal Mobile Devices – Security Policy Objectives – Guidance for Decision Makers – Tone at the Top – Policy as a Project– Cyber Security Management – Arriving at Goals – Cyber Security Documentation – The Catalog Approach – Catalog Format – Cyber Security Policy Taxonomy.

UNIT IIICYBER SECURITY POLICY CATALOG

Cyber Governance Issues – Net Neutrality – Internet Names and Numbers – Copyright and Trademarks – Email and Messaging - Cyber User Issues - Malvertising - Impersonation – Appropriate Use – Cyber Crime – Geo location – Privacy - Cyber Conflict Issues – Intellectual

property Theft – Cyber Espionage – Cyber Sabotage – Cyber Welfare

UNIT IVINFORMATION SECURITY CONCEPTS

Information Security Overview: Background and Current Scenario - Types of Attacks -Goals for Security - E-commerce Security - Computer Forensics – Steganography

UNIT VSECURITY THREATS AND VULNERABILITIES

Overview of Security threats -Weak / Strong Passwords and Password Cracking - Insecure Network connections - Malicious Code - Programming Bugs - Cyber crime and Cyber terrorism - Information Warfare and Surveillance

	LECTURE	TUTORIAL	TOTAL
	45	0	45
DEFEDENCE DOOVC			

REFERENCE BOOKS

1.Jennifer L. Bayuk, J. Healey, P. Rohmeyer, Marcus Sachs , Jeffrey Schmidt, Joseph Weiss "Cyber Security Policy Guidebook" John Wiley & Sons 2012.

2. Rick Howard "Cyber Security Essentials" Auerbach Publications 2011.

3. Richard A. Clarke, Robert Knake "Cyberwar: The Next Threat to National Security & What

to Do About It" Ecco 2010

- 4. Dan Shoemaker Cyber security The Essential Body Of Knowledge, 1st ed. Cengage Learning 2011
- 5. Rhodes-Ousley, Mark, "Information Security: The Complete Reference", Second Edition, McGraw-Hill, 2013.

E REFERENCES

- 1. https://www.coursera.org/specializations/cyber-security
- 2. www.nptel.ac.in
- 3. http://professional.mit.edu/programs/short-programs/applied-cybersecurity

Mapping of COs with GAs:

	GA1	GA2	GA3	GA4	GA5	GA6	GA7	GA8	GA9	GA10	GA11	GA12
C01						2		3				
CO2							2		1			
CO3	3					2	3		1			
CO4										2		
CO5	3											
Total	6					4	5	3	2	2		
Scaled value	2					1	1	1	1	1		

XEC 707 and XEC 804 Project Phase -1 and Phase II Course Outcomes (COs) Phase 1: L:T:P:C 0:0:2 C:P:A = 1:0.5:0.5 Phase II : L:T:P:C 0:0:12 C:P:A 6:3:3											
	At the end of the course, the students will be able to										
CO	Title	Domain	Level								
1	Identify the Engineering Problem relevant to the domain interest.	Cognitive	Analyzing								
2	Interpret and Infer Literature survey for its worthiness.	Cognitive	Analyzing, Applying								
3	Analyse and identify an appropriate technique for solve the problem.	Cognitive	Analyzing, Applying								
4	Perform experimentation /Simulation/Programming/Fabrication, Collect and <i>interpret</i> data.	Psychomotor, Cognitive	CoR, Create, Applying								
5	<i>Record</i> and <i>Report</i> the technical findings as a document.	Cognitive	Remembering, Understanding								
6	<i>Devote</i> oneself as a responsible member and <i>display</i> as a	Affective,	Value,								
	leader in a team to manage projects.	Cognitive	Organization, Create								
7	Responding of project findings among the technocrats.	Affective	Responding								

MLL / U		ct i nuse	I unu /		I I OJECE	i nuse n	r	r	r
	CO1	CO2	CO3	CO4	CO5	CO6	CO7	Total	
GA1	3	2	1	2	1	-	1	10	2
GA2	3	2	1	2	1	-	1	10	2
GA3	-	-	1	3	1	-	-	5	1
GA4	-	1	2	3	1	2	2	11	3
GA5	-	-	2	3	1	-	-	6	2
GA6	1	-	1	1	-	3	3	10	2
GA7	1		1	1	-	1		4	1
GA8	1	-	1	1	-	3	-	6	2
GA9	-	-	-	-	2	3	1	6	2
GA10	-	-	-	-	3	3	3	9	2
GA11	-				2	2	2	6	2
GA12	1				3	3	1	8	2

<u>Mapping of Course Outcomes (COs) with GAs</u> XEE 707 –Project Phase -1 and XEE 804 Project Phase II

COU	JRSE COL	DE	XGS708	L	Т	Р	SS	С	
COU	IRSE NAN	/IE	CAREER DEVELOPMENT	0	0	0	2	0	
	SKILLS								
				L	Т	Ρ	SS	Η	
С	Р	Α	0:0.5:1.5	0	0	0	2	2	
0	0.5	1.5							
					Domain	Level			
COURS	SE OUTCO	OMES	(COs)						
C01	Knowle	dge o	n a career related	(Cognitive	Remembering,			
	commu	nicati	on and learning the different			Understanding			
	formats	of CV						_	
CO2	Prepar	e how	to face an interview and to	Ps	ychomotor,	Remembering,			
	learn ho	ow to	prepare for an interview		Cognitive	Understanding			
CO3	Сотти	nicat	<i>es</i> with the group of people in		Affective	Remembering,			
	discussi	ion					Understand	ling	
UNIT	I - CV WF	RITIN	G					10	

Difference between resume and CV; characteristics of resume and CV; basic elements of CV and resume, use of graphics in resume and CV; forms and functions of Cover Letters.

UNIT II- INTERVIEW SKILLS

Tips for various types of interviews. Types of questions asked ; body language, etiquette and dress code in interview, interview mistakes, telephonic interview , frequently asked questions. Planning for the interview.

10

UNIT III- WORK SHOP

Mock interviews - workshop on CV writing – Group Discussion

Workshop	Total
30	30

TEXT

How To Write a CV That Really Works: A Concise, Clear and Comprehensive Guide to Writing an Effective CV, Paul McGee Hachette UK, 2014

Essentials of Business Communication, Mary Ellen Guffey, Dana Loewy, Cengage Learning, 2012

Interview Skills that win the job: Simple techniques for answering all the tough questions, Michael Spiropoulos, Allen & Unwin, 2005

Effective Interviewing and Interrogation Techniques, William L. Fleisher, Nathan J. Gordon, Academic Press, 2010

REFERENCE WEBSITES

http://www.utsa.edu/careercenter/PDFs/Interviewing/Types%20of%20Interviews.pdf http://www.amu.apus.edu/career-services/interviewing/types.htm http://www.careerthinker.com/interviewing/types-of-interview/

	GA1	GA2	GA3	GA4	GA5	GA6	GA7	GA8	GA9	GA10	GA11	GA12
C01										2		
CO2							1			2		
CO3				2						3		
Total				2			1			7		
Scaled value				1			1			2		

Mapping of COs with GAs:

LIST OF ELECTIVES

SEMESTER	COURSE TITLE	L	Т	Р	С						
	V Semester (PE-I)										
XEC505A	Medical Electronics	3	0	0	3						
XEC505B	Instrumentation and Measurements	3	0	0	3						
XEC505C	Power Electronics	3	0	0	3						
VI Semester (PE-II)											
XEC606A	Telecom Switching Networks	3	0	0	3						
XEC606B	Electromagnetic Interference and	3	0	0	3						
	Compatibility										
XEC606C	Speech Processing	3	0	0	3						
	VII Semester (PE-III)										
XEC704A	DSP Processors and their Applications	3	0	0	3						
XEC704B	Digital Image Processing	3	0	0	3						
XEC704C	Advanced Microprocessors and	3	0	0	3						
	Microcontrollers										
	VII Semester (PE- IV)	-		-							
XEC705A	Disaster Management	3	0	0	3						
XEC705B	Wireless Communication Systems	3	0	0	3						
XEC705C	Radar and Navigational Aids	3	0	0	3						
	VIII Semester (PE- V)										
XEC802A	Optical Networks	3	0	0	3						
XEC802B	Wireless Networks	3	0	0	3						
XEC802C	Television and Video Engineering	3	0	0	3						
	VIII Semester (PE- VI)										
XEC803A	Introduction to MEMS	3	0	0	3						
XEC803B	Internet of Things	3	0	0	3						
XEC803C	Software Defined Radio	3	0	0	3						

LIST OF OPEN ELECTIVES

CODE NO.	COURSE TITLE	L	Т	Р	С
	THEORY				
XECOE1	Industrial Electronics	3	0	0	3
XECOE2	Entertainment Electronics and Management	3	0	0	3

COURS	SE CODE	XEC505A			L	Τ	P	С	
COURS	SE NAME	MEDICAL ELECTRO	NICS		3	0	0	3	
PRERE	EQUISITES	XEC304			L	Т	Ρ	Η	
C:P:A		3:0:0			3	0	0	3	
COURS	SE OUTCOME	S:			Dom	ain		Leve	1
CO1	Describe an	d <i>explain</i> the basics of	f the biomedic	al signals	Cogni	tive	Ren	nembe	ering
	and associat	ed recording instrume	entation	_			Und	ersta	nding
CO2	Describe an	d understand the met	thods of meas	uring of	Cogni	tive	Ren	nembe	ering,
	bio-chemica	l and non electrical pa	rameters	_			Und	ersta	nding
CO3	Describe an	d discuss the assist de	evices and bio-		Cogni	tive	Ren	nembe	ering
	telemetry						Und	ersta	nding
CO4	Understand	l and categorize the p	rinciples ofra	diological	Cogni	tive	Und	ersta	nding
	equipment						Ana	lyzing	۲ >
CO5	<i>Explain</i> the	various diagnostic and	d therapeutic		Cogni	tive	Und	ersta	nding
	equipment a	nd electrical safety							
UNIT I	- ELECTRO-I	PHYSIOLOGY AND BI	O-POTENTIA	L RECORDI	NG				9
The or	igin of Bio-po	tentials, bio-potential	electrodes, bio	ological amp	olifiers	, ECG	, EEG	, EMG	, PCG,
EOG, le	ad systems a	nd recording methods	, typical wave	forms and s	ignal c	harac	cteris	tics.	
									-
UNIT	II - BIO-CHEN	MICAL AND NON ELE	CTRICAL PAR	AMETERM	IEASU	REM	ENT		9
РН, РО	02, PCO2, PHO	CO3, Electrophoresis,	colorimeter, p	ohotometer	, Auto	analy	yzer,	Blood	flow
meter,	cardiac outp	out, respiratory meas	surement, Blo	od pressur	e, terr	ipera	ture,	pulse	, and
Blood o	cell counters.								
UNIT I	II- ASSIST DE	EVICES AND BIO-TEL	EMETRY						9
Cardia radio-p	c pacemakers oill and tele-st	, DC Defibrillator, Tele imulation.	emetry princip	oles, frequei	ncy sel	ectio	n, Bio	-telen	netry,
UNIT I	V - RADIOLO	GICAL EQUIPMENTS							9
Ionizin	g radiation. I	Diagnostic X-ray equir	oments, use of	f Radio Isot	ope ir	n diag	nosis	. Radi	iation
Therap)V.		,		- F	6	,	,	
UNIT V	/ - DIAGNOST	TIC AND THERAPEUT	IC EQUIPMEN	NTS AND EI	LECTR	ICAL	SAFE	сту	9
Therm	ograph Endo	sconv unit Laser in m	edicine Diath	ermy units	Elect	ricals	afety	in me	dical
equipn	nent.	scopy unit, Luser in m	lealenie, Diath	criny anics	псси	i icui c	Jareey		Juicui
			LECTURE	TUTORIA	I. PI	RACT	ICAL	ТС)TAL
		HOURS	45	0		0			45
TFXT BOOKS									
Leislie	Cromwell, "B	iomedical Instrument	ation and Mea	surement"	Prent	ice H	all of	India	. New
Delhi, 2	2002.			,					. –
REFER	ENCES								
R.S.Kha	andpur, "Hand	lbook of Biomedical Ir	nstrumentatio	n", Tata Mc	Graw H	Hill, N	ew D	elhi, 1	997.
Joseph	J.Carr and Joł	nn M.Brown, "Introduc	ction to Biome	dical Equip	ment]	Гechn	ology	, Joh	n
Wiley a	and Sons, 199	7.		1 F			07		
E-REFI	ERENCES								
http://	mx.nthu.edu	tw/~vucsu/3271/n07	7.ndf						
p.//		, jucou/02/1/p0/	Pul						

Mapping of COs with POs:

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO1	PS
CO 1	2	3	2	1	1							1		
CO 2	2	2	2	1	1							1		
CO 3	2	2	3	1	1							1		
CO 4	2	2	3	1	1							1		
CO 5	2	2	2	1	1							1		
Total	10	11	12	5	5							5		
Scaled value	2	3	3	1	1							1		

COURS	E CODE		XEC505B			L	Т	P	С				
COURS	COURSE NAMEINSTRUMENTATION AND MEASUREMENTS3003PREREOUISITESXMA101.XMA201.XPH104.XBE103LTPH												
			MEASUREMEN	TS									
PRERE	QUISITI	ES	XMA101,XMA20	01, XPH104,X	BE103	L	Т	P	Н				
С	Р	Α				3	0	0	3				
3	0	0											
COURS	E OUTC	OMES				Dom	ain	L	evel				
C01	Des	<i>cribe,</i> an	d <i>explain</i> the con	cepts of basic	Co	ognit	ive	Reme	mbering				
	elec	trical and	d electronic meas	uring instrum	nent			Under	standing				
<u> </u>	<u> </u>	ly and ar	aluze monsuring	instrumonts	C	anit	ivo	Apply	ina				
602	Арр Мез	iy anuun suremer	t bridges and Sic	mal analyzers	,	Jgint	IVE	Apply	ilig zing				
C03	Ann	lvandan	alvze the signal o	enerators and	р, Н Сс	nonit	ive	Annly	ing				
005	digi	tal measi	iring instrument	s		561110	IVC	Analy	ring zing				
CO4 Describe, explain and apply the concepts of the Cognitive Rememberi													
sensors and transducers to choose according to Understandi													
the nature.													
CO5DescribeApplyingC05DescribeAdda acquisition system.CognitiveC05Remembering													
Understandir													
UNIT I - BASIC MEASUREMENT CONCEPTS 9													
Measurement systems – characteristics – units and standards of measurements – error													
Measurement systems – characteristics – units and standards of measurements – error analysis – moving coil, moving iron meters – multimeters – True RMS meters – Electronic													
analysis – moving coil, moving iron meters – multimeters – True RMS meters – Electronic multimeters – Cathode ray oscilloscopes – block schematic – applications – special													
oscillos	copes .												
UNIT I	- BRIDO	GES & SI	GNAL ANALYZEF	RS					9				
Bridge	measur	ements	– Maxwell, Hay,	Schering, An	derson ar	nd W	ien bi	ridge. F	requency				
synthes	sizer –	wave a	nalyzer – Harm	ionic distorti	on analy	zer	– spe	ctrum	analyzer.				
UNIT I	II - GEN	ERATOR	AND DIGITAL IN	ues NSTRUMENT	S				9				
Functio	n gener	ators -	RF signal gener	rators - Swe	en gener	ator	s -Dio	ital vol	tmeter _				
multim	n gener eters –	frequen	cv counters – r	neasurement	of frequ	ency	and	time i	nterval –				
extensi	on of fre	auency r	ange – measurem	ient errors.	or nequ	ency	unu	chine i					
UNIT I	V - SENS	ORS ANI	D TRANSDUCERS	5					9				
Sensori	cs- typ	es char	acteristics & it	s application	is Trans	duce	rs- a	rtive &	nassive				
transdu	icers :	Resistan	ce. Capacitance.	inductance:	Strain ga	auges	S. LVE)T.Piezo	Electric				
transdu	icers, Re	sistance	Thermometers, T	'hermocouple	s, Thermi	stors	, Sensi	istors					
UNIT V	- DATA	ACQUIS	ITION SYSTEMS	1			,		9				
Elements of a digital data acquisition system – interfacing of transducers – multiplexing													
computer controlled instrumentation - IEEE 488 bus - fiber optic measurements for power													
and sys	and system loss – optical time domains reflectometer.												
				LECTURE	TUTORI	AL	PRAC	TICAL	TOTAL				
			HOURS	45	0			0	45				
TE	XT BOO	KS											
1. Alb	ert D.He	lfrick an	d William D.Coop	er "Modern E	lectronic l	nstr	ument	ation ar	ıd				
Me	Measurement Techniques", Prentice Hall of India, 2003.												
2. A.K	.Sawhne	ey, "A Cou	irse in Electrical a	and Electronic	cs Measur	emei	nt and						
Ins	 A.K.Sawhney, "A Course in Electrical and Electronics Measurement and Instrumentation", 10th Edition, Dhanpath Rai, 1994. 												

