

Scheme – 2020

Scheme and Syllabus for II, III & IV Year of

Four year B.Tech. Degree Program in

Electronics and Communication Engineering

FOUR YEAR B.TECH. DEGREE COURSE Scheme of Instruction and Examination (With effect from 2020-21)

III Semester ECE Scheme-2020												
	Catagory	Course	Course Title	Credita	So Inst per	cheme tructio iods/v	of on veek	Scheme of Examination Maximum Marks				
	Category	Code	Course Thie	Creuits	L	Т	P/D	End Exam Marks	CIA Marks	Total Marks		
Ι			Theory									
1.	HSSC	HU201	Managerial Economics and Financial Accountancy	3	3			60	40	100		
2.	ESC	EE211	Network Analysis and Transmission Lines	3	3			60	40	100		
3.	PCC	EC201	Digital System Design	3	3			60	40	100		
4.	PCC	EC202	Signals and Systems	3	2	1		60	40	100		
5.	PCC	EC203	Probability Theory and Stochastic processes	3	2	1		60	40	100		
6	SOC	SCEC01	Basic Programming in Python	2	1		2	60	40	100		
7.	MC	MC103	Constitution of India	-	2	-	-	-	100	100		
Π			Practical									
8.	PCCL	EC204	Electronic Devices & Circuits Lab	1.5			3	60	40	100		
9.	PCCL	EC205	Digital System Design Lab	1.5			3	60	40	100		
10.	PCCL	EC206	Basic Simulation Lab	1.5			3	60	40	100		
			Tota	21.5								

IV Semester ECE

Γ	V Semeste	er ECE			Scheme-2020							
	Catagory	Course	Country Title	Creadita	S In per	Schem struc riods/	e of tion week	Schem Ma	Scheme of Examination Maximum Marks			
	Category	Code	Course The	Creans	L	Т	P/D	End Exam Marks	CIA Marks	Total Marks		
Ι			Theory									
1.	BSC	BS204	Complex variables and Numerical Methods	3	2	1		60	40	100		
2.	PCC	EC207	Computer Organization and architecture	3	3			60	40	100		
3.	PCC	EC208	Analog Electronic Circuits	3	3			60	40	100		
4.	PCC	EC209	Electro Magnetic Waves	3	3			60	40	100		
5.	PCC	EC210	Analog and Digital Communications	3	3			60	40	100		
Π			Practical									
6	PCCL	EC211	Analog Electronic Circuits Lab	1.5			3	60	40	100		
7	PCCL	EC212	Analog and Digital Communications Lab	1.5			3	60	40	100		
8	ESCL	EE212	Networks and Transmission Lines Lab	1.5			3	60	40	100		
9	SSC SCCM01 Soft Skills Lab (SS(P))			2			4	60	40	100		
			Tota	21.5								

MANAGERIALECONOMICSANDFINANCIALACCOUNTACY(MEFA) (Common to ECE& CSE)

III Semeste	er: Common to H	ECE &	CSE				S	Scheme: 2020				
Course Code	Category	Но	ours/W	eek	Credits	Max	timum Mar	ks				
HU201	HSSC	L	Т	Р	С	Continuous Internal Assessment	ntinuous nternal sessmentEnd ExamTOTAL4060100					
		3	0	-	3	40	60	100				
Sessional E	xam Duration: 1	$\frac{1}{2}$ Hr	5			En	d Exam Du	ration: 3 Hrs				
Course Ou	tcomes: At the er	nd of th	e cours	se the stu	ident will b	e able to	6.1	1 1 1				
COI: Unde	rstand the nature	and sco	ope of I	manager	ial econom	ics and the concep	ots of deman	d analysis.				
CO2: Understand the significance of demand elasticity and the concepts of demand forecasting.												
CO3: Unde com	CO3: Understand the concepts of production and cost analysis and different market structures and their competitive situations.											
CO4: Under	rstand the concept	and sig	nificano	ce of cap	ital budgetin	ıg.						
CO5: Unde	rstand the princip	oles and	l signif	ïcance o	faccountar	ncy and preparatio	n of final acc	counts.				
				UN	I – TIV							
curve. <u>Elasticity o</u> Elasticity o Domand fo	f Demand and Definition of the second	emand , Meas	<i>Foreca</i> uremer	UN usting: nt and Si	IT – II gnificance;	s of Demand For	ocasting					
				UN.	<u> </u>							
Theory of pProductionLaw of Retand ProduceCost AnalyAnalysis – 1Market Str– MonopolMonopoly.	Theory of production & cost analysis and Market StructuresProduction Analysis: Meaning, Isoquants & Isocosts, The law of diminishing Marginal Returns,Law of Returns to Scale, Internal and External Economies of scale, Optimum combination of inputsand Producer's equilibriumCost concepts, Cost output relationship for Short Run and Long Run, Break EvenAnalysis – Cost concepts, Cost output relationship for Short Run and Long Run, Break EvenAnalysis – Its Importance, Limitations and Managerial usesMarket Structures: Types and Features of different market structures–Perfect Competition – Monopoly– Monopolistic and Oligopolistic; Price output determination in case of perfect competition and											
	UNIT – IV											
Capital and Introduction budgeting of Capital Bud Discounted Profitability	Capital Budgeti n; Definition; S lecisions; Need lgeting-Traditiona Cash flow met v index method.	ng ignifica for cap al Meth hods-	ince o bital bu hods-Pa Net pr	f Capit dgeting ayback p esent v	al Budgeti decisions; period and alue metho	ing; Complication steps in capital Accounting rate o od, Internal Rate	ns involved budgeting; of return me of return n	in capital Methods of thods, method and				

UNIT – V

Introduction to Financial Accountancy

Principles of Accountancy: Introduction, Double Entry System of Book Keeping, Journal, Ledger, Preparation of Trial balance

Preparation of Final Accounts: Trading Account, Profit & Loss Account, and Balance Sheet with adjustments, Final Accounts problems.

Text Books:

1. A.R. Aryasri, Managerial Economics and Financial Analysis, Mc Graw Hill Education

2. Varshiney and Maheswari, Managerial Economics, Sultan Chand & Co, New Delhi

Reference Books:

1) Vanita Agarwal, Managerial Economics, Pearson Education

2) Domnick Salvatore: Managerial Economics in a Global Economy, 4th Edition, Thomson

3) S.P. Jain and K.L. Narang, Financial Accounting

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

NETWORK ANALYSIS AND TRANSMISSION LINES (NTL)

III Semester: ECE	I Semester: ECE						S	cheme:2020			
Course Code	Category	Ho	ours/	Week	Credits	Maximum Marks					
EE211	ESC	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL			
		3	0	0	3	40	60	100			
Sessional Exam D	uration: 2Hrs	•				End E	xam Durat	tion: 3Hrs.			
Course Outcomes: At the end of the course the student will be able to CO1: Understand the concept of mesh & nodal analysis, network topology and Application of Network Theorems for Circuit Analysis. CO2: Understand the characteristics of two port networks Z, Y, g, h, and ABCD parameters and resonance and the characteristics of symmetrical and asymmetrical networks CO3: Understand the behavior of the transient states in RL, RC, RLC circuits. CO4: Understand the signal behavior through a transmission line. CO5: Analyses of reflection coefficient, standing wave ratio, input impedance, Smith Chart.											
Mesh and Nodal me sources, star-to-del <i>Network Topology</i> Definitions, Graphs Networks, Duality <i>Network Theorems</i> Thevenin's theorem	Network Analysis: Mesh and Nodal methods of analysis of Networks with dependent and independent voltage and current sources, star-to-delta, delta-to-star transformation. Network Topology: Definitions, Graphs, Tree, incident matrix, Basic Cutest and Tie set schedules, Matrices for Planar Networks, Duality and Dual Networks. Network Theorems:										
Reciprocity theorem	n.										
					UNIT-II						
Two Port NetworksDriving point and transfer functions, two port network parameters- Z, Y, ABCD, g & h, Relationshipbetween parameter sets, Interconnection of Two port networks.Resonance:Resonance in series and parallel circuits – bandwidth and Q factor, Half-Power Frequencies.Characteristics of NetworksStandard T, π ,L Sections and Lattice networks, Characteristic impedance and propagation constant.Image and iterative impedances, Image transfer constant & iterative transfer constant.											
UNIT-III											
UNIT-III Transient Analysis (First and Second Order Circuits): Introduction to transient response and Initial Conditions, Transient response of series –RL, RC RLC Circuits for sinusoidal, impulse, step, ramp, and exponential excitations, Solution using Differential Equations approach and Laplace Transform method.											

Transmission Line – I

Types of transmission lines, Primary constants, Skin effect, Transmission line equations from source and load end, Infinite line, Secondary constants, Velocity of propagation, Group velocity. Terminations: Open and short-circuited lines, Line distortion, Distortion less line, types of loading.

UNIT-V

Transmission Line –II (RF Lines)

Input impedance relations, SC and OC lines, Reflection coefficient, VSWR. $\lambda/2$, $\lambda/4$, $\lambda/8$ - Impedance transformations.

Smith Chart

Construction and applications of Smith chart, Transmission line matching. Single stub matching and double stub matching.