	REFERENCES
1.	Joseph J.Carr, "Elements of Electronics Instrumentation and Measurement", Pearson
	Education, 2003.
2.	Alan. S. Morris, "Principles of Measurements and Instrumentation", 2 nd Edition, Prentice
	Hall of India, 2003.
3.	Ernest O. Doebelin, "Measurement Systems-Application and Design", Tata McGrawHill,
	2004.
4.	Jones, "Instrumentation Measurement and Feedback", Tata McGrawHill, 1986.
5.	E.W.Golding, "Electrical Measurement and Measuring Instruments", 3 rd Edition, Sir Issac
	Pitman and Sons, 1960.
6.	H.Buckingham, and E.N.Price, "Principles of Electrical Measurements", 1961.
7.	Bosch Rexroth Materials and Manuals for Sensorics.
	E-REFERENCES
1.	http://www.nptelvideos.in/2012/11/ (Prof.A.K.Jana, Prof.D.Sarkar, Department of
	Chemical Engineering, IIT Kharagpur).

Mapping of COs with POs:

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO1	PS
CO 1	3	2			3	2						1		
CO 2	2	2			3	2						1		
CO 3	2	2			3	2						1		
CO 4	2	2			2	2						1		
CO 5	2	2			2	2						1		
Total	11	10			13	10						5		
Scaled	3	2			3	2						1		
value														

COU	IRSE	CODE	XEC505C			L	Τ	P	С			
COU	RSE	NAME	POWER ELECTRONICS			3	0	0	3			
PRE	REQ	UISITES	XEC304			L	Т	P	Н			
С	Р	Α				3	0	0	3			
3	0	0										
COU	RSE	OUTCOM	IES]	Doma	in]	Level			
CO	1	Describe	and explain different type	es of power s	semi- (lognit	ive	Reme	embering,			
		conducto	or devices and their switchi	ing character	ristics.			Unde	rstanding			
CO	2	Underst	and and analyze the opera	tion of phase	e- (lognit	ive	Unde	rstanding			
		controlle	d converters					, Ana	lyzing			
CO	3	Describe	and explain the operatio	n, switching	0	lognit	ive	Reme	embering,			
		techniqu	es and basic topologies of l	DC-DC conve	rter			Unde	rstanding			
CO4 Classify and describe inverters. Cognitive Understanding												
, Remembering												
CO5Describe and explain operation of AC-AC converters.CognitiveRemembering.												
Understandin												
UNIT I- POWER SEMI-CONDUCTOR DEVICES9												
Study of switching devices, - Frame, Driver and snubber circuit of SCR, TRIAC,BJT, IGB												
MOSFET,- Turn-on and turn-off characteristics, switching losses, Commutation circuits for SCR												
UNI	TII	- PHASE-C	CONTROLLED CONVERTE	RS					9			
2-p	ulse,	3-pulse a	nd 6-pulse converters – Ef	fect of source	e inductance	e – pei	forr	nance				
2-pulse, 3-pulse and 6-pulse converters – Effect of source inductance – performance parameters – Reactive power control of converters – Dual converters - Battery charger												
UNI	TI	I - DC TO	DC CONVERTER						9			
Step	-dov	vn and st	ep-up chopper - Time rati	o control an	d current li	mit c	ontr	ol – Bı	ıck, boost,			
bucl	k- bo	ost conve	rter, concept of Resonant s	witching - SI	MPS.							
UNI	T IV	- INVERT	ERS						9			
Sing	le p	hase and	three phase (both 120 m	ode and 180) mode) inv	erters	s - P	WM te	echniques:			
Sinu	soid	al PWM,	modified sinusoidal PWM	- multiple	PWM – Int	roduc	tion	to spa	ace vector			
mod	lulat	ions - Vo	ltage and harmonic cont	rol - Series	resonant i	nvert	er -	Curre	nt source			
inve	rter											
UNI	ΤV·	AC TO A	C CONVERTERS						9			
Sing	le p	hase AC v	voltage controllers – Mult	istage seque	nce control	- sin	gle	and th	ree phase			
cycl	0-CO	nverters -	-Introduction to Integral	cycle contr	ol, Power f	actor	con	itrol a	nd Matrix			
conv	verte	ers.							-			
				LECTURE	TUTORIA	L PI	RAC	TICAL	TOTAL			
HOURS 45 0 0 45												
TEXT BOOKS												
M.H	. Ras	hid, "Pow	er Electronics: Circuits, De	vices and Ap	plication", 3	rd Edi	tion	, Pears	on			
Edu	Education, New Delhi, 2004.											
Phil	ip T.	Krein, "Ele	ements of Power Electronic	s" Oxford Ui	niversity Pro	ess, 2()04.					
REF	ERE	NCES										
Ash	aq A	hmed,"Po	wer Electronics for Techno	ology", Pears	on Educatio	on, Inc	lian	Reprin	t, 2003.			
P.S.I	Simt	ora, "Powe	r Electronics", 3 rd Edition,	Khanna Publ	ishers, 200	3.			1			
Ned	Moł	nan, Tore.l	W.Undeland, William.P.Rob	bins, "Powei	Electronics	s: Con	vert	ers, Ap	plications			
and	and Design", 3 rd Edition, John Wiley and Sons, 2003.											

E-REFERENCES

http://nptel.ac.in/video.php?subjectId=108101038 (Prof. B.G. Fernandes, Department of Electrical Engineering,IIT Bombay).

Mapping of COs with POs:

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO1	PS
CO 1	2	2	1	1								1		
CO 2	2	2	1	1								1		
CO 3	2	2	1	1								1		
CO 4	2	2	1	1								1		
CO 5	2	2	1	1								1		
Total	10	10	5	5								5		
Scaled	2	2	1	1								1		
value														

COUR	SE COI	DE	XEC606A				L	Τ	Р	С	
COUR	SE NAN	ИЕ	TELECOMMUNICATIO	N SWITCHI	NG AND		3	0	0	3	
NETWORKSLTPPREREQUISITESXEC404LTPAAAAAA											
PRER	EQUISI	TES	XEC404				L	Т	Ρ	Η	
С	Р	Α					3	0	0	3	
3	0	0									
COUR	SE OUT	ГСОМЕ	ES			Doma	ain	J	Level		
CO1	Desci	ibe the	e operational characteris	stics of switc	hing (Cognit	ive	Reme	embe	ring	
	techn	iques.									
CO2	Defin	e and e	explain the working prin	nciple of diffe	erent l	Remen	nber	Reme	embe	ring	
Switching types and outline the working the SONET, Applying											
Multiplexing											
CO3Describe and analyze the working concept of DigitalRememberRememberRemember											
	Subsc	riber A	Iccess					, ana	yzing	5	
CO4 Compare the operational characteristics of switching Remember Evaluation											
	techn	iques.									
CO5	Analy	se the	working principles of sv	vitching netv	vorks. I	Remen	nber	Analy	yzing		
			WINO .							0	
UNII	I - MU			1 1 1	T . D.		14 1.			9	
Trans	missior	1 Syste	ms, FDM Multiplexing a	nd modulatio	on, Time Di	vision	Mult	iplexii	ng, Di	gital	
Irans	missior	n and M	Aultiplexing: Pulse Trans	smission, Lir	ie Coding, I	Sinary	N-Zei	ro Sut	Stitu	tion,	
Digita	I BIPNA	ise, Dii	terential Encoding, 11m	le Division I	Multiplexing	g, 11m	e Div	ision	Multi	piex	
Loops		ngs.									
UNIT	II -DIG	ITAL S	WITCHING							9	
Switch	ning Fu	inction	s, Space Division Swite	ching, Time	Division S	witchi	ng, tv	vo-dir	nensi	onal	
Switch	ning: ST	'S Swit	ching, TST Switching, No	o.4 ESS Toll S	Switch, Digi	ital Cro	oss-Co	onnect	: Syst	ems,	
Digita	l Switch	ning in	an Analog Environment.	Elements of	SSN07 sigr	naling.					
UNIT	III - NI	ETWO	RK SYNCHRONIZATION	CONTROL A	AND MANA	GEME	NT			9	
Timin	g: Tim	ing R	ecovery: Phase-Locked	Loop, Clo	ck Instabil	lity, Ji	itter	Meas	urem	ents,	
System	natic	Jitter.	Timing Inaccuracies:	Slips, As	ynchronous	s Mu	ltiplex	xing,	Netv	vork	
Synch	ronizat	ion, U.S	5. Network Synchronizat	ion, Networl	k Control, N	etwor	k Man	agem	ent.		
UNIT	IV - DI	GITAL	SUBSCRIBER ACCESS							9	
ISDN:	ISDN E	asic Ra	ate Access Architecture,	ISDN U Inte	rface, ISDN	D Cha	nnel	Proto	col. H	ligh-	
Data-F	Rate Di	gital Sı	ubscriber Loops: Asymn	netric Digita	l Subscribe	r Line	, VDSI	L. Dig	gital I	Loop	
Carrie	r Syste	ems: 1	Universal Digital Loop	Carrier Syst	ems, Integ	rated	Digita	ıl Loo	p Ca	rrier	
System	ns, Nex	t-Gene	ration Digital Loop Carr	ier, Fiber in	the Loop, H	Iybrid	Fiber	c Coax	Syst	ems,	
and Vo	oice ba	nd Moo	lems: PCM Modems, Loc	al Microwav	e Distribut	ion Se	rvice,	Digita	l Sate	ellite	
Servic	es.										
UNIT	V - TRA	AFFIC A	ANALYSIS							9	
Traffic	c Chara	acteriza	ation: Arrival Distribut	ions, Holdin	g Time Di	stribu	tions,	Loss	Syst	ems,	
Netwo	ork Blo	cking 1	Probabilities: End-to-En	nd Blocking	Probabilitie	es, Ov	erflow	/ Traf	fic, D	elay	
System	ns: Exp	onenti	al service Times, Consta	nt Service Ti	mes, Finite	Queue	s.		r		
LECTURE TUTORIAL PRACTICAL TOTAL										ſAL	
			HOURS	30	30		0		6	0	

TEXT BOOK

- 1. V.S.Bagad, "Telecommunication Switching and Networks", First Edition, Technical Bublications Pune, 2009
- 2. P. Gnanasivam, "Telecommunication Switching and Networks", New Age International, 2005.
- 3. T.Viswanathan, Manav Bhatnagar, "Telecommunication Switching Systems and Networks", Prentice Hall of India, 2015.
- 4. Bellamy John, "Digital Telephony", 3rd Edition, John Wiley & Sons, 2000. **REFERENCES**
- 1. J.E. Flood, "Telecommunication Switching, Traffic and Networks", Second Edition, Pearson Education 2007.

E-REFERENCES

- 1. http://www.nptel.ac.in/downloads/117105076/
- **2.** http://www.bput.ac.in/lecture_notes/Digital%20switching%20and%20telecom%20netw ork%20_PEEC5404_7TH%20SEMESTER_ETC.pdf

Mapping of COs with POs:

	PO	P01	P01	P01	PS	PS								
	1	2	3	4	5	6	7	8	9	0	1	2	01	02
CO 1	3	2		2	2	1	1					1	1	1
CO 2	2	3		2	2	1	1					1	1	1
CO 3	3	3		3	1	1	1					1	1	1
CO 4	3	3		2	2	2	1					1	1	1
CO 5	3	2		3	1	1	1					1	1	1
Total	14	13		12	8	6	5					5	5	5
Scaled	3	3		2	2	1	1					1	1	1
value														

COURS	SE CODE	XEC606B				L	Τ	Р	C				
COURS	SE NAME	ELECTROMAGNETIC IN	TERFERENC	E AND		3	0	0	3				
		COMPATIBILITY											
PRERE	QUISITES					L	Τ	Р	H				
C I	P A	_				3	0	0	3				
$\frac{3}{100000000000000000000000000000000000$					D			T					
COURS		VIES ad algorify the EMI and EM	IC aon conto	C	Doma	ain	Dom	Lev	<u>21</u>				
101	ouumea	In <i>classify</i> the EMI and EM	ic concepts.		ogniti	ve	Kell Und	enibe	ring, ding				
CO2	Understa	nd and explain the princip	oles of FMI	C	ogniti	Ve	Und	erstan	ding				
002	measure	nents.			oginti	vc	App	lving	uiiig,				
CO3	Outline a	nd <i>summarize</i> the EMC st	andards and	С	ogniti	ve	Ren	iembe	ring,				
	associate	d regulations.			0		Und	erstan	ding				
CO4	Classify a	Ind describe the methods	of controlling	EMI C	ogniti	ve	Und	erstan	ding				
							Rem	iembe	ring				
CO5Describe and understand the principles of EMCCognitiveRememberingdesign and interconnection techniquesUnderstanding													
design and interconnection techniques. Understanding UNIT I - BASIC CONCEPTS Image: Concept set of the se													
UNIT I - BASIC CONCEPTS													
Definition of EMI and EMC with examples, Classification of EMI/EMC - CE, RE, CS, RS, EM													
termin	ologies, Ui	lits of Parameters, Source	es of EMI, EN	/II couplii	ng mo	odes ·	· CM	and L	M, ESD				
Phenomena and effects, Transient phenomena and suppression.													
UNIT I	I - EMI ME	ASUREMENTS							9				
Basic p	orinciples	of RE, CE, RS and CS mea	surements, E	MI meası	uring	instrı	iment	ts- Op	en Area				
Test S	ite and A	ntennas, LISN, Feed thro	ough capacito	or, Currei	nt pr	obe, 1	ЕМС	analyz	zer and				
detecti	on techniq	ue, Anechoic chamber, TEN	M cell, Giga-H	ertz TEM	cell.								
UNIT I	II - EMC S	FANDARDS AND REGULA	TIONS						9				
Standa	rdizing or	ganizations - FCC, CISPR, A	NSI, DOD, IE	C, CENEE	EC, FCO	C - CE	and	RE sta	ndards,				
CISPR	- CE and	RE Standards, IEC/EN, CS	standards, F	CC Test	Proce	dure,	MIL-	STD-4	62 Test				
Proced	ure, Frequ	ency assignment - spectru	m conservati	on.					<u> </u>				
UNIT I	V- EMI CO	NTROL METHODS AND F	IXES						9				
Shieldi	ng, Ground	ling, Bonding, Filtering, EM	II gasket, Isola	ation tran	nsform	ner, Oj	pto-is	olator					
UNIT V	/ - EMC DE	SIGN AND INTERCONNEC	TION TECHN	NIQUES					9				
Cable r	routing an	d connection, Component	selection and	d mounti	ng, P(CB de	sign-	Гrace	routing,				
Impeda	ance contr	ol, Decoupling, Zoning and	grounding.										
			LECTURE	TUTOR	IAL	PRA	CTICA	LT	OTAL				
HOURS 45 0 0 45													
TEXT F	BOOKS			_			-						
1. V.Prasad Kodali, "Engineering Electromagnetic Compatibility", S.Chand & Co, New Delhi, 2000.													
2. Clay	ton R.Paul	"Introduction to Electrom	agnetic Comp	oatibility"	', Wile	y & So	ons, 1	992					
REFER	ENCES												
1. Berr	nhard Keis	er,"Principles of Electron	nagnetic Com	patibility	y", 3 rd	Edit	ion, A	Artech	House,				
1994	4.	to "Handhaal- sf EMI / EM	C" Dor Mile's	Comment	ant- 1								
Z. Don	2. Donald R.J.White,"Handbook of EMI / EMC", Don White Consultants, 1985.												

E-REFERENCES

1. https://standards.ieee.org/findstds/standard/electromagnetic_compatibility.html

Mapping of COs with POs:

	PO	P01	P01	P01	PSO	PSO								
	1	2	3	4	5	6	7	8	9	0	1	2	1	2
CO 1	2	1	2			1						1		
CO 2	2	1	2			1						1		
CO 3	2	1	2			1						1		
CO 4	2	1	2			1						1		
CO 5	2	1	2			1						1		
Total	10	5	10			5						6		
Scaled	2	1	2			1						2		
value														

COL	JRSE CO	DDE	XEC606C		L	Т	Р	С			
COL	JRSE NA	AME	SPEECH PROCESSING				3	0	0	3	
PRE	REQUI	SITES	XEC504				L	Т	Р	Н	
С	Р	Α					3	0	0	3	
3	0	0					_		<u> </u>	<u> </u>	
	JRSE O	UTCOM	ES:			Doma	in	P	Lev	el	
C01	L	Outlin	e and <i>represent</i> the hum	an physiology	/ and	Cogniti	lve	Rem	iemb	ering	
<u> </u>	,	Bonnor	iy with signal processing	paradigins.	in (TD)	Cogniti	110	Und	ersta	nding	
02		metho	the narame	s Tille Dulla ters	נעד) ווו	Coginti	lve	Ann	lving	nung,	
CO 3		Repres	<i>ent</i> the speech by variou	s Frequency	Domain	Cogniti	ive	Und	ersta	nding.	
		metho	ds, calculate the paramete	ers analvze t	heir	008		Арр	lving	,	
		perform	nance.	5				Ana	lyzin	g	
CO 4	ŀ	Interp	ret LPC with various met	hods, <i>calcula</i>	te	Cogniti	ive	Und	ersta	nding,	
		thepar	ameters and <i>justify</i> over	TD and FD				App	lying	,	
								Eval	luate		
CO 5	5	Create	various speech signal est	timation, spe	ech	Cogniti	ive	Crea	ate, E	valuate	
		recogn	ition & detection models	, then <i>conclu</i>	ide the						
LINI	TI N	best m	Dael.							0	
Speech production mechanism. Classification of speech, sounds, nature of speech signal, models											
ofs	neech r	roducti	on Sneech signal proces	sing nurnos	ounus, na	ch proc	spec essii	no di	giiai, oital	models	
for s	speech s	signal. D	igital processing of speed	ch signals. Sig	nificance	. short t	ime	analv	sis.	mouels	
IINI	<u>`</u> ти т		MAIN METHODS FOD SI		ESCINC			5		0	
Tim	1 11 - 1	in none	main METHODS FOR SI	da far autra	eting the		atar	a 7 ar		7	
	e doma	un para	neters of speech, metho	bus for extra	cung the	e param	eter	s, Zei	O CH)ssings,	
Лиц			iction, pitch estimation.								
UNI	T III- F	REQUEN	NCY DOMAIN METHODS	FOR SPEECH	I PROCE	ESSING				9	
Sho	rt time	Fourier	analysis, filter bank an	alysis, spectr	ographic	analysi	is, F	orma	t ext	raction,	
pitc	h extrao	ction, An	alysis - synthesis system	S.							
UNI	T IV-L	INEAR I	PREDICTIVE CODING OF	⁷ SPEECH						9	
For	mulatio	n of lin	ear prediction problem	in time do	main, sc	olution	of n	orma	l equ	lations,	
Inte	rpretat	ion of lir	lear prediction in auto co	rrelation and	spectral	domain	IS.				
UNI	т V - Н	омомо	ORPHIC SPEECH ANALY	SIS						9	
Central analysis of speech, format and pitch estimation. Applications of speech processing -											
Spe	ech reco	ognition	Speech synthesis and sp	eaker verifica	ation		- 1-		r	0	
ΙΕΛΤΗΡΕ ΤΗΤΟΡΙΑΙ ΡΡΑΛΤΙΛΑΙ ΤΟΤΑΙ											
			HOURS	LECTORE 45			KA		1L	<u>101AL</u> 45	
TEX		KS	ΠΟΙΛ	тJ	0			v		тJ	
1.	L.R.Rah	iner and	l R.E.Schafer, "Digital Pro	cessing of Sp	eech Sigr	nals". Pro	entic	e Hal	1. 200)7.	
REF	ERENC	ES				10110 9 1 1 1				<u>· · · ·</u>	
1.	J.L.Flan	agan," S	peech Analysis Synthesis	and Percepti	on", 2 nd]	Edition,	Spri	nger-	Verl	ag	
	Berlin l	Heidelhe	erg GmbH, 1972.	*			-	J		2	
2.	2. Ian H.Witten, "Principles of Computer Speech", Academic Press, 1983.										

E-REFERENCES

- 1. http://www.cs.sfu.ca/CourseCentral/365/li/squeeze/index.html
- 2. http://www.gartner.com/newsroom/id/1759714.
- 3. https://prezi.com/lptazi0rjsbo/final-year-project-voice-recognition-system-using-matlab/
- 4. http://www.ifp.illinois.edu/~minhdo/teaching/speaker_recognition/speaker_recognition. html

Mapping of COs with POs:

	P 0 1	РО 2	РО 3	РО 4	РО 5	РО 6	РО 7	РО 8	РО 9	PO1 0	P01 1	P01 2	PSO 1	PSO 2
CO 1	3	1		0	0							1		
CO 2	2	1		2	1							1		
CO 3	1	2		2	1							1		
CO 4	2	1		3	1							1		
CO 5	1	1		3	1							1		
Total	9	6		10	4							5		
Scaled	2	2		2	1							1		
value														

COURSE	CODE		XEC704A L						Р	С	
COURSE	NAME		DIGITAL SIGNAL P	ROCESSORS	AND ITS		3	0	0	3	
			APPLICATIONS								
PREREQ	UISITE	ES	XEC504				L	Т	P	Н	
C I	P	Α					3	0	0	3	
3 (0	0									
COURSE	OUTCO	OMES:				Do	main		L	evel	
CO1	Under	rstand	the DSP architecture	and computa	ational	Cog	nitive	U	Inder	standing	
	accura	acies in	DSP implementation	with other							
	proces	ssors.									
CO2	Under	rstand	and <i>remember</i> the T	MS 320C 542	XX DSP	Cog	nitive	U	Inder	standing	
	proces	ssors						,			
								F	lemei	mbering	
CO3	Select	t the TM	1S 320C 54XX DSP pr	ocessors for		Cog	nitive	A	pplyi	ing	
	imple	mentat	ion of DSP algorithms	5	_						
CO4	Under	rstand	the Memory Space Or	ganization o	f TMS	Cog	nitive	U	Inder	standing	
	3200	<u>54XX I</u>	OSP processors		-		_		-		
CO5	Apply	differe	ent interfacing technic	lues with var	rious	Cog	nitive	pplyi	ing,		
	I/O pe	eripher	als, <i>design</i> and <i>analy</i>	ze a product	t on DSP			C	reate	e,	
	based		ation using MATLAB I	JSP toolbox		NT A T			nalyz	zing	
UNIT I -	ARCH	IIECI	URES FOR PROGRAM	IMABLE DIC	JI I AL SIG	NAL-	PROC	'F22	UKS:	9	
Introduc	tion-	Basic	Architectural Featur	res: DSP C	Computation	onal	Builc	ling	Bloc	cks, Bus	
Architec	ture a	ind M	emory, Data Addr	essing Cap	abilities,	Add	ress	Gen	eratio	on Unit,	
Program	mabilit	y and F	Program Execution, Fe	eatures for E	xternal In	terfac	cing.				
UNIT II	- PROG	RAMM	IABLE DIGITAL SIGN	AL PROCES	SORS:					9	
Introduc	tion-Co	ommerc	cial digital Signal-p	rocessing D	evices: I	Data	Addr	essir	ng M	lodes of	
TMS320	C54xx.,	Memo	ry Space of TMS3200	C54xx Proces	ssors, Prog	gram	Conti	ol, E	Detail	Study of	
TMS320	C54X 8	& 54xx	Instructions and P	rogramming	g, On-Chip	p pei	ripher	als,	Inter	rupts of	
TMS320	C54XX	Proces	sors, Pipeline Operati	on of TMS32	20C54xx P	roces	ssor.				
UNITIII	- IMPI	LEMEN	TATION OF BASIC D	SP ALGORIT	THMS:					9	
Introduc	tion -Tl	he Q-no	otation FIR Filters, IIR	Filters: Inte	rpolation	and I	Decim	atior	n Filte	ers (one	
example	in each	ı case).	Introduction, An FFT	' Algorithm f	or DFT Co	mput	tation	, Ove	erflow	<i>v</i> and	
Scaling, I	Bit-Rev	ersed I	ndex Generation & Im	plementatio	n on the T	'MS3	20C54	4xx.			
UNIT IV	-INTEF	RFACIN	IG MEMORY TO DSP	DEVICES :						9	
Introduc	tion- M	lemory	Space Organization:	External Bus	: Interfacii	ng Sig	gnals.	Men	iory I	nterface,	
Parallel I	l/O Inte	erface, l	Programmed I/O, Inte	errupts and I	/ 0 Direct	t Men	nory A	lcces	s (DI	ИА).	
UNIT V -	INTER	FACIN	G PARALLEL I/O PEF	RIPHERALS	TO DSP D	EVIC	ES:			9	
Introduc	tion, S	ynchro	nous Serial Interfac	ce, A CODE	C Interfa	ce Ci	ircuit.	DS	P Ba	sed Bio-	
telemetr	y Recei	ver, A S	Speech Processing Sys	stem, An Ima	ge Proces	sing S	Systen	n.			
				LECTURE	TUTORI	AL	PRA	CTIC	CAL	TOTAL	
			0		45						

TEXT BOOKS

- 1. Avatar Singh and Srinivasan.S "Digital Signal Processing", Thomson Learning, 2004.
- 2. Phil Lapsley, Jeff Bier, Amit Shoham, Edward A. Lee, "DSP Processor Fundamentals Architectures & Features", IEEE Press, 1997.

REFERENCES

- 1. E. C. Feachor and B.W.Jervis, "Digital Signal Processing: A Practical Approach", Pearson Education, 2002
- 2. Jonatham Stein, "Digital Signal Processing", 1st Edition, Wiley-Interscience, 2000.
- 3. B.Venkataramani and M.Bhaskar, "Digital Signal Processors", TMH, 2002.
- 4. Peter Pirsch, "Architectures for Digital Signal Processing", John Wiley & Sons, 2007.

E-REFERENCES

- 1. http://freevideolectures.com/Course/2317/Digital-Signal-Processing-IIT-Delhi
- 2. http://nptel.ac.in/courses/117102060/
- 3. https://www.conted.ox.ac.uk/H600-24
- 4. https://www.edx.org/course/discrete-time-signal-processing-mitx-6-341x-0
- 5. http://ocw.mit.edu/resources/res-6-008-digital-signal-processing-spring-2011/
- 6. https://eeweb.ee.ucla.edu/course_objectives.php?class=ee113

	P 0 1	P0 2	P0 3	РО 4	P0 5	РО 6	P0 7	P0 8	РО 9	PO1 0	P01 1	P01 2	PSO 1	PSO 2
CO 1	3	2										1		
CO 2	2	3		2	1							1		
CO 3	2	2			3	2						1		
CO 4	1	2	3	2	1	2						1		
CO 5	1	2		2	3	2	1			1		1		
Total	9	11	3	6	8	6	1			1		5		
Scaled	2	3	2	2	2	2	1			1		1		

Mapping of COs with POs:

COUF	RSE CC	DE	XEC704B	L	Т	•	Р	С		
COUF	RSE NA	ME	DIGITAL IMAGE PROCESSING	3	0)	0	3		
PRER	EQUI	SITES	XEC504	L	Т	•	Р	Н		
C	Р	Α		3	0		0	3		
3	0	0		5			U	5		
COUF	<u>RSE OI</u>	JTCOM	ES	Doma	in	_	L	evel		
C01	Dut pro	t <i>line</i> an cessing	d <i>classify</i> basic principles of digital image and transforms.	Cogniti	ve	Re Ur	emei nder	nbering, standing		
CO2	Des	cribe,	categorise and manipulate images in spatial	Cogniti	ve	Re Ur	emei nder	nbering, standing		
	and	freque	ency domain.			, A	naly	zing		
CO3		strate	and <i>determine</i> restoration of images and	Cogniti	ve	Uı F	nder	standing		
CO4 Cognitive Understanding										
<i>Classify</i> and <i>explain</i> image segmentation techniques.										
CO5Distinguish and describe image compression techniquesCognitiveUnderstandinand image descriptors., Rememberin										
UNIT	UNIT I - DIGITAL IMAGE FUNDAMENTALS AND TRANSFORMS									
UNIT I - DIGITAL IMAGE FUNDAMENTALS AND TRANSFORMS9Fundamental Steps in Digital Image Processing, Components of an Image Processing SystemVidicon camera tube, Digital Camera, Elements of Visual Perception, Image sampling and Quantization, Basic Relationship Between Pixels, Basic geometric transformations. One dimensional and two dimensional Fourier Transform and Discrete Fourier Transform two dimensional Fourier Transform, Properties of Fourier Transform.UNIT II -IMAGE ENHANCEMENT METHODS9Image Enhancement : Spatial Domain methods, Basic grey level transformation, Histogram processing, Noise models, Image enhancement using arithmetic/ logic operations, Image Subtraction, Image Averaging, Spatial filtering: Smoothing by spatial filtering, Sharpening by spatial filtering.UNIT III - IMAGE RESTORATION COLOR IMAGE PROCESSING9										
Image Restoration : Model of Image Degradation/Restoration Process, Estimating the Degradation function, Inverse filtering, Least Mean Square filtering, Constrained Least Mean Square Filtering, Geometric transformation Colour image processing : Fundamentals, Colour models, Dither- Quantization and Colour image enhancement.UNIT IV - IMAGE SEGMENTATION9										
Intro	ductio	n: Imag	e segmentation, Detection of discontinuities, Poi	nt detec	tion	ı, Li	ine c	letection,		
Edge and n	Detec nergin	tion, Tl g, Morp	nres holding, Region Based segmentation, Region Phological operations, Segmentation by morphological sections (Segmentation Section Se	n growi gical wa	ng, ater	Reg she	gion eds, i	splitting Markers		
UNIT	V- IM	IAGE C	OMPRESSION AND IMAGE DESCRIPTORS					9		
Need codin codin stand	of dat g, Huf g, Los ards :	a comp fman c ssy pre JPEG, N	pression, Image Compression Models, Lossless co oding, Arithmetic coding, LZW coding, Bit plane edictive coding, Transform coding, Wavelet co 1PEG., Boundary representation,	ompress coding, oding,	ion: Los Imag	Va ssle ge	riab ss p com	le length redictive pression		

Image descriptors : Boundary descriptors and Regional descriptors.