Text Books:

- 1. Van Valkenburg, Network Analysis. 3rd Edition, PHI 1974.
- 2. Choudhary D.Roy, "Networks & Systems", New Age International Publishers, 2nd edition 2010.
- 3. Umesh Sinha, Networks and Transmission Lines, 8th Edition, Satya Prakashan

Reference Books:

- **1.** John D Ryder, Networks Lines and Fields, 2nd Edition, Prentice Hall 2003.
- 2 Johnson, Transmission Lines and Networks, TMH.
- 3. VKAA tree, Network Theory & Filter Design, New Age International.
- 4. A.Sudhakar and S.P.Shyam Mohan, Circuits and Networks, 3rdEdition, TMH2007

Web References:

- 1. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-002-circuits-and-lectronics-spring-2007/
- 2. http://nptel.ac.in/courses/108102042/
- 3. https://lecturenotes.in/subject/553/electrical-circuit-ec
- 4. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-763-applied-superconductivity-fall-2005/lecture-notes/lecture7.pdf

5. nptel.ac.in/courses/117101056/

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain subquestions and the student should answer any one question from each unit. Each Question carries 12 marks.

UNIT-IV

DIGITAL SYSTEM DESIGN (DSD)

III Semes	III Semester: Common to ECE & EEE			Scheme: 2020								
Course Code	Category	Но	urs/We	ek	Credits	Maxi	mum Marks	6				
EC201	РСС	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL				
		3	-	-	3	40	60	100				
Sessional	Exam Durati	on: 1 ½ I	Hrs.			End	Exam Durat	tion: 3 Hrs.				
Course O	utcomes: At t	the end of	the cou	rse the s	tudents are a	able to	1 11					
CO1:App	ly the basic kn	lowledge	of numb	er syste	ms, Boolean	algebra to solve si	mple probler	ns				
CO2: Understand Boolean algebra, and apply it to minimize and realize Boolean functions												
CO3.Desi	ign simple sea	uential lo	gic circu	niai logi iits								
CO5:Dist	inguish types	of FSMs a	and desi	gn them	by followin	g the standard proc	edure					
	UNIT - I											
Number S Binary nu numbers, i Boolean A standard fo Minimizat 2,3,4,5 -v SOP simp digital gat INVERT(Devices: I	<i>System :</i> mbers, Number Signed binary Algebra : basic orms, all logic <i>tion & Realize</i> ariable Karnan plifications, s tes, 2- level a (OAI), Quine- PROM, PLA &	er-base Co numbers, c definitio functions ution Met ugh map implificat and multi -McClusk & PAL	onversio Binary ons, bas of two hods (K-map ions wi -level N ey (QN	ns, Octa codes, l ic theore variable UI) metho ith don' VAND/N () Tech	al and Hexad binary logic ems and pro s, digital log NIT – II od, prime im 't-cares con VOR realiza mique or 7	lecimal numbers, c operties, Boolean fr gic gates pplicants, essential ditions, NAND/Ne tions, AND-OR-IN Fabulation Methoo	omplements unctions, can prime impli OR impleme VVERT(AOI l, Programm	of ionical and cants, POS, entations of),OR-AND- nable Logic				
				UN	III – TIV							
Combinational Logic Design Combinational circuits: half-adder, full-adder, binary adder, carry look ahead adder, half-subtractor, full-subtractor, binary adder with subtractor, BCD adder, binary multiplier, magnitude comparator, decoder and its applications for combinational logic implementation, encoder, priority encoder, multiplexer (MUX), combinational logic implementation using MUX, hazards in combinational logic. UNIT – IV												
Sequential Logic Design Sequential circuit, types of sequential circuits, latches, flip-flops, excitation tables, flip-flop conversions, registers, shift registers and its types, counters: ripple counter, BCD ripple counter, synchronous counter, Ring counter, Johnson counter												
	• • • • • • • • • • • • • • • • •			U	NIT – V							
<i>Finite Sta</i> Mealy and chart), des	te Machines Moore state Sign of synchro	machines	, Algori uential c	ithmic S ircuits, s	tate Machin	es, ASM chart, De	esign exampl tors, design e	es (ASMD examples.				

chart), design of synchronous sequential circuits, state reduction, sequence detectors, design examples.

Text Books:

1. Mano, Morris. M and Ciletti, Michael D, *Digital Design with an Introduction to Verilog HDL*, 5th edition, Pearson, New Delhi,2013

2. Jain, R. P., Modern Digital Electronics, 4th edition, Tata McGraw-Hill Education, New Delhi, 2010

Reference Books:

1. Kumar, Anand. A., *Fundamentals of Digital Circuit*, 4th Edition, Prentice-Hall India, New Delhi, 2016

2. Fletcher, W.L., An Engineering Approach to Digital Design, Pearson India, 2015

3. Kohavi, Zvi, Switching and Finite Automata Theory, 3rd edition, Cambridge University Press, 2009

4. Roth, Charles H., Fundamentals of Logic Design, 5th Edition, Cengage Learning, 2004

5. Taub, H and D.Schilling, Digital Integrated Electronics, McGraw Hill, New York, 1977

Web References:

1.http://nptel.ac.in/courses/117106086/1

2. http://www.nptelvideos.in/2012/12/digital-systems-design.html

3. http://www.nptelvideos.in/2012/12/digital-circuits-and-systems.html

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

SIGNALS AND SYSTEMS (SAS)

III Semester: EC	E						S	cheme:2020			
Course Code	Category	Ho	ours/	Week	Credits	Maximum Marks					
EC202	РСС	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL			
		3	0	0	3	40	60	100			
Sessional Exam Du	iration:1 ¹ / ₂	Hrs.				E	nd Exam Du	ration:3 Hrs.			
~ ~ ~											
Course Outcomes	s: At the end	ofth	e cou	irse th	e student wi	ll be able to	<u> </u>	1 .			
Description	of periodic s	and c ignal	lassii s.	icatio	n of signals	and systems, analy	yze frequency	y domain			
CO2: Analyze fre	quency doma	$\frac{\partial}{\partial t}$	escrip	otion c	of a periodic	signals, understan	d the charact	eristics of			
LTI system	LTI system and discretization of analog signals										
CO3: Apply the constraints of	CO3: Apply the concepts of convolution to find the response of the system and find the degree of similarity of two signals using correlation										
CO4: Understand the s-domain representation of continuous time signals and systems using Laplace Transforms											
CO5: Analyze the using Z-Tra	CO5: Analyze the discrete time signals in z-domain and perform transform analysis of LTI systems using Z-Transform										
UNIT–I											
<i>Introduction</i> Basic continuous Elementary signa continuous time sy	and discrete ls, Singulari ystems and di	tim ty f	e sig unction te tim	nals, ons: 1 ne syst	Classificatio Impulse, St tems and the	on of Signals, Ba ep and Ramp fu vir properties.	usic operation unctions, Cla	ns on signals, Issification of			
Fourier series											
Dirichlet's conditi significance, Amp	ons, Trigono litude and Pl	meti nase	ric Fo spect	ourier ra.	series and E	Exponential Fourie	er series, Spe	ctrum and its			
				1	UNIT– II						
<i>Fourier Transform</i> Fourier transform Fourier transforms signals through c Distortion less tran	UNIT-II <i>Fourier Transforms and Linear time invariant (LTI) system</i> Fourier transform (FT), Fourier transform of standard signals, properties of Fourier transforms, Fourier transforms involving impulse function, Fourier transform of periodic signals, Transmission of signals through continuous and discrete time LTI systems, Transfer function of an LTI system, Distortion less transmission through LTI system, Causality & stability										
Sampling of continuous time signals Sampling theorem, Reconstruction of signal from its samples, effect of under sampling–Aliasing, Practical aspects of sampling, Types of sampling											
				I	UNIT-III						
<i>Convolution and a</i> Graphical method correlation function between auto corr convolution and correlation	UNIT-III Convolution and correlation of signals Graphical method of convolution, auto correlation and Cross correlation of functions, properties of correlation function, Energy density spectrum, Parseval's theorem, Power density spectrum, Relation between auto correlation function and energy/power spectral density function, Relation between convolution and correlation, Applications of convolution and correlation.										

Laplace Transforms

Laplace transform (LT), Concept of region of convergence (ROC) for Laplace Transforms, Properties of Laplace Transforms, Laplace Transform of periodic signals, Inverse Laplace transforms, Electric circuit analysis using Laplace Transforms, Analysis of continuous time LTI systems using Laplace Transforms

UNIT-V

Z-Transforms

Review of discrete time signals, Region of Convergence (ROC) and its properties, Constraints on ROC for various classes of signals, properties of Z-Transforms, System function, causality and stability, Inverse Z-Transform, Analysis of discrete time LTI systems using Z-Transforms

Text Books:

- 1. Simon Haykin, "Signals and Systems", 2nd Edition, Wiley-Eastern, 2007
- 2. Oppenheim A. Vand Willsky, "Signals and Systems", 2nd Edition, Pearson Edition. 2013
- 3. Hwei Piao Hsu, "Schaum's, Outline of Theory Problems of Signals and Systems", McGraw-Hill Professional.2010
- 4. P.Ramesh Babu, "Signals & Systems" 4thedition, Scitech Publications India, 2011.

Reference Books:

- 1. Simon Haykin, "Communication Systems", 2nd Edition, Wiley-Eastern.2001
- 2. B.P.Lathi, "Communication Systems", Wiley Eastern.
- 3. Anand Kumar, "Signals and systems", 3rd edition, PHI, 2013
- 4. A.Nagoor Kani, "Signals and Systems: Simplified", Mc Graw-Hill

Web References:

- 1. https://ocw.mit.edu/resources/res-6-007-signals-and-systems-spring-2011/video-lectures/
- 2. https://onlinecourses.nptel.ac.in/noc18_ee02/preview
- 3. <u>https://www.youtube.com/watch?v=s8rsR_TStaA</u>

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain subquestions and the student should answer any one question from each unit. Each Question carries 12marks.

UNIT-IV

PROBABILITY THEORY AND STOCHASTIC PROCESSES (PTSP)

III Semester:	II Semester: ECE						Sc	cheme: 2020				
Course Code	Category	Hou	irs/We	ek	Credits	Ma	ximum Mark	S				
EC203	РСС	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL				
		3	0	0	3	40	60	100				
Sessional Exan	n Duration:1 ½ H	Irs.	•	•		End E	xam Duratior	n: 3Hrs.				
Course Outcor	nes: At the end of	$\frac{f \text{ the } c}{c}$	ourse t	he stu	dent will be	able to						
CO1. Underst	and the concept of	f prob	ability	using	an appropri	ate samples pac	e.					
CO2. Underst	and the concept of	f a ran	inlo ro	ariable	e and operat	tions on single r	andom variabl	e.				
variables.												
CO4 . Analyze the concept of random processes in time domain and frequency domain.												
CO5. Apply th	ne concepts of Prol	babilit	y to In	forma	tion theory.							
				U	NIT-I							
Probability int Probability To Random Varia Introduction, T Density Funct Exponential, H Operations on Introduction, I Moments: Ch Inequality, Tra	Probability Probability introduced through Sets and Relative Frequency, Joint and Conditional Probability Total probability, Bayes' Theorem, Combined Experiments and Bernoulli Trials. UNIT-II Random Variable Introduction, The random variable concept, Classification of Random variables, Distribution Function, Density Function, The Gaussian Random Variable, Other Distribution and Density Functions: Uniform, Exponential, Binomial, Poisson's, Rayleigh, Conditional Distribution and Density functions. Operations on Single Random Variable Introduction, Expectation, Moments: Moments about the Origin, Central Moments, Functions that give Moments: Characteristic Function, Moment Generating Function, Chebyshev's Inequality, Markov Inequality, Transformations of a random variable.											
				UN	IT -III							
Multiple Rand Introduction, Properties, Co Sum of Two R Operations on Introduction, I Joint Central properties, Tr Random Varia	UNIT -III <i>Multiple Random Variables</i> Introduction, vector random variables, Joint Distribution and its Properties, Joint Density and its Properties, Conditional Distribution and Density, Statistical Independence Distribution and Density of a Sum of Two Random Variables, Sum of Several Random Variables, Central Limit Theorem. <i>Operations on Multiple Random variables</i> Introduction, Expected Value of a Function of Random Variables: Joint Moments about the Origin, Joint Central Moments, Joint Characteristic Functions, Jointly Gaussian Random Variables& properties, Transformations of Multiple Random Variables, Linear Transformations of Gaussian Random Variables.											

UNIT-IV

Random Processes-Temporal Characteristics

Introduction, Random Process Concept, Classification of Random Processes, Distribution and Density Functions, Stationarity and Statistical Independence. Ensemble Averages, Time Averages, Mean-Ergodic Processes, Correlation-Ergodic Processes, Autocorrelation Function and its Properties, Cross-Correlation Function and its Properties, Covariance Functions.

Random Processes-Spectral Characteristics

Introduction, Power Density Spectrum and its Properties, Relationship between Power Spectrum and Autocorrelation Function, Cross Power Density Spectrum and its Properties, Relationship between Cross-Power Spectrum and Cross-Correlation Function.

UNIT-V

Information Theory:

Introduction, Information and its properties, Entropy and its Properties, Information Rate, Discrete Memory Less Channel, Types of Channels, Conditional & Joint Entropies, Mutual Information and its properties, Channel Capacity, Shannon Hartley Law, Shannon Fano Coding, Huffman Coding

Text Books:

- 1. Peyton Z. Peebles, -*Probability Random variables and Random signal principles*", 4th Edition, TMH, 2017.
- 2. Athanasius Papoulis and Unni Krishna Pillai, -*Probability, Random variables and Stochastic Processes* "4th Edition, PHI, 2009.
- 3. Simon Haykin, -Communication Systems, 2nd Edition, John Wiley, 2009.
- 4. P Ramesh Babu, Probability Theory and Random Processes, McGraw-Hill, 2015

Reference Books:

1. Henry Stark and John W.Woods, -*Probability and Random processes with applications to signal Processing*", 3rd edition, Pearson Education, 2009.

2. R.P.Singh and S.D.Sapre, Communication Systems Analog &, Digital", 2nd edition, TMH-2007.

3. Dr.Sanjay Sharma, -Digital Communications, 5th Edition, KATARIA, 2013.

4. Murray R. Spiegel, John J. Schiller, R. Alu Srinivasan, "Schaum's Outline of Theory and Problems of Probability and Statistics", McGraw-Hill, 2000

Web References:

- 1. http://nptel.ac.in/courses/117103067/
- 2. <u>http://https://ocw.mit.edu/courses/mathematics/18-445-introduction-to-stochastic-processes-spring-2015/</u>
- 3. <u>https://www.nptel.ac.in/courses/111/102/111102111/</u>

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

BASIC PROGRAMMING IN PYTHON (BPP)

III Semester: ECE							Sc	heme: 2020		
Course	Category	Hou	rs/We	ek	Credits	Ma	ximum Marks	8		
Code				1						
		т	т	D	C	Continuous	End Evon	тотат		
SCEC01	SOC	L	1	I	C	Assessment		IOIAL		
		1	0	2	2	40	60	100		
Sessional Exan	n Duration: 1 ½ l	Hrs.		1		E	nd Exam Dura	tion:3 Hrs.		
Course Outcon	nes: At the end of	f the c	ourse t	he stu	dent will be	able to				
CO1. Interpret Data type	the fundamental P es and Operators	ython	syntax	k and s	semantics ar	nd be fluent in t	he use of Pytho	on		
CO2. Express p	CO2. Express proficiency in the handling of Control Flow Statements									
CO3. Determin	e the methods to a	create	and m	anipul	ate Python j	programs by uti	lizing the data			
CO4. Articulate	the Object-Orien	ted P	rogram	ming	concepts su	ch as encapsula	tion and			
inheritan	ce, Error and Exc	eption	n hand	ling as	used in Pyt	thon				
CO5. Develop	CO5 . Develop general scientific programming through Matplotlib, NumPy and Pandas packages									
	UNIT-I									
Introduction -	ntroduction - History of python, Features, Need and Applications of python programming, Basic									
elements of pyt	elements of python, Installing Python, Running Python program									
Python Langua	age Syntax - Keyv	words	, Ident	light d	Variables, C	Comments, Inde	entation			
Operators -	Arithmetic One	rators	is, imp Cor	non u	on (Relation	n Data Types	rs Assignme	nt		
Operators, Log	ical Operators. Bi	itwise	Opera	tors.	Membershir	Operators. Ide	entity Operator	rs.		
Expressions and	l order of evaluati	ons	opui			op o 10010, 100	energy operator	,		
1				U	IIT-II					
Control Flow S	Statements –									
Decision making	ng - The if Decisi	ion C	ontrol	Flow	Statement,	The ifelse D	ecision Contro	ol Flow		
Statement, The	ifelifelse Dec	cision	Contro	ol Stat	ement, Nest	ed if Statement				
Looping - The	while Loop, The f	for Lo	op, Ne	ested L	oop structu	res				
Branching - Th	e continue, pass a	ind br	eak Sta	atemei	nts					
				UN	IT –III					
Data Structur	es - Lists - O	perati	ons, S	Slicing	, Methods;	Tuples, Sets	, Dictionaries,	Sequences.		
Comprehension	S.							_		
Functions - De	efining Functions	, Call	ing Fu	nction	is, Passing	Arguments, Ke	yword Argum	ents, Default		
Arguments, Va	riable-length argu	iment	s, And	onymo	us Function	s, Fruitful Fun	ctions (Function	on Returning		
Values), Scope	of the Variables in	n a Fu	nction	- Glo	bal and Loc	al Variables.				
		0.01		UN		10 1111				
Object Orient Mothod Inharit	ance Programming	g UUI	noong	ytnon ilotior	- Classes,	self-variable, f	vietnods, Cons	tructor		
Fror and Fy	entions - Differe	isili, L ence i	ncapsi	n an e	error and Ex	ig. cention Hand	ling Exception	try except		
block Raising I	Exceptions User	Defin	ed Exc	rentior		ception, manu		, ily except		
		Denn		UN	IT-V					
Python Packag	es -									
Matplotlib - M	atplotlib basics, C	Contou	r plots	, heat	maps and 3	D plots.				
NumPy - Basic	e array methods,	Readi	ng and	writi	ng an array	to a file, Statis	tical methods,	Polynomial,		
Linear algebra,	Matrices, Randon	n samj	pling, 1	Discre	te Fourier ti	ransforms		1 00		