	LECTURE	TUTORIAL	PRACTICAL	TOTAL	-
HOURS	45	0	0	45	

TEXT BOOKS

1. Rafael C. Gonzalez, Richard E.Woods, "Digital Image Processing", 3rd Edition, Pearson Education, 2007.

REFERENCES

- 1. S.Jayaraman, T.Veerakumar, S.Esakkirajan, "Digital Image Processing", Tata McGrawHill, 2013.
- 2. Rafael C. Gonzalez, Richard E.Woods, Steven L.Eddins, "Digital Image Processing using MATLAB", 2nd Edition, Gatesmark Publishing, 2010.
- 3. Anil .K.Jain, "Fundamentals of Digital Image Processing", PHI, New Delhi, 2007.
- 4. William K Pratt, "Digital Image Processing", 3rd Edition, John Wiley & Sons, 2001.
- 5. Majumdar, "Digital Image Processing and Analysis", Prentice Hall of India, 2003.
- 6. Milan Sonka, Vaclav Hlavac, Roger Boyle, "Image Processing Analysis and Machine Vision", 4th Edition, Cengage Learning, 2013.
- 7. B.Chanda, Dutta Majumder, "Digital Image Processing and Analysis", Prentice Hall of India, 2006.

E- REFERENCES

1. http://nptel.ac.in/courses/117105079/# (Prof .P. K. Biswas Department of Electronics and Electrical Communication Engineering Indian Institute of Technology, Kharagpur)

Mapping of COs with POs:

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P0 11	P0 12	PSO 1	PSO 2
CO 1	3	2		2	1	1						1		
CO 2	2	3		2	2	1			1	1		2		
CO 3	3	3		2	2	1			1	1		2		
CO 4	3	2		3	2	1			1	1		2		
CO 5	3	3		2	1	1						2		
Total	14	13		11	8	5			3	3		9		
Scaled	3	3		2	2	1			1	1		2		
value														

COU	RSE C	ODE	XEC704C	C704C L						Р	C		
COU	RSE N	IAME	ADVANC	ED MICROPRO	CESSORS AND			3	0	0	3		
			MICROCO	NTROLLERS									
PRE	REQU	ISITES	XEC604					L	Т	Р	Н		
С	Р	Α	3:0:0					3	0	0	3		
3	0	0											
COU	RSE C	UTCOM	IES				Dom	ain		Lev	'el		
C01	Ou	tline and	d relate the	e concepts of H	igh Performanc	e	Cogni	tive	Ren	nemł	bering,		
	CIS	C(PENT	IUM) Archi	tecture.					Ana	lyzir	ıg		
C02	Dis	cuss and	d <i>explain</i> t	he concepts of	RISC (ARM) pro	ocessor	Cogni	tive	Und	erst	anding		
	des	sign .											
CO3	Use	e and de	<i>velop</i> the a	ssembly langua	age programmi	ng in the	Cogni	tive	App	lying	5,		
	AR	<u>M based</u>	systems.						Crea	ate .			
C04	Ou	tline and	d relate the	e concepts of M	otorola		Cogni	tive	Ren	iemt	bering,		
005	68		crocontroll	ers.		11	<u> </u>		Ana	lyzir	ig		
C05	Ou	tline and	d explain t	ne concepts of	PIC Microcontro	oller.	Cogni	tive	Ren	iemt	bering,		
UNIT I HICH DEDEODMANCE CISC ADCHITECTUDE DENTIUM.											anding		
UNIT I - HIGH PERFORMANCE CISC ARCHITECTURE -PENTIUM : 9										9			
CPU Architecture- Bus Operations - Pipelining - Brach predication - floating point un											t unit-		
Ope	rating	Modes	-Paging	- Multitasking	g – Exception	and Inter	rrupts	– Ir	istruc	ction	set –		
addi	essing	g modes	– Program	ming the Penti	um processor.								
UNI	T II - H	HIGH PE	RFORMAN	CE RISC ARCH	IITECTURE – A	RM:					9		
Arc	on RIS	C Machi	ne – Archi	tectural Inheri	tance – Core &	Architectu	ıres –	Regis	ters -	- Pip	oeline –		
Inte	rrupts	– ARM	organizati	on – ARM proc	cessor family –	Co-proces	sors –	ARM	l inst	ructi	on set-		
Thu	mb In	structio	n set – In	struction cycle	e timings – Th	e ARM Pi	rogran	ımer'	s mo	del	– ARM		
Dev	elopm	ent tools	s – ARM As	sembly Langua	ige Programmir	ng – C prog	gramm	ing –	Optir	nizir	ıg ARM		
Asse	embly	Code – C)ptimized F	rimitives									
UNI	T III -	ARM AI	PPLICATIC	N DEVELOPM	ENT:						9		
Intro	oducti	on to D	SP on ARM	1 –FIR filter –	IIR filter – Dis	screte Fou	irier ti	ransfo	orm -	- Exe	ception		
hand	dling -	- Interru	upts – Inte	rrupt handling	g schemes- Fir	mware an	d boo	t load	ler –	Em	bedded		
Ope	rating	system	s – Integ	rated Develop	ment Environ	nent- STI	DIO Li	brari	es –	Per	ipheral		
Inte	rface	– Applio	cation of A	ARM Processo	r – Caches – I	Memory p	protect	tion I	Jnits	– N	lemory		
Man	ageme	ent units	– Future A	RM Technolog	ies								
UNI	T IV -	MOTOR	OLA 68HC	11 MICROCON	NTROLLERS:						9		
Inst	ruction	n set	- address	sing modes -	operating m	odes- Int	errupt	syst	tem-	RTO	C-Serial		
Com	munic	ation In	terface – A	/D Converter P	WM and UART								
UNI	T V - F	PIC MICF	ROCONTRO)LLER							9		
CPU	Archi	tecture -	- Instructio	n set – interru	pts- Timers- I2(C Interfacin	ng –UA	RT-A	A/D C	onve	erter –		
PWN	A and	introduc	ction to C-C	ompilers.	-		-		-				
				LECTURE	TUTORIAL	PRACTIO	CAL		TO	TAL			
ΗΟΙ	JRS			45	0	0			4	-5			
TEX	T BOO)KS			1	1							
1.	Andre	w N.Slos	s. Dominic	Symes and Ch	ris Wright. "ARI	M System I	Develo	per's	Guid	e:			
	Desig	Andrew N.Sloss, Dominic Symes and Chris Wright, "ARM System Developer's Guide : Designing and Optimizing System Software", 1 st Edition, Morgan Kaufmann Publishers, 2004.											

2. WilliamHohl, Christopher Hinds, "ARM Assembly Language, Fundamentals and Techniques" 2ndEdition, CRC Press, 2015.

REFERENCES

- 1. Andrew N.<u>Sloss</u>, Dominic <u>Symes</u>, Chris<u>Wright</u>, "ARM System Developer's Guide" 1st Edition, Morgan Kaufmann, 2004.
- 2. Steve Furber, "ARM System-on-Chip Architecture" 2ndEdition, Pearson Education, 2001.
- 3. Muhammad Ali Mazidi, SarmadNaimi, SepehrNaimi, Janice Mazidi" ARM Assembly Language Programming & Architecture" 1st Edition, Kindle Edition, 2014.
- 4. Steve Furber, "ARM System –on –Chip Architecture", Addison Wesley, 2000.
- 5. Daniel Tabak, "Advanced Microprocessors", McGraw Hill, 1995.
- 6. James L.Antonakos, "The Pentium Microprocessor", Pearson Education, 1997.
- 7. Gene H.Miller, "Micro Computer Engineering", Pearson Education, 2003.
- 8. JohnB.Peatman, "Design with PIC Microcontroller", Prentice Hall, 1997.

E - REFERENCES

- 1. http://cie-wc.edu/Microprocessor-7-19-2011.pdf?pdf=Microprocessor
- 2. http://slogix.in/ap7103-advanced-microprocessor-and-microcontroller-subjectmaterials/index.html
- 3. https://www.arm.com/files/pdf/ARM_Arch_A8.pdf
- 4. http://www.freescale.com/tools/software-and-tools/hardware-development-tools/ freedom-developmentboards:FREDEVPLA

Mapping of COs with POs:

	DO1	PO	P01	P01	P01	PSO	PSO							
	FUI	2	3	4	5	6	7	8	9	0	1	2	1	2
CO 1	3	3		2	1	1	1					1		
CO 2	2	2		2	2	1	1					1		
CO 3	3	3		3	2	2	2			1		1		
CO 4	3	3		2	3	1	1			1		1		
CO 5	3	3		3	2	2	2			1		1		
Total	14	14		12	10	7	7			3		5		
Scaled	3	3		3	3	1	1			1		1		
value														

COURSE CODE XEC705A COURSE NAME DISASTER MANAGEMENT									Т	Ρ	С
COURSE NAME DISASTER MANAGEMENT									0	0	3
PRER	EQ	UISITES						L	Т	Р	Н
С	P	Α	2.75:0:0.25					3	0	0	3
2.75	0	0.25				r					
COUR	SE	OUTCOM	ES			Doi	main		Le	evel	
C01		Understa	and and <i>Recognize</i> th	ne concepts of	disaster	Cogi	nitive	Un	ders	tand	ling,
602		Decemi	a and describe the		ata af	Carr		Rer	nem	ber	ng Line e
LU2		Recogniz	<i>e ana aescribe</i> the c	auses and ene	CTS OF	Cogr	litive		lers	tano bori	ling,
		disaster						Nei	nem	Dell	Ing
C03		Describe	the various approac	hes of risk red	uction	Cogi	nitive	Rer	nem	beri	ing
<u> </u>		Dave are at				Carr		I.I.e.			1
C04		Demonst	<i>rate</i> the inter-relatio	onsnip betwee	n disaster	Cogi	nitive	Une	lers	tand	iing
		and devel	lopment								
C05		Discuss h	nitive	Remembering							
000		respond t	o drills related to rel	lief		Affe	ctive	Res	pon	se	
		responde	cuve		1						
UNIT I -INTRODUCTION TO DISASTERS											6
Conce	epts	and defin	itions- Disaster, Haza	ard, Vulnerabi	lity, Resilier	nce, R	isks				
UNIT	II-I	DISASTER	S: CLASSIFICATION	, CAUSES, IMI	PACTS						12
Differ	enti	ial impact	s- in terms of caste,	class, gender	age, locati	on, di	isability	y Glo	bal	tren	ds in
disast	ers,	urban dis	sasters, pandemics, c	omplex emerg	encies, Clin	nate c	hange				
UNIT	III ·	APPROA	CHES TO DISASTER	RISK REDUC	ΓΙΟΝ						10
Disast	ter (cycle - its	analysis, Phases, Cul	ture of safety,	prevention	, miti	gation	and	prep	are	dness
comm	nuni	ty based	DRR, Structural- n	onstructural	neasures, 1	roles	and re	espo	nsib	ilitie	es of-
comm	nuni	ty, Pancha	ayati Raj Institution	s/Urban Local	Bodies (PI	RIs/U	LBs), s	tates	s, Ce	ntre	e, and
other	stal	<u>ke-holders</u>									
UNII	IV-	IN I EK-K	ELATIONSHIP BET	WEEN DISASI	ERS AND L	JEVE	LOPME	INI			6
Facto	rs a	ffecting V	ulnerabilities, differe	ential impacts	impact of I	Devel	opmen	t pro	oject	s su	ch as
dams,	, en	nbankmer	nts, changes in Lan	d-use etc. Cli	mate Chan	ige A	daptati	on.	Rele	van	ce of
indige	enou	<u>is knowle</u>	dge, appropriate tec	hnology and lo	cal resourc	es					
UNIT	V-L	DISASTER	RISK MANAGEMEN	IT IN INDIA							11
Hazar	'd a	and Vulne	erability profile of	India Compo	nents of D	Disast	er Reli	ief:	Wat	er,	Food,
Sanita	atio	n, Shelter	r, Health, Waste M	Management	Institutiona	ıl arı	angem	ents	(M	litig	ation,
Respo	onse	and Prep	aredness, DM Act an	d Policy, Othe	r related po	licies	, plans,	pro	gran	nme	s and
legisla	atio	n).									
Thon	roid	oct / fiold	work to understand	wulnorabilitio	c work on	roduc	tion of	dice	octor	ricl	r and
build	a cu	iltural safe	work to understalld	vumerapiiitie	S, WULK UIL	reuut	.0011 01	uisa	istel	1151	x allu
Junu		illui ui bult									
				LEC TURE	TUTORIA	L	PRACT	TICA	L	гот	'AL
	HOURS 45 0										-5

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TEXT BOOKS

- 1. Coppola P Damon, "Introduction to International Disaster Management, Butterworth-Heinemann, 2015
- 2. K. N. Shastri, "Disaster Management in India", Pinnacle Technology, 2012
- 3. Gupta Anil K, Sreeja S. Nair, "Environmental Knowledge for Disaster Risk Management, NIDM, New Delhi, 2011
- 4. Lee Allyn Davis, "Natural Disasters", Infobase Publishing, 2010
- 5. Andharia J, "Vulnerability in Disaster Discourse", JTCDM, Tata Institute of Social Sciences Working Paper no. 8, 2008

REFERENCES

- 1. Alexander David, Introduction in 'Confronting Catastrophe', Oxford University Press, 2000
- 2. Carter, Nick 1991. Disaster Management: A Disaster Manager's Handbook. Asian Development Bank, Manila Philippines.