Pandas – Creating Objects, viewing data, Selection and Manipulating Data, Working with CSV Files, Visualization

Text Books:

- 1. Wesley J. Chun. "Core Python Programming Second Edition", Prentice Hall
- 2. E. Balagurusamy. "Introduction to Problem Solving with Python", TMH 1st 2016
- Michael H. Goldwasser, David Letscher, "Object-oriented Programming in Python", Pearson Prentice Hall 1st 2008

Reference Books:

- 1. Think Python, Allen Downey, Green Tea Press
- 2. Core Python Programming, W. Chun, Pearson.
- 3. Introduction to Python, Kenneth A. Lambert, Cengage
- 4. Kenneth A. Lambert, "Fundamentals of Python First Programs", CENGAGE Publication
- 5. R. Nageswara Rao, "Core Python Programming", dreamtech

Web References:

- 1. https://bscitpro.com/wp/syllabus/python-programming/
- 2. <u>https://www.gowrishankarnath.com/syllabus-for-python-programming-course-as-prescribed-for-3rd-semester-computer-science-and-engineering-programme-starting-from-the-year-2019.html</u>

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

List of Experiments
1. Write the program for the following:
a. Create a program that asks the user to enter their name and their age. Print out a message addressed to them that tells them the year that they will turn 100 years old.b. Enter the number from the user and depending on whether the number is even or odd, print out an appropriate message to the user.
2. Write a Python program to get the Fibonacci series.
3. Write a Python program to remove the characters which have odd index values of a given string.
4. Write a Python script to sort (ascending and descending) a dictionary by value.
5. Write a Python program to get the largest number from a list.
6. Write a Python program to create a tuple with different data types.
7. Write a Python function to calculate the factorial of a number (a non-negative integer).The function accepts the number as an argument.
8. Design a class that store the information of student and display the same.
9. Implement the concept of inheritance using python
10. Write a program to implement exception handling.
11. Write a program by using Pandas Library.
12. Write a program by using NumPy Library.

CONSTITUTION OF INDIA (CI)

III Semester : Common for all Branches				s Scheme : 20							
Course Code	Category	Hours/Week			Credits	Μ	aximum Mark	S			
MC103	МС	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL			
		2	-	-	-	100	-	100			
Course Outc	omes : At the end	d of th	e cours	se the s	student will	be able to					
CO1: Unders	tand the formation	$\frac{1}{1}$	princi	ples of	Indian Con	istitution.		6			
President, Vic	tand structure and e president, Prin	nd fund ne Mir	nister,	of Uni Gover	on governm nor, Chief N	linister cabinet	and State Legi	es of slature.			
CO3: Unders Preside	tand constitution ent rule.	al ame	endmei	nts of 4	42, 44,74,76	5,86 and 91. Ce	ntral-State relat	tions,			
CO4: Understand Indian social structure and languages in India. Rights of women, SC, ST and then weaker section.											
CO5: Unders Subordinate c	tand the structure courts, Judicial re	e of Ju eview.	diciary	, Role	and function	ons of Supreme	Court, High co	ourt and			
	1 1 ~ .			U	NIT - I						
Historical ba	Historical back ground, Significance of Constitution, Making of the constitution, Role of the										
constitution Fundamental rights-Derivative principles of state policy-Elections in India											
UNIT - II											
Union Execu	tive: Structures	of Un	ion Go	overnr	nent & Fun	ctions. Preside	ent. Vice Presid	lent. Prime			
Minister, Cab	oinet, Parliament	- State	e Exect	utive:	Structures a	and Functions,	Governor, Chie	ef Minister,			
Cabinet, State	e Legislature										
				UN	IT - III						
Central, State Constitutiona	e Relations, Pres l functionaries, V	ident' Vorkii	s Rule	, Cons arliam	stitutional A entarysyste	Amendments [4 m in India	2, 44, 74, 76,	86 & 91]-			
				UN	IT - IV						
Indian Social Women- S.C	Structure, Langu 's, S.T's & other	uages weak	in Indi er secti	a-Poli ions.	tical Parties	& Pressure gro	oups, Rights of				
				UN	IT - V						
Judiciary: Str Supreme Cou	ucture, Organisa rt, High Courts &	tion of & Sub	f Judic ordina	iary, i te cou	ndependenc rts, Judicial	e of the Judicia Review.	ary, role and fu	nctions of			
Toyt Dooleg c											
1 Durge De	Rasu "Introdu	uction	to the	Const	tution of In	dia" Wedwe	Company				
2 Macivel	Page "An Intro	ductio	n Anal	vsis"	Society		Company				
3. M.V. Pv	ee. "Indian Con	stituti	on". S.	Chan	d Publicatio	ons					
4. Subhash	C Kashvao : " <i>Ou</i>	r Cons	stitutio	n".Na	tionalBank.	Trust. India.					
5. Constitut	ional Law of Ind	ia by I	Dr.S.M	Rajar	1 1	11030, 1110101					
		5		J							
Reference Boo	oks :										
1. The Cons	titution of India.	Bythe	Minis	tryof	Law and Jus	stice, The Govt	t. of India.				
2. Constituti	onal Law of Indi	a by k	ashyap	subh	asah						
3. Indian cor	nstitution Law by	и М.Р.,	Jain								
4. Constituti	onal Law of Indi	a by H	I.M Se	ervai							
Web Keferenc	es:	/			······································	u dia					
1. https://w	ww.india.gov.in/	my-go	overnn	ient/co	pristitution-1	ndia					

ELECTRONIC DEVICES AND CIRCUITS LAB (EDC (P))

III Semeste	r: ECE						Schei	me:2020				
Course Code	Category	Hours/	Week		Credits	Μ	laximum Marl	ΧS				
EC204	PCCL	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL				
		-	-	3	1.5	40	60	100				
							End Exam I	Duration: 3 Hrs				
Course Out	comes: At th	he end of	the cou	irse, stu	udents are	able to						
COI: Under	rstand the op	eration of	telectro	onic eq	upment's	- CRO, CDS and	I FG.					
CO2: Analy	ze the charac	cteristics	and ap	plicatio	ons of PN-d	liode and Zener of	diode.					
CO3: Under	rstand the cha	aracterist	ics of E	BJT, JF	ET and UJ	Τ.						
CO4: Analy	CO4: Analyze the transistor amplifier and biasing circuits.											
	List of Experiments											
	Note: At least 12 of the following experiments shall be conducted											
				Ha	rdware Ex	periments						
	(Study a	and cond	luct an	y Eigh	t Experim	ents in addition	to experiment	t no.1)				
1. Study of E	Electronic equ	lipments	- CRC	, CDS	and FG.							
2 V-I Charac	cteristics of P	'N Juncti	on Dio	de								
3. V-I Chara	cteristics of Z	Zener Di	ode and	1 its ap	plication as	s Voltage Regula	itor					
4. Performar	nce character	istics of	half wa	ve rect	ifier.							
5. Performan	nce character	istics of	full wa	ve recti	ifier.							
6. Common	emitter input	-output c	haracte	eristics.								
7. JFE1 drai	n and transfe	r charact	eristics	•								
8. UJT Chara	vation Oscille	ator										
10 Common	Base Input	and Outn	ut char	acterist	ics							
10.00111101	Duse Input t	Simul:	ation F	xnerin	nents (Usi	ng Tinapro Soft	tware)					
		(St	tudy ar	nd con	duct any F	our Experiment	ts)					
11. Clipping	1. Clipping circuits using diodes.											
12. Clampin	g circuits usi	ng diode	s.									
13. Design o	of Voltage Di	vider Bia	using U	sing B.	JT							
14. Transisto	or as an Amp	lifier		-								
15. Design o	of Fixed Bias	circuit u	sing B.	T								

DIGITAL SYSTEM DESIGN LAB (DSD (P))