E- REFEENCES

- 1. NIDM Publications at http://nidm.gov.in- Official Website of National
- 2. Institute of Disaster Management (NIDM), Ministry of Home Affairs,
- 3. http://cwc.gov.in, http://ekdrm.net, http://www.emdat.be,
- 4. http://www.nws.noaa.gov, http://pubs.usgs.gov, http://nidm.gov.ini
- **5.** http://www.imd.gov.ini

Table 1: Mapping of CO with GA														
Course outcomes	GA1	GA2	GA3	GA4	GA5	GA6	GA7	GA8	GA9	GA10	GA11	GA12		
CO1	1					3	2	1				1		
CO2	1					3	2	1				1		
CO3	1					3	2	1				1		
CO4	1					3	2	1				1		
CO5	1					3	2	1				1		
Total	5					15	10	5				5		
Scaled	1					3	2	1				1		

COU	RSE COD	L	Т	Р	С					
COU	RSE NAM	1E	WIRELESS COMMUNICATION SYSTEMS		3	0	0	3		
PRE	REQUISI	TES	XEC404,XEC602		L	Τ	Р	Н		
С	Р	Α			3	0	0	3		
3	0	0								
COU	RSE OUT)oma	in		Level					
C01	Desci	/e	Remembering							
systems deployments.										
CO2	Desci	ribe a	and <i>explain</i> cellular engineering concepts and	Со	gnitiv	/e	Rem	Remembering,		
	work	ing p	rinciples.				Unde	erstan	ding	
CO3	Desci	r ibe f	ree space propagation of EM waves.	Со	gnitiv	/e	Rem	embei	ring	
CO4	Disti	nguis	s h and explain various Multipath effects and	Со	gnitiv	/e	Unde	erstan	ding	
	fadin	g in v	vireless communication							
CO5Describe multiple input multiple output systems forCognitiveRemembering								ring		
	wirel	ess c	ommunication							
UNI	ТІ - МО	DER	N WIRELESS COMMUNICATION SYSTEMS						9	
Fvol	lution of Mobile Radio Communications Present Day Mobile Communication -									

Fundamental Techniques -Radio Transmission Techniques - Cellular Concept -Operational Channels - Making a Call - Future Trends -First Generation Networks 2G: Second Generation Networks - TDMA/FDD Standards -CDMA/FDD Standard -2.5G Mobile Networks - Third Generation Networks -3G Standards and Access Technologies -3G W-CDMA (UMTS) -3G CDMA2000 3G TD-SCDMA- Wireless Transmission Protocols - Wireless Local Loop (WLL) and LMDS -Bluetooth- Wireless Local Area Networks (W-LAN) WiMax - Zigbee -Wibree Beyond 3G Networks

UNIT IITHE CELLULAR ENGINEERING FUNDAMENTALS

Cellular Structure- Frequency Reuse Channel Assignment Strategies - Fixed Channel Assignment (FCA)- Dynamic Channel Assignment (DCA) -Handoff Process Factors Influencing Handoffs Handoffs In Different Generations- Handoff Priority A Few Practical Problems in Handoff Scenario - Interference & System Capacity Co-channel interference (CCI) -Adjacent Channel Interference (ACI) -Enhancing Capacity And Cell Coverage - The Key Trade-off Cell-Splitting Sectoring- Microcell Zone Concept -Trunked Radio System

UNIT IIIFREE SPACE RADIO WAVE PROPAGATION

Free Space Propagation Model -Basic Methods of Propagation Reflection- Diffraction Scattering- Two Ray Reflection Model - Diffraction Knife-Edge -Diffraction Geometry - Fresnel Zones: the Concept of Diffraction Loss -Knife-edge diffraction model- Link Budget Analysis Log-distance Path Loss Model- Log Normal Shadowing -Outdoor Propagation Models-Okumura Model - Hata Model - Indoor Propagation Models - Partition Losses Inside a Floor (Intra-floor) - Partition Losses Between Floors (Inter-floor) - Log-distance Path Loss Model 9

UNIT IVMULTIPATH WAVE PROPAGATION AND FADING

Multipath Propagation Multipath & Small-Scale Fading -Multipath Fading -Effects -Factors Influencing Fading -Types of Small-Scale Fading Fading- Effects due to Multipath Time Delay Spread - Fading Effects due to Doppler Spread- Doppler Shift Impulse Response Model of a Multipath Channel Relation Between Bandwidth and Received Power - Linear Time Varying Channels (LTV)Small-Scale Multipath Measurements - Multipath Channel Parameters- Time Dispersion Parameters - Frequency Dispersion Parameters - Statistical models for multipath propagation NLoS Propagation: Rayleigh Fading Model - LoS Propagation: Rician Fading Model Generalized Model: Nakagami Distribution - Second Order Statistics

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9

UNIT V- DIVERSITY AND MIMO SCHEMES 9										
Diversity, Timediversity Repetition coding, Timediversity coded esign criterion, Timediversity in										
GSM.Antennadiversity-ReceivediversityTransmitdiversity,space-										
timecodesMIMO,MIMOschemesFrequencydiversity-										
MultiplexingcapabilityofdeterministicMI	MOchannels-									
Capacityviasingularvaluedecomposition-I	Capacityviasingularvaluedecomposition-PhysicalmodelingofMIMOchannels-									
ModelingofMIMOfadingchannels-MIMOII:capacityandmultiplexingarchitectures-TheV-										
BLASTarchitecture,FastfadingMIMOchannel-Receiverarchitectures.										
	LECTURE TUTORIAL PRACTICAL TOTAL									
	45	0	0	45						
TEXT BOOKS										
David Tse and PramodViswanath, "Fund	lamentals of	f Wireless Com	munication", C	ambridge						
University Press, 2005.	University Press, 2005.									
Dr. Abhijit Mitra, "Lecture Notes on Mobile Communication", A Curriculum Development Cell										
Di Homjie Milea, Lecture Notes on Mobile	e Communica	tion", A Curricu	lum Developme	ent Cell						
Project Under QIP, IIT Guwahati, Departme	e Communica ent of Electro	ition", A Curricu	lum Developme unication Engin	ent Cell neering,						
Project Under QIP, IIT Guwahati, Departme Indian Institute of Technology Guwahati, O	e Communica ent of Electro Guwahati – 78	ntion", A Curricu onics and Comm 81039, India, No	lum Developme unication Engin ovember 2009	ent Cell neering,						
Project Under QIP, IIT Guwahati, Departme Indian Institute of Technology Guwahati, C Andrea Goldsmith, "Wireless Communicat	e Communica ent of Electro Guwahati – 79 ions", Cambr	ition", A Curricu onics and Comm 81039, India, No idge University	lum Developme unication Engin ovember 2009 Press, 2005.	ent Cell neering,						
Project Under QIP, IIT Guwahati, Departme Indian Institute of Technology Guwahati, C Andrea Goldsmith, "Wireless Communicat Andreas F. Molisch, "Wireless Communica	e Communica ent of Electro Guwahati – 78 ions", Cambr itions", Wiley	ntion", A Curricu onics and Comm 81039, India, No ridge University 7 - IEEE, 2011.	lum Developme unication Engin ovember 2009 Press, 2005.	ent Cell neering,						

T.S.Rappaport, "Wireless Communication", Pearson Education, 2002.

E REFERENCES

http://nptel.ac.in/courses/117102062/ (Prof. Dr. Ranjan Bose," Wireless

Communications"Department of Electrical Engineering Indian Institute of Technology, Delhi)

Mapping of COs with POs:

	P01	P02	P03	PO4	P05	P06	P07	P08	P09	P010	P011	P012	PSO	PSO
													1	2
CO 1	1	3								1		2	2	3
CO 2	1	3										1	2	3
CO 3	1	3								1		1	2	3
CO 4	1	2										1	2	3
CO 5		2										1	2	3
Total	4	13	0	0	0	0	0	0	0	2		6	10	15
Scaled	1	3	0	0	0	0	0	0	0	1	0	2	2	3

COURSE CODE XEC705C							Р	С		
COURS	E NAME		RADAR AND NAVIGATIONAL	3	0	0	3			
PRERE	QUISITE	S	XEC404,XEC603		L	Т	Р	Η		
C	Р	Α			3	0	0	3		
3	0	0								
COURS	E OUTCO	Domai	n]	Level					
C01	Descri	Cognitiv	e	Reme	mbering,					
	operat			Analy	zing					
CO2	Expla	<i>in</i> the m	ving target identification proce	ss by	Cognitiv	e	Unde	rstanding,		
	differe	ent types	of radars and <i>describe</i> tracking				Reme	mbering		
CO3	Categ	orize det	ectors using radars and <i>describ</i>	e	Cognitiv	e	Analy	zing		
	variou	is antenn	as, transmitters and receivers				Reme	mbering		
<u> </u>	associ	ated with	radars.	•	<u>C '1'</u>	-	D			
C04	Classi	fy , aiscu	ss alrection finding methods us	sing	Cognitiv	e	Keme	mbering,		
	radar	and vario	us equipment available for dire	ction			Unde	standing		
COF	Deser	g. ihadiatar	as massing landing quatom as	nd	Cognitiv	0	Domo	mharing		
LU5	Doppl	or Novig	tion	na	Cognitiv	e	Remembering			
IINIT I								9		
Basic R	adar – Th	e simple	form of the Radar Equation- Ra	dar Bloc	k Diagra	m- R	adar F	requencies		
-Applic	ations of	f Radar –	The Origins of Radar. The Rada	ar Equati	on: Intro	duct	ion- D	etection of		
Signals	in Noise	- Receiv	r Noise and the Signal-to-Noise	e Ratio-F	Probabili	tv De	ensitv	Functions		
Probab	ilities of	Detectio	and False Alarm- Integration of	of Radar	Pulses- F	Radai	· Cross	Section of		
Targets	- Radar	cross Se	ction Fluctuations- Transmitte	r Power	-Pulse R	epet	ition l	requency		
Antenn	a Parame	eters-Sys	em losses – Other Radar Equati	on Cons	ideration	S		1 5		
UNIT II	- MTI A	ND PULS	E DOPPLER RADAR					9		
Introdu	ction to	Doppler	and MTI Radar- Delay -Line (Canceler	s- Stagge	ered	Pulse	Repetitior		
Freque	ncies –D	oppler	ilter Banks - Digital MTI Pro	ocessing	- Movir	ng Ta	arget	Detector ·		
Limitat	ions to M	ITI Perfo	mance - MTI from a Moving Pla	atform (A	AMIT) - F	Pulse	Dopp	er Radar -		
Other I	Doppler 1	Radar To	pics- Tracking with Radar - M	onopuls	e Trackii	1g –(Conica	l Scan and		
Sequen	tial Lobi	ng - Li	nitations to Tracking Accuracy	v - Low-	Angle Ti	acki	ng - T	'racking ir		
Range	- Other	Tracking	Radar Topics -Comparison of	Tracker	rs - Auto	omat	ic Tra	cking with		
Surveill	ance Rac	lars (AD'	·).							
UNIT I	II – SIGN	AL PRO	PAGATION, NOISE AND RADAR	R SUBSY:	STEMS			9		
Introdu	ction – M	latched -	Filter Receiver –Detection Crite	eria – De	tectors –	-Auto	omatic	Detector ·		
Integra	tors - Co	nstant-Fa	lse-Alarm Rate Receivers - The	Radar o	perator -	Sign	al Mai	nagement ·		
Propaga	ation Ra	dar Wav	es - Atmospheric Refraction -	Standard	d propag	gatio	n - No	onstandard		
Propaga	ation - T	he Rada	Antenna - Reflector Antennas	- Electro	onically S	Steer	ed Pha	ased Array		
Antenn	as - Phas	se Shifter	s - Frequency-Scan Arrays Rad	ar Trans	smitters-	Intr	oducti	on –Lineai		
Beam P	ower Tu	ibes - So	id State RF Power Sources - M	lagnetro	n - Cross	sed F	Field A	mplifiers ·		
Other F	RF Power	r Source	- Other aspects of Radar Tran	smitter.	Radar R	lecei	vers -	The Rada		
Receive	er - Rece	eiver no	se Figure - Super heterodyne	e Receiv	er - Dup	olexe	rs and	1 Receiver		
Protect	ors- Rada	ar Displa	/S.							
UNIT I	v - INTRO	UDUCTI	IN TO FOUR METHODS OF NA	VIGATIC	JN			9		
Radio I	Direction	Finding	- The Loop Antenna - Loop In	put Circ	uits - An	Aur	al Nul	l Direction		
Finder	- 1ne Go	momete	- Errors in Direction Finding -	AUCOCK	Directio	on F1	nuers	- Direction		

Finding at Very High Frequencies - Automatic Direction Finders - The Commutated Aerial Direction Finder - Range and Accuracy of Direction Finders Radio Ranges - The LF/MF Four course Radio Range - VHF Omni Directional Range(VOR) - VOR Receiving Equipment - Range and Accuracy of VOR - Recent Developments .Hyperbolic Systems of Navigation (Loran and Decca) - Loran-A - Loran-A Equipment - Range and precision of Standard Loran - Loran-C - The Decca Navigation System - Decca Receivers - Range and Accuracy of Decca - The Omega System **UNIT V - ADVANCED NAVIGATION**

DME and TACAN - Distance Measuring Equipment - Operation of DME - TACAN - TACAN Equipment. Aids to Approach and Landing - Instrument Landing System - Ground Controlled Approach System - Microwave Landing System(MLS).Doppler Navigation - The Doppler Effect -Beam Configurations - Doppler Frequency Equations - Track Stabilization - Doppler Spectrum -Components of the Doppler Navigation System - Doppler range Equation - Accuracy of Doppler Navigation Systems. Inertial Navigation - Principles of Operation - Navigation Over the Earth -Components of an Inertial Navigation System - Earth Coordinate Mechanization - Strapped-Down Systems - Accuracy of Inertial Navigation Systems. Satellite Navigation System - The Transit System – Navstar, Global Positioning System (GPS)

ITun		ming by seem (arbji		
		LECTURE	TUTORIAL	PRACTICAL	TOTAL
	HOURS	45	0	0	45
TEX	T BOOKS				
1.	Merrill I. Skolnik , "Introduction to	Radar System	ns", 3 rd Edition	, Tata McGraw-H	ill,2003.
2. Li	nda Williams, "Navigational Aids", I	Marshall Cavei	ndish, 2007.		
REF	ERENCES				
1.	Peyton Z. Peebles:, "Radar Princip	les", John Wile	ey, 2004.		
2.	J.C.Toomey, "Principles of Radar",	2 nd Edition, Pr	entice Hall of	India, 2004.	
E-RE	EFERENCES				
1.	https://books.google.com/books?	isbn=8126515	5279		
2.	http://www.scribd.com/doc/245	36892/Radio-	Navigation-Ai	ds-Presentation-3	2-Navaids-
	Radar	-	-		
3.	www.nd.edu/~ndpi/current/less	ons/Navigatio	nl.ppt.		
4.	http://www.sailingusa.info/basic	_navigation.htm	m		

5. http://www.slideshare.net/J.T.A.JONES/navigation

Mapping of COs with POs:

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO 1	PSO 2
CO 1	3	3		1								1		
CO 2	3	1		1								1		
CO 3	2	3										2		1
CO 4	3	2		1								2		1
CO 5	3	2		1								1		1
Total	14	11		4								7		3
Scaled	3	3		1								2		1
value														

0-	No Re	elation 2	I - Low Relation , 2 -	Medium Rela	tion, 3- Hi	gh Ro	elatio	n			
COURSE CODEXEC802ALTPC											
COUR	SE NA	ME	OPTICAL NETWORK	S		3	0	0	3		
PRER	EQUIS	ITES	XEC703			L	Τ	Р	H		
С	P	Α				3	0	0	3		
3	0	0									
COUR	SE OU	ГСОМЕ	5			Dom	ain]	Level		
CO 1	L <i>L</i>	escribe	and <i>explain</i> the optical	network	(Cogni	tive	Reme	mber	ing,	
	С	ompone	nts.					Unde	rstand	ling	
CO2	2 U	Indersta	and and explain the clie	ent layers of o	ptical (Cogni	tive	Unde	rstand	ling,	
	li	ayer.					-	Apply	ving		
CO3 Outline and summarize the optical network Cognitive Ren									mber	ing,	
60	a	rchitect	ures.	<u> </u>	. 1 (Unde	rstand	ling	
	+ <i>L</i>	<i>iscuss</i> t	ne survivability aspects	s of optical ne	tworks (Jogni	live	Unde	rstand	ling	
<u> </u>	5 7	Indorsta	nd the design senects	of WDM notw	orks (ogni	tivo	Undo	retand	ling	
		nuersu	ind the design aspects		01K3.	Jogin		Unue	Istan	iiiig	
UNIT	I - OPT	ICAL N	ETWORK COMPONEN	ТЅ						9	
Couple	ers, Is	olators	& Circulators, Multipl	exers & Filte	rs, Optica	l Am	plifie	rs, Tra	insmit	ters,	
Detect	cors, Sv	vitches,	Wavelength Converters	5.			•				
UNIT	II - CLI	ENT LA	VERS OF OPTICAL LAY	VER						9	
SONE		Ontio	al Transport Notwo	de Conoria	Framing	Droc	odure	ւ Ե+Ի	ornot		
SUNE Multir	rotocc	Upuca Upuca	ai fransport networ	K, Generic	Framing	PIOC	euure	e, cui	ernet,	IP,	
Multip		I Label	Switching.								
UNIT	III - OI	PTICAL	NETWORK ARCHITEC	TURES						9	
WDM	netwo	rk elem	ents, Metropolitan-Are	a Networks, I	Layered A	rchite	cture	; Broa	adcast	and	
Select	Netwo	orks – T	opologies for Broadca	st Networks,	Media-Acc	ess C	ontro	ol Prot	ocols,	Test	
beds f	or Broa	adcast &	Select WDM; Wavelen	gth Routing A	rchitecture	<u>)</u> .					
UNIT	IV - NE	TWORI	X SURVIVABILITY							9	
Protec	ction i	n SONE	T/SDH, Protection in	client layer	, Optical	layer	prot	tection	sche	mes,	
Interw	vorking	g betwee	en layers.	Ū.		5					
UNIT	V- WE	M NET	WORK DESIGN							9	
	and	 Ρ\λ/Λ r	robloms Dimonsioni	ng Wayalan	oth Rout	ina	Notw	orke	Statio		
Dimer	anu isionin	a model	s Maximum load dime	ng waveleli	als	ing		01KS,	Statis	stical	
Dimen	15101111	5 mouer	5, Maximum Ioda annei		TUTORIA		PRAC	TICAL	ТО	TAL	
			HOURS	45	0		1010	0		45	
TEXT	BOOK	S	noono	10	•			•			
1. Ra	ajiv Ra	naswan	ni, Kumar N. Sivarajan,	Galen H.Sasak	i, "Optical	Netw	orks :	A Pra	ctical		
Pe	erspect	ive", 3 rd	Edition, Morgan Kaufn	nann, 2011.							
DEEE	DENCI	7 C	-								
КЕГЕ 1 D	REINCI Domoc	uami ar	d K Sivarajan "Ontical	Notworks" 2	nd Edition	Mora	an Ka	ufman	n 200	12	
2 M	artin a	nd Maia	r "Ontical Switching Na	nerworks, 2° atworks" Cam	bridge IIn	iversi	an Na tv Pra	annan 200 20	n, 200 08	, 2.	
3. C	Siva R	am Moo	rthy and Mohan Gurus	amy. "WDM O	ntical Netw	vorks	: Con	cent			
D: 0.	esign a	nd Algoi	rithms", 1 st Edition, Pre	ntice Hall of I	ndia. 2002.	, or its		cept,			
4. P.	E. Gree	n, "Fibe	r Optic Networks". Prei	ntice Hall. 199	3.	•					
E-RE	FEREN	CES		, _ / /							
1. htt	:p://w	ww.pdf-	search-engine.com/opt	tical-networki	ng-pdf.htn	nl					
2. htt	1. http://www.pdf-search-engine.com/optical-networking-pdf.html 2. http://www.networktutorials.info/networkhowto/what is optical networking.html										

144 | Regulation 2015 - Curriculum & Syllabus
	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO1	PS
CO 1	2	2	1	1	2							1	2	
CO 2	2	2	1	1	2							1	2	
CO 3	2	2	1	1	2							1	2	
CO 4	2	2	1	1	2							1	2	
CO 5	2	2	1	1	2							1	2	
Total	10	10	5	5	10							5	10	
Scaled	2	2	1	1	2							1	2	
value														

COU	RSE COD	E	XEC802B			L	Τ	P	C	
	RSE NAM	E	WIRELESS NET	WORKS		3	0	0	3	
PRE	REQUISI	ГES	XEC404,XEC602		L	Τ	Р	Η		
С	Р	A				3	0	0	3	
3	0	0								
COU	RSE OUT	COM	ES		Domai	n		Leve	1	
C01	Descr	ibe a	nd <i>compare</i> vario	ous Multiple Rad	lio Cognitive		Rem	nembe	ering,	
	Access	S	•	•		Evaluate				
CO2	Descr	ibe W	ide Area Networl	KS.	Cognitive		Rem	nembe	ering	
CO3	Define	e and	<i>explain</i> various V	Vireless LAN	Cognitive		Rem	nembe	ering,	
	standa	ards					Und	erstai	nding	
CO4	Descr	ibe w	ireless MAN and I	PAN.	Cognitive		Rem	iembe	ering,	
C05	Expla	in the	features of 4G an	nd 5G networks	Cognitive		Und	erstai	nding	
UNIT	ΓΙ - ΜU	LTIP	LE RADIO ACCES	S					9	
Medi	ium Acces	ss Alt	ernatives: Fixed-	Assignment for	Voice Oriented Net	tworks	Ranc	lom A	ccess	
for D	ata Orien	ted N	etworks, Handoff	and Roaming S	upport, Security and	d Priva	су.			
UNIT	ГII - WIF	RELES	SS WANS						9	
First	Generati	on A	nalog, Second Ge	neration TDMA	. – GSM, Short Mes	saging	Servi	ice in	GSM	
Seco	nd Genera	ation	CDMA – IS-95, GP	RS - Third Gene	eration Systems (WO	CDMA/	CDMA	A 2000))	
UNIT	Г III- WI	RELE	SS LANS						9	
Intro	duction	to wi	reless LANs - IE	EE 802.11 WL	AN – Architecture	and S	ervice	es, Ph	ysica	
Laye	r- MAC s	ublay	er- MAC Manage	ment Sublayer,	Other IEEE 802.11	standa	ards,	HIPEI	RLAN	
WiM	ax standa	rd.								
UNI 7	Г IV- WIR	ELES	S MANS AND PA	NS					9	
Wire	eless MAN	le – F	hysical and MAC	layer details, V	Vireless PANs – Ar	chitect	ure o	f Blue	toot	
		13 1				cincet				
Syste	ems, Phys	ical a	nd MAC layer det	ails, Standards.		cinteet				
Syste	ems, Phys	ical a	nd MAC layer det	ails, Standards.		enneer				
Syste	ems, Phys <mark>F V - 4G N</mark>	ical a	nd MAC layer deta	ails, Standards.					9	
Syste UNII	ems, Phys <mark>ΓV-4GN</mark> -Network	ical a	nd MAC layer deta ORKS itecture and Inter	ails, Standards. 	Interface and Radio) Netwo	orks -	Scheo	9 Juling	
Syste UNII LTE –Moł	ems, Phys <mark>F V - 4G N</mark> -Network bility Mar	ical a ETW Arch	nd MAC layer deta ORKS itecture and Inter nent and Power (ails, Standards. rfaces -FDD Air Optimization –L	Interface and Radic TE Security Archite) Netwo	orks – -Inter	Schec	9 Iuling	
Syste UNII LTE –Moł with	ems, Phys <mark>F V - 4G N</mark> -Network bility Mar UMTS an	ical a ETW Arch nagen	nd MAC layer deta ORKS itecture and Inter nent and Power (M –LTE Advanced	ails, Standards. rfaces -FDD Air)ptimization –L 1 (3GPPP Relea:	Interface and Radic TE Security Archite se 10) -4G Network	Netwo ecture - s and (orks - -Inter Comp	Schec	9 luling ection Radio	
Syste UNII LTE –Moł with Envii	ems, Phys F V - 4G N -Network bility Mar UMTS an ronment	ical a ETW Arch agen d GS –Prot	nd MAC layer deta ORKS itecture and Inter tent and Power (M –LTE Advanced tocol Boosters –F	ails, Standards. rfaces -FDD Air Optimization –L l (3GPPP Releas Iybrid 4G Wire	Interface and Radio TE Security Archite se 10) -4G Network less Networks Prot	Netwo ecture - s and (tocols	orks – -Inter Comp –Gree	Scheo conne osite en Wii	9 Iuling ectior Radio reless	
Syste UNII LTE –Moł with Envin Netw	ems, Phys F V - 4G N -Network bility Mar UMTS an ronment vorks –Ph	ical a ETW Arch agen d GS –Prot ysica	nd MAC layer deta ORKS itecture and Inten nent and Power (M –LTE Advanced cocol Boosters –H Layer and Multip	ails, Standards. rfaces -FDD Air)ptimization –L 1 (3GPPP Releas Iybrid 4G Wire ole Accesses –Ch	Interface and Radic TE Security Archite se 10) -4G Network less Networks Pro- nannel Modeling for	Netwo cture - s and (tocols 4G–Int	orks – -Inter Comp –Gree	Schec conne osite en Win ction	9 duling ectior Radio reless to 5G	
Syste UNII LTE –Mol with Envin Netw	ems, Phys F V - 4G N -Network bility Mar UMTS an ronment vorks –Ph	ical a IETW Arch agen d GS –Prot ysica	nd MAC layer deta ORKS itecture and Inter- nent and Power (M –LTE Advanced cocol Boosters –H Layer and Multip LECTURE	ails, Standards. rfaces -FDD Air Optimization –L d (3GPPP Releas lybrid 4G Wire ole Accesses –Ch TUTORIAL	Interface and Radio TE Security Archite se 10) -4G Network less Networks Pro- nannel Modeling for PRACTICAL	Netwo ecture - s and (tocols 4G–Int	orks – -Inter Comp –Gree troduc TAL	Schec conne osite en Win ction	9 Iuling ectior Radic reless to 5G	
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Syste UNI7 LTE –Mol with Envin Netw TEX	ems, Phys F V - 4G N -Network bility Mar UMTS an ronment vorks –Ph HOUR T BOOKS	ical a ical a E TW Arch agen d GS –Prot ysica	nd MAC layer deta ORKS itecture and Inter- nent and Power (M –LTE Advanceo cocol Boosters –H Layer and Multip LECTURE 45	ails, Standards. rfaces -FDD Air Optimization –L d (3GPPP Releas Hybrid 4G Wire ole Accesses –Ch TUTORIAL 0	Interface and Radic TE Security Archite se 10) -4G Network less Networks Pro- nannel Modeling for PRACTICAL 0	Netwo ecture - s and (tocols 4G–Int 4G–Int 4G	orks – -Inter Comp –Gree crodu TAL	Schec conne osite en Wi ction	9 Iuling ectior Radio reless to 5G	
Syste UNI1 LTE –Mol with Envin Netw TEX1	ems, Phys F V - 4G N -Network bility Mar UMTS an ronment vorks –Ph HOUR T BOOKS William	ical a ical a E ETW Arch agen d GS –Prot ysica Stallij	nd MAC layer deta ORKS itecture and Inter- nent and Power (M –LTE Advanced cocol Boosters –H Layer and Multip LECTURE 45 Margan Wireless Cor	ails, Standards. rfaces -FDD Air Optimization –L d (3GPPP Releas lybrid 4G Wire ole Accesses –Ch TUTORIAL 0	Interface and Radio TE Security Archite se 10) -4G Network less Networks Pro- nannel Modeling for PRACTICAL 0 nd networks", 2 nd E	Netwo ecture - s and (tocols 4G–Int 4G–Int 45 dition	orks – -Inter Comp –Gree rodu TAL	Schec conne osite en Win ction	9 luling ection Radio reless to 5G	
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REFERENCES BOOKS

- 1. Vijay. K. Garg, "Wireless Communication and Networking", Morgan Kaufmann Publishers, 2007.
- 2. Kaveth Pahlavan, Prashant Krishnamurthy, "Principles of Wireless Networks", Pearson Education Asia, 2002.
- 3. Gary. S. Rogers and John Edwards, "An Introduction to Wireless Technology", Pearson Education, 2007.
- 4. Clint Smith, P.E. and Daniel Collins, "3G Wireless Networks", 2nd Edition, Tata McGraw Hill, 2007.
- 5. Jonathan Rodriguez, "Fundamentals of 5G Mobile Networks", Wiley, 2015.

E REFERENCES

- 1. http://www.ed2go.com/online-courses/wireless-networking
- 2. https://www.cbtnuggets.com/it-training/network-administration-engineering/wirelessnetworking

Mapping of COs with POs:

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO	PSO
													1	2
CO 1	1	3								1		2	2	3
CO 2	1	3										1	2	3
CO 3	1	3								1		1	2	3
CO 4	1	2										1	2	3
CO 5		2										1	2	3
Total	4	13								2		6	10	15
Scaled	1	3								1		2	2	3

COU	RSE	CODE	2	XEC802C		L	Т	Р	С
COU	RSE	NAM	E	TELEVISION AND VIDEO ENGINEERING		3	0	0	3
PREF	REQ	UISIT	ES	XEC302,XEC404		L	Т	Р	Н
С	Р		Α			2	0	0	Э
3	0		0			3	U	U	3
COU	RSE	OUTO	COMI	ES	Do	omain		Le	evel
CO	1	Outli	i ne co	omposite video signal ,	Co	gnitive	Re	mem	bering,
	L	desci	ribea	and <i>classify</i> camera tubes			Un	derst	tanding
CO2	2	Desc	ribe	the operation of various sections of	Co	gnitive	Rei	mem	bering
		Mono	ochro	ome TV transmitter and receiver.					
COS	3	Unde	ersta	nd the operation of different types of	Co	gnitive	e Un	derst	tanding
		colou	ır Te	elevision systems					
CO4	4	Illust	trate	the advanced Television systems and	Co	gnitive	An	alyzi	ng
		displ	ay de	evice technologies.					
COS	5	Expr	<i>ess</i> t	he concepts of digital video processing	Co	gnitive	e Un	derst	tanding
UNIT	' I - '	TELEV	VISIO	ON FUNDAMENTALS					9

Aspect ratio-Image continuity-Number of scanning lines-Interlaced scanning-

Picture resolution – Cameratubes - Image Orthicon – Vidicon - Plumbicon- Silicon Diode Array Vidicon- Solidstate Image scanners- Monochrome picture tubes- Composite video signal- video signal dimension -horizontal sync. Composition-vertical sync. Details-Functions of vertical pulsetrainScanning sequence details. Picture signal transmission-

positive and negative modulation- VSB transmission- Sound signal transmission-Standard channel bandwidth.