III Semeste	er: ECE						Sc	heme: 2020				
Course Code	Category	Hou	ırs/Wee	k	Credits	Max	ximum Marks					
EC205	PCCL	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL				
		-	-	3	1.5	40	60	100				
						ŀ	End Exam Durat	tion: 3 Hrs.				
Course Ou	tcomes: At t	the end of	f the cou	irse the	e student wi	ll be able to						
CO1: Explo	ore Boolean	algebra a	nd basic	e digita	al circuits							
CO2: Desig	gn combinati	onal logi	c circuit	s and	simulate							
CO3: Desig	gn sequential	logic cir	cuits an	d simu	ılate							
List of]	List of Experiments (Note: Implement using digital ICs)											
1. Rea	1. Realization of Boolean Expressions using Gates											
2. Des	2. Design and realization logic gates using universal gates											
3. Ger	neration of cl	lock using	g NANI	D / NC	OR gates							
4. Des	sign a 4–bit A	Adder / S	ubtracto	or								
5. Des	sign and real	ization of	f a 4–bit	Gray	to Binary an	d Binary to Gray C	converter					
6. Des	sign and reali	ization of	an 8-bi	paral	lel load and	serial out shift regi	ster using FFS					
7. Des	sign and real	ization of	fa Syncl	nronou	is and Asyno	chronous counter u	sing FFs					
8. Des	sign and real	ization of	fAsyncl	nronou	is counters u	sing FFs						
9. Des	sign and reali	ization of	f8x1 M	JX us	ing 2x1 MU	X						
10. Des	ign and reali	zation of	4-bit co	mpara	tor							
11. Des	ign and Real	ization o	f a seque	ence d	etector: An]	FSM						
Maj	jor Equipme	ent requi	red for	Labor	atories:							
1. 5V F	ixed Regulat	ted Powe	r Supply	y/0-5V	or more Re	gulated Power Sup	ply.					
2. 20 M	IHz Oscillos	cope witl	n Dual C	Channe	el.							
3. Brea	d board and	compone	nts/ Tra	iner K	it.							
4. Mult	4. Multimeter.											
Reference Books:												
1. Wak	erly, John F.	, Digital	Design:	Princi	ples and Pra	ctices, Prentice Ha	ll PTR, 2005					

BASIC SIMULATION LAB (BS (P))

III Semest	er: ECE							Scheme:2020				
Course Code	Category	Н	ours/W	/eek	Credits	Ν	/Jaximum Mai	rks				
EC206	PCCL	L	T	P/D	C	Continuous Internal Assessment	End Exam	TOTAL				
		0	0	3	1.5	40	60	100				
							EndExar	nDuration:3 Hrs.				
Course Out	comes: At the	e end of t	he cou	se studen	nts will be	able to,						
CO1: Gener	rate basic sig	nals and	perform	m basic o	peration	on signals.						
CO2: Understand the difference between convolution and correlation of the signals.												
CO3: Apply Fourier and Laplace transforms on the signals.												
CO4: Comp	oute the respo	nse of L	TI syst	em for u	nit impul	se, step and sinu	soidal signals.					
CO5: Test the linearity and time variance properties of LTI systems and apply auto correlation to remove Noise in the signals.												
Noise in the signals. List Of Experiments												
Note: At least 12 of the following experiments shall be conducted												
1. Operatio	ons on Matri	ces.										
2. Generati	ion of Basic S	ignals.										
3. Operatio	ons on Signals											
4. Even and	d odd parts of	f a Signa	1.									
5. Convolu	ition of Signa	ls.										
6. Auto Co	rrelation and	Cross C	orrelati	on of Sig	gnals.							
7. Verificat	tion of Sampl	ing Theo	orem.									
8. Fourier	Transform of	a Signal	•									
9. Laplace	Transform of	a Signal										
10.Comput Verifyi	ation of Unit ing Its Physic	Sample, al Reliat	Unit S pility ar	tep and S nd Stabili	Sinusoida ity Prope	l Response of the	e given LTI Sy	stem and				
11. Demon	stration of Gi	bbs Pher	nomen	on.								
12. Verifica	12. Verification of Linearity and Time Invariance Properties.											
13. Remova	13. Removal of Noise by Autocorrelation.											
14. Verifica	ation of Wien	er-Khint	chine l	Relations	5.							
L												

Note: All the above experiments can be executed using SCILAB Open-Source Simulation Software

COMPLEX VARIABLES AND NUMERICAL METHODS (CVNM) (Common to ECE and EEE)

IV Semeste	er: Common to E	CCE an	d EEE	C			S	Scheme: 2020	
Course Code	Category	Ho	urs/W	eek	Credits	Maximum Marks			
BS204	BSC	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL	
		2	1	-	3	40	60	100	
Sessional Exam Duration: 1 ¹ / ₂ Hrs.						End	Exam Dur	ation: 3 Hrs.	

Course Outcomes: At the end of the course the student will be able to

CO1: Understand continuity and analyticity of various complex valued functions.

CO2: Evaluate Integration and Taylor's and Laurent's series expansion of the complex functions.

CO3: Understand the properties of the Bessel's and Legendre functions.

CO4: Apply Numerical Methods and Principles of least Square Methods in engineering problems and find interpolating polynomial for the given data.

CO5: Evaluate ordinary differential equations by using numerical techniques

UNIT – I

Complex Variables: Analytic functions, Cauchy-Riemann equations (Cartesian and Polar form), Harmonic function, Method to find the Conjugate function, Milne – Thomson method, Conformal Mapping (e^z , z^2 , sinz, cosz), Bilinear Transformation.

UNIT – II

Complex Integration & Series: Simple and Multiple Connected regions, Cauchy's Integral theorem (without proof), Cauchy's integral formula (without proof), Generalized Integral formula (without proof). Taylor's series, Maclaurin's series and Laurent's series, Residue theorem (without proof), Method of finding residues, Evaluation of real integrals by contour integration, Integration round the unit circle and in the interval $(-\infty, \infty)$.

UNIT – III

Bessel Functions: Solution of Bessel's equation, Recurrence relations for $J_n(x)$, Generating function, Jacobi series, Orthogonality of Bessel's function.

Legendre Functions: Solution of Legendre's equation, Rodrigue's formula, Legendre polynomials, Generating function, Recurrence relations for $P_n(x)$, Orthogonality of Legendre polynomials.

UNIT – IV

Numerical Methods: Solution of Algebraic and Transcendental Equations – Method of False Position, Newton – Raphson Method; Solution of Simultaneous Equations – Gauss Seidel iteration method; Curve Fitting – Least Squares Method-Fitting a straight-line y = a + b x and parabola $y = a + b x + cx^2$.

Interpolation: Operators, relation between the operators, Newton's forward and backward interpolation formulae. Lagrange's interpolation formula.

UNIT – V

Numerical Solutions of Ordinary Differential Equations of First Order: Taylor's method, Picard's method, Euler's method, Modified Euler's method, Runge -Kutta methods of second and fourth order; Milne's Predictor - Corrector method.

Text Books

1. B.S. Grewal [2012], Higher Engineering Mathematics, Khanna Publishers, New Delhi

2. K. V Iyengar and others [2013], Engineering Mathematics Vol-3, S. Chand & Co. New Delhi

Reference Books

1. S. S. Sastry, "Introductory Methods of Numerical Analysis", PHI, 2010

2. Erwin Kreyszig "Advanced Engineering Mathematics", John Wiley and Sons 8th Edition, 2008

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER / OR Type) in each section. The student shall answer one question from each section.

End Examination:

COMPUTER ORGANIZATION AND ARCHITECTURE (COA)

IV Semester:	ECE						S	cheme:2020				
Course Code	Category	Hou	ırs/We	ek	Credits	Ma	ximum Marks	8				
EC207	РСС	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL				
		3	0	0	3	40	60	100				
Sessional Exar	n Duration:1 ½	Hrs.]	End Exam Du	ration:3Hrs.				
Course Outcon	mes: At the end of	of the c	ourse t	he stu	dent will be	able to						
CO1: Understa	ind the concepts of	of Regi	ster tra	insfer	and Micro-o	operations.						
CO2: Analyze	the concepts of C	Comput	er orga	anizati	ion and its d	lesign.						
CO3: Apply the	e concept of Com	puter	Arithm	netic.								
CO4: Understa	and the concepts of	$\frac{\text{of I/O}}{(D^2 + 1)}$	and Me	emory	organizatio	n.						
COS: Analyze the importance of Pipeline and Vector Processing.												
UNIT-I												
Register Trans Register transfe logic shift unit.	er, Bus and Mer	Operat ory tra	ions: insfers	, Aritl	nmetic, Log	ic and Shift m	icro-operations	, Arithmetic				
Basic Comput	er Organization	and D	esign:									
Instruction cod Memory referen	les, Computer rence instructions, l	gisters Input/o	, Com output a	puter and In	instructions terrupt, Des	s, timing and o sign of basic cor	control, Instruction nputer.	ction cycle,				
				UN	IT –III							
Central Proces	ssing Unit:	1		4 T	· · · · · · · · · · · · · · · · · · ·		-ing and the D	-				
and manipulati	on, Program cont	rol.	ganiza	tion, 1	Instruction 1	ormats, Addres	sing modes, D	ata transfer				
Algorithms for arithmetic oper	fixed point and s ations.	igned 2	2'scom	pleme	ent binary a	rithmetic operat	tions, Floating	point				
				UN	IT–IV							
Input/ Output Peripheral devi interrupt, DMA Memory Orga Memory hierard memory	Organization: aces, Input/ Outp a. nization: chy, Main memor	ut inte ry, Au	erface, xiliary	Asyno	chronous da ory, Associa	ata transfer, Mo	odes of transfer	r, Priority Virtual				
UNIT-V												
Pipeline and V	ector Processing	p :			L- V							
Parallel Process processing, Arr	sing, Pipelining, and Processing.	Arithm	etic Pi	peline	e, Instruction	n Pipeline, RISO	C pipeline, Vec	etor				

Text Books:

- 1. M. Morris Mano, Computer System Architecture, PHI,3/e,2007.
- 2. William Stallings, Computer Organization and Architecture- designing for performance, 8th edition, Prentice Hall, New Jersy,2010

Reference Books:

- 1. John P. Hayes, Computer Architecture and Organization, McGrawHill, 3/e, 1998
- 2. Hemachar, Computer Organization, Mc Graw Hill, 5/e, 2002.