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UNIT II - MONOCHROME TELEVISION TRANSMITTER AND RECEIVER

Principles of Monochrome Television Transmitter and Receiver systems. -TV transmitter-TV signal Propagation- Interference- TV Transmission Antennas- Monochrome TV receiver-RF tuner- UHF, VHF tuner-Digital tuning techniques-AFT-IF subsystems-AGC Noise cancellation-Video andSound inter-carrier detection-Vision IF subsystem- DC reinsertion-Video amplifier circuits-Sync operation-typical sync processing circuits-Deflection current waveforms, Deflection oscillators- Frame deflectioncircuitsrequirements- Line deflection circuits-EHT generation-Receiver antennas.

UNIT III - ESSENTIALS OF COLOUR TELEVISION

Colour Characteristics-Chromaticity diagram-Colour Cameras - NTSC colour TV systems-SECAM system- PAL colour TV systems- Cancellation of phase errors-PAL-D Colour system-PAL coder-PAL-Decoder receiver-Chromo signal amplifier Separation of U and V signalscolour burst separation-Burst phase Discriminator-ACC amplifier-Reference Oscillator-Ident and colourkiller circuits-U and V demodulators- Colour signal matrixing- Sound in TV

UNIT IV -ADVANCED TELEVISION SYSTEMS AND DISPLAY DEVICE TECHNOLOGIES

High Definition TV, DVD, Blue Ray, Hard Drives, IPTV (Web TV), On Demand Services, Multimedia Broadcasting, Mobile TV, Video Display Devices, Plasma vs. LCD, and DLP. Satellite TV technology-Geo Stationary Satellites-Satellite Electronics-Domestic Broadcast System-Cable TV-Cable Signal Sources-Cable Signal Processing, Distribution & Scrambling-Video Recording-VCR Electronics-Video Home Formats- Video

Disc recording and playback-DVD Players-Tele Text Signal coding and broadcast receiver-Digitaltelevision-Transmission and reception –Projection television- flat panel display TV receivers -LCD and Plasma screen receivers-3DTV-EDTV.

UNIT V - DIGITAL VIDEO PROCESSING				9
Digital and High Definition Television Pr	inciples of di	gital video bro	adcasting-Digi	tizing the TV
picture-SDTV sampling rate-Video sam	pling-Samplir	ng structure-T	he bit rate-HD	TV common
interface format-Intra-frame (spatial)	prediction-In	ntra-blocks a	nd modes-Size	and mode
selection-Intra-prediction operation-AV	°C motion co	mpensation-M	lotion compen	sation block
sizes-Motion vector prediction.				
	LECTURE	TUTORIAL	PRACTICAL	TOTAL
HOURS	45	0	0	45
TEXT BOOKS				
1. R.R.Gulati, "Monochrome Television	Practice, Prir	iciples, Techno	ology and Servi	cing",
3 rd Edition, New Age International (H	Publishers,	2006		
2. K.F Ibrahim, "Television and Video T	'echnology", 4	th Edition, Nev	wness Publicati	ons, 2007.
3. M.Dhake, "Television and Video Engi	ineering", 2 nd	Edition, Tata	McGraw Hill, 2	003.
REFERENCES				
1. Herve Benoit, "Digital TV for Satellite	e Broadcastin	g", 4 th Edition,	Elsevier Public	cation, 2005.
2. Lars Ingemar Lundstrom, "Unders	standing Digi	tal Television	: An introduct	tion to DVB
systems with satellite, cable, broa	adband and	terrestrial TV	distribution",	1 st Edition,
Elsevier Publications, 2006.				
3. R.P.Bali, "Color Television, Theory an	nd Practice", "	Гаta McGraw-I	Hill, 1994.	
4. R.R.Gulati, "Modern Television Pra	ctice: Transr	nission, Recep	otion and App	lication", 5 th
Edition, New Age International Publ	ishers, 2015.			
E-REFERENCES				
1. http://textofvideo.nptel.iitm.ac.in/10	6106090/lec	3.pdf		

2. http://happy.emu.id.au/lab/lectures/uoc/uocdtv1/

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO1	PS
CO 1	3	1	1								1	2		
CO 2	3	1	1								1	2		
CO 3	3	1	1								1	2		
CO 4	3	1	1			1					1	2		
CO 5	3	1	1	1							1	2		
Total	15	5	5	1		1					5	10		
Scaled	3	1	1	1		1					1	2		
value														

Mapping of COs with POs:

COUR	RSE COI	DE	XEC803A			L	Т	Р	С
COUR	URSE NAMEINTRODUCTION TO MEMS3003								
PRER	EQUIS	ITES				L	Т	Р	Н
С	Р	Α	3:0:0			3	0	0	3
3	0	0							
COUR	RSE OU'	тсоми	ES			Dom	ain		Level
CO1	Des	scribe,	classify MEMS	S and microsystem	S.	Cogni	tive	Reme	mbering,
								Under	rstanding
CO2	Des	scribe a	and <i>explain</i> the	e materials for ME	MS.	Cogni	tive	Reme	mbering,
								Under	rstanding
CO3	Des	scribe	and <i>explain</i> the	e Fabrication Proc	esses.	Cogni	tive	Reme	mbering,
								Under	standing
CO4 <i>Classify</i> Micro manufacturing and <i>understand</i> the Cognitive Analyzing,									
	des	ign pri	nciples of Micr	osystems.				Under	standing
CO5Describe, categorizeScaling laws and MEMSCognitiveUnderstandi									rstanding,
	packaging. Analyzing								zing
UNIT	<u>I - OV</u>	ERVIE	W OF MEMS A	ND MICROSYSTE	MS				9
Introc	duction	to MEI	MS, sensors, tra	ansducers, actuato	rs, MEMS and	d Micro	osystei	ms, Mio	crosystems
and r	nicroel	ectroni	ics, Microsyste	ems and miniatu	rization, app	licatio	n of i	micro	system in
auton	notive i	ndustr	y, Working pri	nciple of- Micro s	ensors, Micro	o actua	itors, I	MEMS	with Micro
actual	tors, M	icro acc	celerometers.						
UNIT	II -MA	TERIA	LS FOR MEMS						9
Subst	rate an	d wafe	r, silicon as a s	ubstrate material	silicon comp	oound,	silicor	1 Piezo	- resistors,
Galliu	m Arse	nide, q	uartz, Piezoele	ctric crystals, poly	mers and pa	ckagin	g Mate	erials. (lean room
lab te	chniqu	es: clea	n rooms, gown	ing procedures; sa	afety, fire, tox	icity; a	cids a	nd base	es.
UNIT	III - F	ABRIC	ATION PROCE	SS					9
Photo	lithogr	aphy, I	on implantatio	n, Diffusion, Oxida	tion, Chemica	al vapo	r depo	osition	(CVD),
Physic	cal vap	or depo	osition (PVD)-s	puttering, Deposit	ion by Epitax	y, Etch	ing.		
UNIT	IV-MI	CROMA	NUFACTURIN	G AND MICROSY	STEM DESIG	N			9
Manu	facturi	ng P	rocess: Bull	K Micromachin	ng. Surfac	e M	icrom	achinir	ng. LIGA
Proce	ss.Micr	osvstei	m Design: Desi	gn considerations	. Process Des	ign. De	esign o	of a Sili	con Die for
micro	pressu	ire sens	sor, Computer	Aided Design.	,	0,	0		
UNIT	V -SCA	LING L	AWS AND ME	MS ASSEMBLY					9
Scalin	g Laws	: Scalin	ig in Geometry	, Electrostatic forc	es, Electroma	gnetic	forces	s, Elect	ricity, Heat
transfer-conduction, convection.									
MEMS	S Pack	aging a	and Assembly	: Overview of m	echanical pa	nckagin	ig of	microe	electronics,
Micro	system	Pack	aging, Interf	aces in Micros	ystem Pack	aging,	Esse	ential	Packaging
techn	ologies	, 3D pa	ckaging, Assen	ubly of Microsyste	ms, Selection	of pac	kaging	g mater	rials, Signal
Марр	ing and	l Trans	duction, Desig	n case: Pressure se	nsor Packagi	ng.			
			LECTURE	TUTORIAL	PRACTIC	AL		TOT	'AL
H	OURS		45	0	0			45	5

	TEXT BOOKS
1.	Tai-Ran Hsu, "MEMS and Microsystems Design and Manufacturing", Tata McGraw Hill,
	2002.
2.	Hector J. De Los Santos, "RF MEMS Circuit Design for wireless communication", Artech
	House Micromechanical Systems (MEMS) Series, 2002.
3.	Vijay K.Varadan, K.J.Vinoy, K.A.Jose "RF MEMS and Their Applications", John Wiley &
	Sons Ltd, 2003.
	REFERENCES
1.	Julian W Gardner, "Microsensors MEMS and Smart Devices", John Wiley and Sons, 2001.
2.	Chang Liu, "Foundation of MEMS", Pearson International Edition, 2006.
3.	Gabriel M Rebeiz, "RF MEMS - Theory Design and Technology", John Wiley and Sons,
	2003.
	E-REFERENCES
1.	http://nptel.ac.in/courses/117105082/# (Prof. Santiram Kal, "MEMS & Microsystems,
	NPTEL online courses", Department of Electronics & Electrical Communication
	Engineering, Indian Institute of Technology, Kharagpur)
2.	http://freevideolectures.com/Course/2956/Introduction-to-MEMS-Design-Fall-2011#
	(Prof. Clark Tu-Cuong Nguyen, "Introduction to MEMS Design,UC Berkeley Course
	online courses", Department of Electrical Engineering, UC Berkeley)

	PO	P01	P01	P01	PS	PS								
	1	2	3	4	5	6	7	8	9	0	1	2	01	02
CO 1	3	2	3		2	1	1				1	1		1
CO 2	3	1			2	1						1		
CO 3	2				1							1		
CO 4	2	1			2							1		
CO 5	2	3	1		2	2	1				1	1		1
Total	12	7	4		9	4	2				2	5		2
Scaled	3	2	1		2	2	1				1	1		1

COL	JRSI	E CODE	XEC803B					L	Т	Ρ	С
COL	JRSI	E NAME	INTERNET OF THINGS 3 0 0								
PRE	REC	UISITES						L	Т	Р	Η
С	Р	Α						3	0	0	3
3	0	0									
COL	JRSI	E OUTCOM	IES			Doma	ain		Le	vel	
C01		Describe l	internet of Thins (IoT) an	d <i>explain</i> va	rious	Cogniti	ve	Ren	nemb	ering	g,
		IoT relate	ed technologies					Und	lersta	Indir	ıg
C02		Describe	resource management in	IoT.		Cogniti	ve	Ren	nemb	ering	g
C03		Describe a	and <i>distinguish</i> various th	e architectu	re,	Cogniti	ve	Ren	nemb	ering	g,
		platforms	s, services of IoT.					Und	lersta	ndir	ıg
C04		<i>Explain</i> h	ow IoT can be integrated	to IP		Cogniti	ve	Und	lersta	ndir	ıg
C05		Describe	various IoT applications			Cogniti	ve	Ren	ıemb	erin	g
UNI	ΤI	- INTROE	DUCTION AND ENABLIN	G TECHNOL	OGIES	IN IOT					9
IoT,	Ма	chine to M	lachine, Web of Things, I	Definition- M	lajor co	mponen	ts if I	loT d	evice	s-Co	ntrol
Unit	s-Se	ensors-Con	nmunication Modules-P	ower Sourc	es Vis	ion- Ch	aract	eristi	cs -	Lay	reed
Arcl	nited	ture- Lar	ndscape IoT Function	al View-Io	Г rela	ted Inte	ernet	Tec	hnolo	ogy-c	loud
com	puti	ng-Netwo	rks and Communication	ns related	to IoT	-Process	es re	elated	to	IoT-	Data
Man	age	ment relat	ed to IoT-Security Priva	cy and Trust	t-Devic	es level	energ	gy iss	ues-S	tand	lards
rela	ted										
UNI	ΤII·	RESOURC	E MANAGEMENT IN TH	E INTERNET	r of ti	HINGS					9
Clus	teri	ng - Softwa	are Agents - Data Synchro	onization - Cl	usterin	ig Princij	ples i	n an I	nterr	iet o	f
Thir	igs /	Architectu	re - The Role of Context	: - Design Gu	lideline	es -Softw	are A	Agent	s for	Obj	ect –
Data	a Sy	nchronizat	ion- Types of Network A	rchitectures	- Fund	lamenta	l Con	cepts	of Ag	gility	' and
Auto	onor	ny-Enablir	ig Autonomy and Agility	by the Inte	rnet of	Things-	Tech		Requ	irem	ients
IOr	Sati	siging the	New Demands in Prod	uction - In	e Evoll	ltion irc	om th		ID-Da	isea	EPC
Net	wori	k to an Age	ent based internet of 1 nin	igs- Agents i	or the E	senaviou	roru	object	S		
UNI	ΤII	I- THE AR	CHITECTURE, PLATFOR	RMS, SERVIC	CES						9
The	Lay	ering conc	epts, IoT Communicatio	n Pattern, Io	T proto	ocol Arch	itect	ure, T	'he 6	LoW	PAN,
Plat	forn	ns - IBM wa	atson-Intel Platform- Car	riot Platform	ı- Webı	nms-dev	iceW	ISE			
UNI	T IV	- SCALAB	LE INTEGRATION FRAM	IEWORK							9
Intr	odu	ction- IPV	6 Potential- IoT6- IPV6	for IoT- Ad	apting	IPV6 to	IoT	requi	ireme	ent-	IoT6
arch	itec	ture - Dig	Covery- IoT6 Integratio	n with clou	d and	EPICS- I	Enabl	ing E	leter	ogen	eous
Inte	grat	ion- IoT6 S	Smart Office use case- Sca	lability perc	eptive.						
IINI	тv.	ΙΟΤ ΔΡΡΙ	ICATIONS							T	9
Sma	rt F	nvironmer	its and Smart Snace crea	tion - Conne	cted De	evices ill	ustra	tion-l	ndus	trial	JoT-
IFR	ar ar	nlication	Domains-SmartFnvironn	nent Monito	ring-	Smart Fi	ierov	- Sn	nart	huil	ding-
Sma	rt T	ransport a	nd mobility-IoT Smart X	applications			5y	51	iiui t	Sun	81118
		poi e u	mosinty to romant A	LECTURE	TUT	ORIAL	PR/	АСТІС	CAL	ТО	TAL
		Н	IOURS	45		0		0		4	45
TEX	ТВ	OOKS				-		~		ı	-
Ovid	liu V	ermesan.	Peter Friess, "Internet of	Things- From	n Rese	arch and	Inno	vatio	n to r	nark	et
Den	lovn	nent". Rive	er Publishers. 2014.	0- 101			0				
- P	-) -	,									

REFERENCES

Arshdeep Bahga, Vijay Madisetti Internet of Things: A Hands-On Approach Hardcover –

Madisetti Publishers, 2014 Samuel Greengard, "The Internet of Things", MIT Press, 2015.

E REFERENCES

http://postscapes.com/internet-of-things-resources/

Mapping of COs with POs:

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO 1	PSC 2
CO 1	1	3								1		2	2	3
CO 2	1	3										1	2	3
CO 3	1	3								1		1	2	3
CO 4	1	2										1	2	3
CO 5		2										1	2	3
Total	4	13	0	0	0	0	0	0	0	2		6	10	15
Scaled	1	3	0	0	0	0	0	0	0	1	0	2	2	3

COURSE NAME SOFTWARE DEFINED RADIO 3 0 0 3 PREREQUISITES XEC404,XEC502,XEC703 L T P H C P A 3:0:0 I T P H COURSE OUTCOMES Domain Level COURSE Describeand discusssystem-level decisions for cognitive Cognitive Remembering, Understanding CO2 Define and sketchthe cognitive networks Cognitive Remembering, Applying CO3 Understandand develop different CR architectures models, point out its developmental issues and outline its hierarchy Cognitive Understanding, Create, Analyzing CO4 Understand and design the analog RF components as SDR Architecture. Cognitive Remembering, Create, Analyzing CO5 Select suitable method and construct the CR along with site, SDR Architecture. Create, Analyzing O UNIT I - NTRODUCTION V V Neembering, Create, Analyzing O UNIT II - COGNITIVE NETWORKS 9 Introduction, Definition, Motivation and Requirements. A Simple Example: Foundations and Related Work Cognitive RAdio Cross-layer Design. Recent Work: Implementation, Sectorarce Radio, Creas-layer Design. Recent Work: Implementation, Secons-layer Design. Recent Work: Implementat	COURSE NAMESOFTWARE DEFINED RADIO300PREREQUISITESXEC404,XEC502,XEC703LTPCPA3:0:0300300011COURSE OUTCOMESDomainLLCognitiveC01DescribeDefined Badia technology and productsCognitiveReme	3 H 3 Level embering, rstanding embering, /ing									
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1. Jeffery H.Reed, "Software Radio-A Modern Approach to Radio Engineering", PHI, 2002.	1. Jeffery H.Reed, "Software Radio-A Modern Approach to Radio Engineering", PHI,	, 2002.									
2. Tony J. Rouphael, "RF and Digital Signal Processing for Software Defined Radio" Elesiver, 2009.	Elesiver,										

	REFERENCES
1.	B.G.Golderg, "Digital Techniques in Frequency Synthesis", McGraw Hill, 1996.
2.	N.J.Fliege, "Multirate Signal Processing", John Wiley and Sons, 1994.
	E-REFERENCES
1.	https://www.researchgate.net/publication/262688697_SoftwareDefined_Radio_A_New_
	Paradigm_for_Integrated_Curriculum_Delivery
2.	file:///C:/Users/Administrator/Downloads/rtl-sdr.2.pdf
3.	https://media.blackhat.com/bh-dc-11/Perez-Pico/BlackHat_DC_2011_Perez-
	Pico_Mobile_Attacks-Slides.pdf
4.	http://www.digisatitalia.com/public/65352646_SDRGuida_rapida.pdf
5.	http://www.digisatitalia.com/public/65352646_SDRGuida_rapida.pdf
6.	http://darcverlag.de/mediafiles//Sonstiges/HackRF-Artikel1.pdf
7.	http://blog.alexandrecazaux.fr/wp-content/uploads/2012/08/Tutorieldutilisationdun
	RTL2832UavecSDR-2.pdf

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO1	PS
CO 1	2	3												
CO 2	1	2		1	2	1						1	1	
CO 3	1	2		2	3	1						1		
CO 4	2	3	1	1	1							1		
CO 5	1	1	1	3	2	1						1	1	
Total	7	11	2	7	8	3						4	2	
Scaled	2	3	1	2	2	1						1	1	
value														

COURSE	CODE	XECOE1	L	Т	Р	С				
COURSE	NAME	INDUSTRIAL ELE	3	0	0	3				
PREREQ	UISITES	XBE103,XPH104	L	Τ	Р	Η				
C P	Α					3	0	0	3	
3 0	0					-				
COURSE	OUTCOMES				DOMAIN	N	L	EVE	Ĺ	
CO1Describe and understand Power electronics devicesCognitive								mbei •stan	ring ding	
CO2	<i>Explain</i> and <i>classify</i> various convertors, inverters and Cognitive Remember Cognitive Understa									
CO3	Describe an	nd <i>apply</i> DC and AC	industrial dri	ves	Cognitive	e]	Reme: Apply	mbei ing	ring	
CO4	<i>Explain</i> and integrated	d use industrial elec circuits	ctronic circuits	and	Cognitive	e]	Reme Apply	mbei ing	ring	
CO5	<i>Explain</i> an electronics	d understand othe	er applications	of	Cognitive	e]	Reme: Under	mbei rstan	ring, ding	
UNIT I -	POWER DEV	VICES					onaci	Stall	9	
General j a SCR, ba Power M	ourpose Dio sics of Gate OSFET,IGBT	des, Power diodes, Turn Off thyristor, T ,GTO and SCS	Power transis TRIAC and DIA	tors, SCR , trigg C , Application	gering circ is of TRIA	cuits C-DI	s, turn AC cir	ing-c rcuit,	off of	
UNIT II -	CONVERTE	RS, INVERTER ANI	D CHOPPER						9	
Introduc controlle and AC inverters Chopper AC chopp	tion to half d and fully controllers, s – Current classificatio pers	wave, full wave an controlled converte – Voltage Source Source Inverter (C n–Class A,B, C, D, E	d bridge recti ers – Dual con Inverter (VSI CSI) – Choppe S–	fiers – Single overters – Intr) – Series an ers – Step up	phase and oduction d Parallel and step	d th to C l inv o do	verter	hase conv · – E hopp	Half erters Bridge oers –	
IINIT III	- DC AND A	C INDUSTRIAL DR	IVES						9	
UNIT III - DC AND AC INDUSTRIAL DRIVES 9 Review and comparison of Torque-speed characteristics of DC motors and AC induction motors. Basic principles of speed control of AC/DC motor, Basics of BLDC motor, Stepper motor, Servo Motor. Suitability of each motor for various industrial applications, Selection and sizing of motors for										
UNIT IV	- INDUSTRI	AL ELECTRONIC CI	RCUITS AND	INTEGRATED					9	
ONIT IV - INDUSTRIAL ELECTRONIC CIRCUITS AND INTEGRATED CIRUITS9Review of Operational amplifiers and 555 Timer, Voltage follower (Buffer), Instrumentation Amplifier, Summing amplifier, Schmitt triggers Active first order filter: Low pass and high pass filter, Power Op Amps Optical Isolation amplifier, Digital counters , Registers, decoders and encoders, Multiplexer and Demultiplexer, Integrated circuits and logic families : Logic Levels, Noise Immunity, Fan Out, Power Dissipation, Propagation Delay9										
UNIT V -	OTHER INE	OUSTRIAL ELECTR	ICAL AND ELE	CTONIC DEVI	CES				9	
Overview controlle and offli dielectrie	v of generic d AC and DC ne ups – Sv c heating	Microprocessor, ar C Electrical Drives a witched mode pow	chitecture and nd Communic er supply – I	l functional bl ation systems Principle and	ock diagra – Voltage applicatio	am- reg n o	Micro ulator f indu	oproc rs – (ictio	cessor Dnline n and	
			LECTURE	TUTORIAL	PRAC	ΓΙር	\L	TO	TAL	
		HOURS	45	0	0)		4	15	

TEXT BOOKS

1. Alok Jain, Power Electronics and Its Applications, Penram International Publishing (India) Pvt. Ltd.,

2004, Second Edition.

2. D.Roy Choudhary, Sheil B.Jani, 'Linear Integrated Circuits', II Edition, New Age, 2003.

3.AnilK. Maini , *Digital* Electronics. *Principles*, Devices and *Applications*.. DefenceResearchand

DevelopmentOrganization (DRDO), India.

REFERENCES

1. M.H. Rashid, 'Power Electronics: Circuits, Devices and Applications', Pearson Education, PHI Third

edition, New Delhi 2009.

2. P. S. Bimbra; Title of the Book: Power Electronics; Publisher: Khanna Publishers, New Delhi; Year:

2012; 5 th Edition:

- 3. Ashfaq Ahmed Power Electronics for Technology Pearson Education, Indian reprint, 2003.
- 4. Philip T.Krein, "Elements of Power Electronics" Oxford University Press, 2004 Edition
- 5. Ned Mohan, Tore.M.Undeland, William.P.Robbins, 'Power Electronics: Converters, Applications and

Design', John Wiley and sons, third edition, 2003.

- 6. Jain R.P., "Modern Digitals Electronic "Tata McGraw Hill, 1984.
- 7. Fundamentals of Microcontrollers and Embedded System, Ramesh Gaonkar, PENRAM
- 8. Electrical drives by G K Dubey, Narosapublications
- 9. Power Electronics, Ned Mohan, Undeland, Robbins, John Wiley Publication
- 10. Digital principal and Application, Malvino& Leach, Tata McGraw Hill, 1991.
- 11. Digital design, Morris M. Mano, Prentice Hall International 1984.
- 12. Electronic Devices and Circuits, Robert Boylestad and Louis Nashelsky, Prentice-Hall of India.
- 13. Electronic Devices and Circuits, Millman and Halkias, Tata McGraw-Hill.
- 14. MSP430 Microcontroller Basics, John H. Davies, Newnes; 1 edition (September 4, 2008) **E- REFERENCES**

1.Lecture Series on Power Electronics by Prof. B.G. Fernandes, Department of Electrical Engineering.IIT

Bombay. For more details on NPTEL visit http://nptel.iitm.ac.in

Mapping of COs with POs:

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO1	PSO2
CO 1	2	1			1							2		
CO 2	2	1			1							2		
CO 3	2	1			1							2		
CO 4	2	1			1							2		
CO 5	2	1`			1							2		
Total	10	5			5							10		
Scaled	2	1			1							2		
value														

COURS	SE COE)E	XECOE2	L	Τ	Р	C		
COURSE NAME			ENTERTAINMENT ELECTRONICS AND	3	0	0	3		
			MANAGEMENT						
PRERI	EQUISI	TES	XBE103	L	Τ	Р	Η		
С	Р	Α		3	0	0	3		
3	0	0							
COURSE OUTCOMES			S	DOMA	IN	LE	VEL		
CO1	Class	ify and	Cognitiv	ve	Understanding				
CO2	CO2 <i>Discuss</i> the working principles of Monochrome and color					Understanding			
	TV.								
CO3	Unde	erstand	and d <i>iscuss</i> Electronic Gadgets and Domestic	Cogniti	ve	Understanding			
	Home Appliances.								
CO4	Outli	ne and	<i>explain</i> the office equipments landline and	Cogniti	ve	Remem	ıbering,		
	mobi	le telep	hony			Outline			
CO5	Sumi	narize	he concepts repair, servicing and maintenance	Cogniti	ve	Underst	tanding		
	of electronic gadgets.								
IINIT I	I - ALID		ГЕМЅ				Q		

Microphones: construction, working principles and applications of microphones, their types viz: a) Carbon b) moving coil, c) velocity, d) crystal, e) condenser, e) cordless etc. Loud Speaker: Direct radiating, horn loaded woofer, tweeter, mid range, multi-speaker system, baffles and enclosures. Sound recording on magnetic tape and tape transport mechanism. Hi-Fi system, preamplifier, amplifier and equalizer system, stereo amplifiers. Audio recording and reproduction – Cassettes, CD and MP3, stereophonic sound system

UNIT II - MONOCHROME AND COLOUR TV

Monochrome TV : Elements of TV communication system, Scanning, Progressive scanning, Interlaced scanning, Construction and working of Monochrome picture tube, Construction and working of camera tube: vidicon and plumbicon, Block diagram of TV camera, Block diagram and function of a TV receiver.

Colour TV : Primary colours, concepts of additive and subtracting mixing of colours, concepts of luminance, Hue and Saturation, Block diagram of colour TV camera ,Introduction to PAL, NTSC, SECAM colour TV systems, Video camera .Construction and working principles of colour picture tubes, Block diagram,explanation and working of Colour TV receiver.

UNIT III - ELECTRONIC GADGETS AND DOMESTIC HOME APPLIANCES

Electronic Toys, Data organizers, Video system – VCR/VCD/DVD players, MP4 players ,Set Top box, CATV ,Principle of video recording on magnetic tape, Digital watch, Digital clock, Digital Calculator ,Digital camera, Handicam, Home security system, CCTV, Air conditioners, Refrigerators, Working of Automatic and Semi automatic washing Machine/Dish Washer, Microwave oven, Vacuum cleaners, Set Top box, Block diagram and principles of working of CATV and DTH, cable TV using internet, DTV, LCD, Plasma & LED TV, Projectors ,Home Theatres and Remote Controls

UNIT IV - OFFICE EQUIPMENTS, LANDLINE AND MOBILE TELEPHONY

Scanners – Barcode / Flat bed , Printers , Multifunction units (Print, Scan, fax,copy),Working principles of Cordless telephones, Pager, Working of Photostat machines, Basic idea of Fax system and its applications. Principle of operation and block diagram of modern FAX system. Important features of modern FAX machines, Basic landline equipment – CLI, Cordless Intercom/ EPABX system, Mobile phones – GPRS & Bluetooth, GPS Navigation system, Home automation system

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UNIT V - REPAIR, SERVICING AND MAINTENANCE CONCEPTS

Introduction, Modern electronic equipment, Mean time between failures (MTBF), Mean time to repair (MTR), Maintenance policy, potential problems, preventive maintenance, corrective maintenance. Study of basic procedure of service and maintenance, Circuit tracing techniques and Concepts of shielding, grounding and power supply considerations in instruments, Use of digital tools for trouble shooting digital components, Trouble Shooting procedures in the following: Oscilloscope, Power Supplies, Digital multimeters, Signal generator, PA system, Tape recorder, CD player and Stereo amplifier, Fault finding of colour TV.

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	LECTURE	TUTORIAL	PRACTICAL	TOTAL
HOURS	45	0	0	45
TEXT BOOKS				

1.R. P. Bali, "Consumer Electronics", Pearson Education, 2008

2.R. G. Gupta," Audio and Video systems", Tata McGraw Hill,2004

REFERENCES

- 1. R.R Gulati ,"Monochrome and Colour Television-principles & practice", Wiley Eastern Limited, New Delhi, 4th edition ,2011
- 2. R.R Gulati , "Composite Satellite & cable Television", New age International Publisher,2nd edition, 2011
- 3. RC Vijay ,"Colour Television Servicing" ,BPB Publication, 4th Edition, 2007, New Delhi
- 4. A.K. Maini , "Colour Television & Video Technology" , CSB Publishers, 2005
- 5. S.P. Sharma , "VCR-principles, maintenance & repair" , Tata Mc Graw Hill, New Delhi
- 6. A.Dhake , "Colour TV" , Tata Mc Graw Hill Publication, 2nd edition,
- 8. K. Blair, Benson "Audio Engineering Hand book",2001
- 9. S.P. Sharma, "VCR-principles, maintenance & repair", Tata Mc Graw Hill, New Delhi, 2003
- 10. "Service Manuals", BPB Publication, New Delhi, 2000

E-REFERENCES

- 1. http://www.mediacollege.com/audio/01/sound-systems.html
- 2. https://books.google.co.in/consumer electronics/
- 3. http://www.circuitstoday.com/working-of-amplifiers

4. http://www.britannica.com/technology/television-technology/Principles-of-television-systems

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS 01	PS 02
CO 1	3	2					1	1		1		1		
CO 2	3	2				1	1	1				1		
CO 3	2	2					1	1				2		
CO 4	2	2				1		1		1		2		
CO 5	2	2				1	1	1				1		
Total	12	10				3	4	5		2		7		
Scaled	3	2				1	1	1		1		2		
value														