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

ANALOG ELECTRONIC CIRCUITS (AEC)

IV Semest	er: ECE						Sch	eme :2020		
Course Code	Category	Ho	ours/Weel	X	Credits	Maximum Marks				
EC208	РСС	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total		
		3	0	0	3	40	60	100		
Sessional	Exam Duratio	n: 1 ½ Hrs	5.			End E	xam Durat	ion: 3Hrs.		
Course O	utcomes: At th	ne end of t	he course	students	will be able	e to				
CO1: Und	erstand small si	gnal low fr	requency n	nodels of	BJT Amplif	ïer.				
Ana CO2: Und	lyze the effect of	on cascading	g on ampn	ner Circi	IIIS.	IOSEET amplif	204			
CO2: Und	erstand small sig	gliai low li	equency n		JET and N	MOSFET ampin	ler.			
CO3. 010	vza Nagativa fa	adback ar	gli llequell	rouita & C	Decillatore ci	rouito				
CO4. Anal	yze Negative le	amplifior	piners ch	Tunod on	oplifior airou	ita				
CUS. Allal	yze large signal	ampiner	circuits &	I uneu an		ints.				
				UNIT-	ſ					
Small signa Transistor Approxima <i>Multistage</i> Types of co Darlingtor <i>FET and M</i> Small sign Basic conc resistive, d <i>Transistor</i> Hybrid-π m resistive lo bandwidth Analysis of	al low frequence hybrid Model, so the CE, CB, CC <i>Transistor Amp</i> oupling- direct of a Bootstrap and <i>IOSFET Ampl</i> al model of JFE epts of MOSFE iode and current <i>At High Freque</i> nodel, Hybrid- π ad, Relation beto product (GBW) CS and CD JFI	cy transist small signa Models, M <i>plifiers:</i> coupled RC Cascode a <i>ifiers:</i> T, Analysi T amplifie t source lo <i>encies:</i> conductan tween f _T an , Bandwid ET amplifie	or model(al model or Aillers The C coupled, mplifiers. s of CS, C s, MOSFE ads. ces and ca nd f_{β} , Sing th of casca ers at high	h-param f BJT, An eorem and Analysis UNIT- D JFET a T small s UNIT-I pacitance de stage (aded amp frequenc	eters): alysis of tra d its Dual. of two stage II umplifiers. ignal model II es, CE short CE transisto lifier stages. ies.	nsistor amplifier e RC coupled an . Common source circuit current g r amplifier frequ	r using h-pa nplifier, ce amplifier ain, Curren uency respo	rs with t gain with onse, Gain-		
				UNIT-I	V					
Feedback A Concept of feedback ci Oscillator General for	Amplifiers: Feedback, effercuits and analy Circuits: Bark-I Frm of LC Oscilla	ects of neg ysis. Hausen crit ators-Hartl	ative feed eria, Class ey and Co	back, Ty sification lpitts Osc	pes of nega of Oscillato illators, Cry	tive feedback c rs, RC Oscillato stal Oscillators	onnections	, practical sed),		
Power Am	olifiers:									
Classes of distortion, (operation, (<i>Tuned Am</i> amplifies, I diagram an	operation, Class Class B amplifie Class C amplifie <i>plifiers</i> Need of Effect of cascad d operation only	A amplifi ers (Push p ers, Transis of tuned a ling on bar y.	ers (Series ull, Comp stor power mplifiers, adwidth of	s fed, Tra lementary dissipati Analysis single tu	nsformer co y symmetry) on, Heat sin of two sta ned amplific	upled, Push pull , Crossover dist ks ge capacitive c es, Double Tune), Second H ortion and o oupled sing ed amplifier	Harmonic Class AB gle tuned rs-Circuit		

Text Books:

1. Milliman and Halkis: "Integrated Electronics", Tata McGraw Hill, 2004.

2. R.E.Boylstead and L.Nashelsky: "*Electronic Devices and Circuit Theory*", 9/e, Pearson Education, 2007.

3. David Bell, "Electronic Devices and Circuits"- 5th Edition, Oxford, 2008.

4. Donald A Neamen and Dhrubes Biswas, "Semiconductor Physics and Devices", 4th EditionTMH, 2012

5. B. Razavi, "Design of Analog CMOS Integrated Circuits". 1st edition,

TMH. (For MOSFET amplifiers), 2002. Reference Books:

1. Ben.G. Streetman, "Solid state electronic devices", Pearson, 2015

2. G. K. Mithal, "Electronic Devices and Circuits", 23rdEdition, Khanna pub. 2006

3. Bogart Theodore, "Electronic Devices and Circuits", 6thEdition, PE 2008.

4. Allen Mottershed, "Electronics devices and circuits", 1stEdition, PHI, 1973.

5. S.Salivahanan, N.Suresh Kumar, "Electronic Circuit Analysis", Edition 1,2020, McGraw Hill India

Web References:

https://www.electronics-tutorials.ws

www.informationvine.com

Question Paper Pattern:

Sessional Exam: The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

ELECTRO MAGNETIC WAVES (EMW)

Course Code Category Hours/Week Credits Maximum Marks EC209 PCC L T P C Continuous Internal Assessment End Exam TOTAL 3 0 0 3 40 60 100 Sessional Exam Duration: 1 ½ Hrs. End Exam Course Outcomes: At the end of the course the student will be able to Course Outcomes: At the end of the course the student will be able to CO1: Understand the principles of vector algebra, vector calculus and their physical interpretations in electromagnetic fields CO2: Analyze Gauss's law and its applications CO3: Apply concepts and principles of electrostatic fields to solve complex problems CO4: Analyze Biot-savart's law and Ampere's law to determine magnetic field intensity CO4: Analyze Maxwell's equations for time varying electromagnetic fields and understand the formation and characteristics of electromagnetic wave UNIT - I Co-ordinate Systems and Vector Calculus Vector Algebra, Co-ordinate systems Cartesian, Cylindrical and Spherical, Transformation of Vector functions, Stoke's theorem, Divergence theorem. UNIT - II Electro Static Fields-I Coulomb's law, Electric field intensity, Field due to different charge distributions-Line charge. Sheet charge and Volume charge distributions. Electric field, Line integral, Potential d	IV Semester: E	CE						S	Scheme:2020			
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Time Varying Fields & Maxwell's Equations

Faraday's law, Lorentz Force Equation, Maxwell's equations in various forms, Displacement Current Density.

Uniform Plane Wave

Electromagnetic wave propagation media, Wave motion in free space, perfect and lossless dielectrics, lossy dielectrics and good conductors, skin depth, Surface impedance, Poynting theorem, Polarization, Brewster Angle, Snell's law, Reflection of plane waves- Normal Incidence and oblique incidence (Perpendicular and Parallel Polarizations)

Text Books:

1. Hayt.W.H, Engineering Electromagnetics, 7th Edition, TMH.

2. Sadiku, Engineering Electromagnetics, 3rd Edition, Oxford University press.

3. G.S.N. Raju, EM Field Theory and Transmission Lines, 1st Edition, Pearson Ed.

Reference Books:

1. Jordan and Balmain, EM Waves and Radiating Systems, 2nd edition, Pearson Ed.

- 2. John.D. Kraus, *Electromagnetics*, 6th Edition, McGraw-Hill.
- 3. Nanapeneni Narayana Rao, Elements of Engg. Electromagnetics, 6th Edition, Pearson Ed.

Web References:

- 1. https://ocw.mit.edu/resources/res-6-001-electromagnetic-fields-and-energy-spring-2008/
- 2. https://www.youtube.com/playlist?list=PL4BE7BAFFAB78FC44
- 3. https://www.youtube.com/watch?v=CZWK0tCrX6k

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

ANALOG AND DIGITAL COMMUNICATIONS (ADCM)

IV Semester:	ECE						Scheme:	2020				
Course Code	Course Category	Hours	s/Week	Z	Credits	Maxin	num Marks	5				
EC210	РСС	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL				
		3	0	0	3	40	60	100				
Sessional Exam	Duration: $1\frac{1}{2}$	Hrs.	.1	. 1		End Exa	n Duration	: 3 Hrs.				
Course Outcom	hes: At the end of	the cou	irse the	stude	$\frac{1}{1}$ $\frac{1}{1}$	able to						
COI: Understa	ind different amp	litude, a	$\frac{1}{\cdot}$	odula	tion and de	modulation scheme	S.					
CO2: Evaluate	the Figure of me	rit of va	rious A	AM ar	nd FM sche	mes.						
CO3: Understa	and various pulse	modula	tion an	d den	nodulation	schemes.						
CO4: Evaluate	the probability o	f error a	nd pow	ver fo	r various co	herent digital modu	lation techr	niques.				
CO5: Analyze	the Linear block	codes a	nd Cyc	lic co	odes							
	UNIT – I											
Waves; Square Coherent detect SSB Modulated Angle modulation Frequency Mo Generation of Multiplexing, I	law detector, ion of DSBSC n waves, Demodul odulation and P FM, Demodulati introduction to PA	ttion thase M on of F	ESSB V SSB V Iodulati M - Fi VM and	unition, I PPM	DSBSC-E d SSB -Ph s. $\Gamma - II$ FM narrov ncy discrim [schemes, '	v band and wide nination method, Fi	band techn requency D	Modulator generating niques, ivision				
Noise in AM a	nd FM											
Noise definitio Threshold effect	n, Types of noise ct, Pre-emphasis	s, Noise and De-	e in AN empha	A and asis ci	FM, Figur ircuits.	e of merit of AM, L	SBSC and	FM,				
			ا	UNIT	- III							
Pulse Code Ma Elements of PC PCM systems, Modulation (D	<i>odulation</i> CM, Quantizatior Transmitters and M), Adaptive De	ı (Unifo l receiv lta mod	orm and ers of ulation	l Non Diffe (AD	-uniform), rential Puls M).	Companding, Band se code modulation	width, Noi (DPCM), 1	ise in Delta				
				UNI	$\Gamma - IV$							
Digital modula Optimum recei filter receiver, Description of Comparison of	<i>ttion and demodu</i> ver, Coherent rec Determination QPSK, QAM, In coherent and non	ulation a ception of of Prob atroduction-cohere	techniq of ASK bability ion to 1 ent AS	<i>ues</i> , FSF of e Non-c K, FS	K and PSK error for co coherent rea K and PSK	schemes, Correlation oherent ASK, FSK ception of ASK, FS schemes.	n Receiver, and PSK K and PSK	Matched schemes, schemes,				

Linear Block Codes

Introduction, Matrix description of Linear Block codes, Error detection and error correction capabilities of Linear block codes, Hamming codes, Binary cyclic codes, Algebraic structure, Encoding, Syndrome calculation, BCH Codes.

Text Books:

1. Simon Haykin, *Communication Systems*, 2nd Edition, Wiley Eastern, 2008.

2. K. Sam Shanmugam, *Digital and Analog Communication Systems*, 2nd Edition, Wiley-India, 2008.

Reference Books:

1.Taub, H and D. Schilling, *Principles of communication systems*, 3rd edition, Tata McGraw Hill, 2013 2. R.P. Singh and S.D. Sapre, *Communication systems- Analog & Digital*, 2nd edition, TMH, 2008.

3. B.P. Lathi, *Communication Systems*, 3rd edition, BS publications, 2007.

Web References:

1.https://nptel.ac.in/courses/117105143/

2. http://www.nptelvideos.in/2012/12/digital-communication.html

3. http://www.digimat.in/nptel/courses/video/117105143/L51.html

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

ANALOG ELECTRONIC CIRCUITS LAB (AEC (P))

IV Semester: F	ECE				Scheme:202						
Course Code	Category	E	Iours/W	Veek	Credits Maximum Marks						
EC211	PCCL	L T P C		Continuous Internal Assessment	End Exam	TOTA L					
		0	0	3	1.5	40	60	100			
	End Exam Duration: 3Hrs.										

Course Outcomes: At the end of the course students will be able to

CO1: Understand the FET and MOSFET amplifier characteristics.

CO2: Analyze the effect of Negative and Positive feedback on amplifiers.

CO3: Evaluate the efficiency of Power amplifiers.

CO4: Analyze two stage RC coupled amplifier, Bootstrap and Cascode Amplifiers.

CO5: Analyze single Tuned amplifier and verify its frequency response.

List of Experiments

(Study and conduct Six Experiments from Hardware and Six Experiments using simulation Software)

Cycle – 1: Hardware Experiments:

- 1. Construct CS-FET Amplifier and calculate gain, bandwidth, input and output resistances.
- 2. Construct Hartley Oscillator and obtain its output frequency.
- 3. Construct and obtain power efficiency of Class B Complementary Symmetry Amplifier.
- 4. Construct and obtain parameters of Two Stage RC Coupled Amplifier.
- 5. Construct and obtain parameters of Boot-strap Pair Amplifier.
- 6. Construct Current series feedback amplifier and calculate gain, bandwidth, input and output resistances

Cycle –2:Simulation Software Experiments (using TINAPRO/MULTISIM):

- 1. Simulate MOSFET Amplifier and obtain its gain, bandwidth and signal handling capacity.
- 2. Simulate Voltage-shunt feedback Amplifier and compare its parameters with and without feedback.
- 3. Simulate RC Phase shift Oscillator. Compare phase shift & output frequency with theoretical values.
- 4. Simulate Class C Power Amplifier and obtain its power efficiency.
- 5. Simulate Cascode Amplifier and obtain its frequency response, gain and bandwidth.
- 6. Simulate Single Tuned Amplifier and calculate Q-factor & its bandwidth.

Additional Experiments (Hardware & Simulation):

- 1. Study the operation of Current series Feedback Amplifier and compare its parameters with and without feedback (Hardware)
- 2. Simulate Colpitt's Oscillator and compare theoretical and practical values of output frequency.
- 3. Simulate Wein bridge Oscillator, compare theoretical and practical values of output frequency.
- 4. Compare performance of different circuits practically and through Simulation.

ANALOG AND DIGITAL COMMUNICATION LAB (ADCM (P))

IV Semester: B.	Tech ECE						Sche	eme:2020							
Course Code	Course Category	Hou	rs/We	ek	Credits	Max	imum Mark	S							
EC212	PCCL	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL							
		0	0	3	1.5	.5 40 60 100									
~ ~ ~						En	dExamDura	tion:3 Hrs.							
Course Outcom	es: At the end of the	course	the stu	udent	will be ab	ole to									
CO1: Analyze	various analog modu	lation	and de	modu	ulation sch	emes.	·								
spectrun	d the spectral charact	eristic	s of va	rious	analog mo	dulation schemes	susing								
CO3: Understand various pulse modulation and demodulation schemes.															
CO4: Analyze various digital modulation and demodulation techniques.															
CO5: Analyze various analog and digital modulation and demodulation schemes using MATLAB Simulation.															
		LIS	TOF	EXPI	ERIMENT	<u>rs</u>									
	Note: At least 12	of the	follow	ing e	xperiment	s shall be conduc	ted								
1. Conduct a	an experiment on Am	plitude	e modu	latio	n and dem	odulation.									
2. Conduct a	an experiment on Free	quency	/ modu	latio	n and demo	odulation.									
3. Conduct a	an experiment on Free	luency	/ Divis	ion m	ultiplexing	g and De-multiple	exing.								
4. Analysis	of AM and FM signal	s usin	g Spec	trum	Analyzer.										
5. Conduct a	an experiment on Puls	e amp	litude	modu	lation and	demodulation.									
6. Conduct a	an experiment on Puls	e wid	th and	Pulse	position n	nodulation and de	modulation								
7. Conduct a	an experiment on ASH	K mod	ulation	n and	demodulat	ion.									
8. Conduct a	an experiment on FSK	C mod	ulation	and	demodulat	ion.									
9. Simulation	n of Amplitude modul	ation	and de	modu	lation usin	g MATLAB									
10. Simulatio	on of DSBSC modulat	tion ar	nd dem	odula	ation using	MATLAB									
11. Simulatio	on of Line coding tech	nnique	s using	g MA	TLAB										
12. Simulatio	12. Simulation of PSK modulation and demodulation using MATLAB														
13. Conduct	an experiment on SSI	B mod	ulatior	n and	demodulat	ion.									
14. Conduct	an experiment on Del	ta mo	dulatio	on and	l demodula	ation.									
15. Simulatio	on of ASK and FSK m	nodula	tion an	d der	nodulatior	using MATLAB									

NETWORKS AND TRANSMISSION LINES LABORATORY (NTL (P))

IV Semester: B.	Tech ECE				Scheme:2020							
Course Code	Course	Hours	/Week		Credits	Maxi	mum Marks					
	Category			T			Γ	1				
					G	Continuous		TOTAL				
EE212	ESCL	L	Т	P	C	Assessment	End Exam	TOTAL				
		0	0	3	1.5	40	60	100				
		Ū	Ū	U	110	End H	Exam Duratio	n:3 Hrs.				
Course Outcom	es: At the end of	the cours	se the st	udent	will be ab	ole to						
CO1: Analyze the	e applications of N	etwork Tł	neorems	for Ci	ircuit Analy	vsis.						
CO2: Analyze the	e characteristics of	RLC Ser	ies & Pa	arallel	Resonance	Circuit, Self & Mutu	al Inductance.					
CO3: Analyze the	e characteristics of	two port	network	ts Z, Y	Y, h, g and A	BCD parameters.						
CO4: Analyze th	e characteristics of	filters.	1 .		• 1•							
CO5: Analyze th	e signal behaviou	ar throug	h a tran	smiss	ion line.							
List of Experiments												
<u>List of Experiments</u>												
1. Verificati	on of Thevenin's	and Nor	ton's th	eoren	n. (i) Expe	eriment (ii) Simula	tion					
2. Verificati	on of Superpositi	on theore	em and	Recip	procity The	orem. (i) Experime	ent (ii) Simula	tion				
3. Verificati	on of Maximum l	Power Tr	ansfer '	Theor	rem (i) Exp	eriment (ii) Simul	ation					
4. Study the	characteristics of	f RLC Se	ries & I	Parall	el Resonar	nce Circuit.						
5. Determin	ation of Self & M	Iutual Ind	luctanc	e.								
6. To calcul	ate and verify 'Z'	and 'Y' p	aramet	ers of	two-port r	network.						
7. To calcul	ate and verify AF	BCD para	meters	oftw	o-port netv	work.						
8. To determ	nine and verify th	e equiva	lent par	ramete	ers of serie	s connection of two	o port network	<u>.</u>				
9. To determ	nine and verify th	e equiva	lent par	ramete	ers of paral	llel connection of t	wo port netwo	vrk.				
10. To determ	nine the equivaler	nt param	eters of	the c	ascade con	nection of two por	t network.					
11. Design th	e characteristics	of Consta	unt-K L	ow Pa	ass and Hig	gh Pass filters.						
12. Design th	e characteristics	of m-der	ived Lo	w Pas	ss and Higl	h Pass filters.						
13. Design th	e characteristics	of Consta	ant k Ba	and Pa	ass filters a	and Band stop filter	rs.					
14. To determ	nine & verify cha	racteristi	c impe	dance	and propa	gation constant of	symmetrical n	etworks.				
15. To determ	nine and verify th	e image	impeda	ince a	nd iterative	e impedance of asy	mmetrical net	works.				

SOFT SKILLS LAB (SS(P))

III/IV Semeste	er: Common for	r all Bra	anches				Sche	me: 2020			
Course Code	Course Category	Hours	s/Week		Credits	Maxin	num Marks	5			
SCCM01	SSC	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL			
		0	0	4	2	40	60	100			
Course Outcom	and a At the and a	file				1. 4.					
Course Outcon	cate effectively a	nd enha	nce the	in inte	erpersonal	relationship building	skills with	renewed			
self confi	dence				erpersonar			Tente i eu			
CO2: Work toge	ether in teams and	d accom	plish o	bjecti	ves in a co	rdial atmosphere					
CO3: Face inter	rviews, GDs and	give pre	sentatio	ons			<u> </u>	<i>.</i> .			
CO4: Understar	Dringinlag of Dar	e etique	tte nece		to present	themselves in a pro-	tessional set	ting			
COS: Learn the	Principles of Per	sonarei	lectivei	less							
List of Activities											
List of Activities											
1. Ice breaking A	Activities, Princip	oles of T	ime and	d Stre	ess Manage	ment					
2. Art of speakin	ng										
3. Art of writing	- Essay / Picture	/ Story									
4. Business eliqu	lette - Telephone		an								
5. Presentation S	Skills - Power por sion – Objectives	int maki	ng ills test	ed in	a GD_type	s of GD. Dos and de	on'ts & prac	tice			
7. Teem work	Dromo / Sleit / De				a GD, type						
8 Paper / Poster	Presentation	ne play									
0. Problem Solvi	in a by lataral this	linan									
9. Problem Solv	General Awarene	$\frac{1 \times 100}{1 \times 100}$	vieda		117						
11. Principles of	Personal excelle	$\frac{1}{nce}$	wicuge	- Qi	41Z						
12 Interview Sk											
Reference Boo	oks :										
1. Stephen R. London	Covey, "The Sev	ven Hab	its of H	ighly	Effective F	People", Pocket Boo	ks Publisher	rs,			
2. Priyadarsh	ani Patnaik, "Gro	oup Disc	sussion	and I	nterview S	kills with VCD", Fo	undation Bo	ooks.			
3. Sangeeta S Learning I	harma & Binod l Private Limited.	Mishra,	"Comn	nunica	ation Skills	for Engineers and S	cientists", I	PHI			
4. Shiv Khera	a, "You Can Win	", MacN	/lillan I	ndia I	Publishers,	New Delhi					
5. Campus Co http://cam	onnect Portals - 7 pusconnect.infos	CCS - ht ys.com/	tps://ca	mpus	commune.	cs.com; Infosys -					

FOUR YEAR B.TECH. DEGREE COURSE

Scheme of Instruction and Examination

V SEM ECE

S No	Category	Course		Cuadita	S Ins per	cheme structio riods/v	of on veek	Scheme of Examination Maximum Marks		
5. INU		Code	Course Title	Creatis	L	Т	P/D	End Exam Marks	CIA Marks	Total Marks
Ι			Theory							
1.	PCC	EC301	Microprocessors and Microcontrollers	3	2	1		60	40	100
2.	PCC	EC302	Linear and Digital IC Applications	3	2	1		60	40	100
3.	PCC	EC303	Antennas and Wave Propagation	3	2	1		60	40	100
4.	PCC	EE317	Linear Control Systems	3	3			60	40	100
5.	PEC		PEC-I	3	3			60	40	100
6.	OEC		OEC-I	3	3			60	40	100
7.	MC	MC105	Essence of Indian Traditional Knowledge		2			-	100	100
Π			<u>Practical</u>							
8.	PCL	EC307	Microprocessors and Microcontrollers Lab	1.5			3	60	40	100
9.	PCL	EC308	Linear and Digital IC Applications Lab	1.5			3	60	40	100
10.	SC	SCEC03	PCB Design Lab	2			4	60	40	100
11.			Summer Internship-I	1.5				-	100	100
			Total	24.5	17	3	10	540	560	1100

VI SEM ECE

Scheme-2020

Scheme-2020

S.	Cotogowy	Course		Cuadita	S In per	chem struc iods/	e of tion week	Scheme of Examination Maximum Marks			
No	Category	Code	Course Title	Creatis	L	Т	P/D	End Exam Marks	CIA Marks	Total Marks	
Ι			Theory								
1.	PCC	EC309	VLSI Design	3	2	1		60	40	100	
2.	PCC	EC310	Digital Signal Processing	3	2	1		60	40	100	
3.	PCC	EC311	Microwave and Optical Communications	3	2	1		60	40	100	
4.	PEC		PEC-II	3	3			60	40	100	
5.	OEC		OEC-II	3	3			60	40	100	
6.	MC	MC104	Professional Ethics		2			-	100	100	
Π			Practical								
6.	PCL	EC315	E-CAD Lab	1.5			3	60	40	100	
7.	PCL	EC316	Digital Signal Processing Lab	1.5			3	60	40	100	
8.	PCL	EC317	Microwave and Optical Communications Lab	1.5			3	60	40	100	
9.	SC	SCEC04	Mobile App Development and Embedded systems Programming Lab	2			4	60	40	100	
			Total	21.5	12	3	13	540	460	1000	

FOUR YEAR B.TECH. DEGREE COURSE Scheme of Instruction and Examination

VII SEM ECE					Scheme-2020					
S. No	Category	Course Code	Course Title	Credits	Scheme of Instruction periods/week			Scheme of Examination Maximum Marks		
					L	Т	P/D	End Exam Marks	CIA Marks	Total Marks
Ι			Theory							
1.	PEC		PEC-III	3	3			60	40	100
2.	PEC		PEC-IV	3	3			60	40	100
3.	PEC		PEC-V	3	3			60	40	100
4.	OEC		OEC-III	3	3			60	40	100
5.	OEC		OEC-IV	3	3			60	40	100
6.	HSS	HSSC701	Universal Human Values-2	3	3			60	40	100
Π			Practical							
7.	SC	SCEC05	Data Science Lab	2			4	60	40	100
8.			Summer Internship-II	3					100	100
			Total	23	18		4	420	380	800

VIII SEM ECE

Scheme-2020

S. No	Category	Course Title	Credits	Scheme of Instruction periods/week			Scheme of Examination Maximum Marks			
				L	Т	P/D	End Exam Marks	CIA Marks	Total Marks	
1	PROJ	Project work	6			12	60	40	100	
2		Internship	6			12	-	100	100	
		Total	12			24	60	140	200	
PROFESSIONAL ELECTIVE COURSES

	COURSE CODE	COURSE TITLE
Professional Elective Course I	EC304	Electronic Measurements & Instrumentation
Professional Elective Course –I	EC305	Operating Systems
(FEC-I)	EC306	Satellite Communications
Professional Flasting Course II	EC312	Embedded Systems and IOT
(PEC II)	EC313	Coding Theory and Techniques
(FEC-II)	EC314	Bio-Medical Electronics
Professional Flasting Course III	EC401	Cellular and Mobile Communications
(PEC III)	EC402	Radar Systems
(FEC-III)	EC403	Global Positioning System
Drofossional Elective Course W	EC404	Computer Networks
(PEC IV)	EC405	Wireless Communications
(FEC-IV)	EC406	Artificial Neural Networks
Professional Flasting Course V	EC407	VLSI Signal Processing
(DEC V)	EC408	FPGA and ASIC Architectures and Applications
(FLC-V)	EC409	Network Security and Cryptography

	LIST OF OPEN ELECTIVES - OEC-I & OEC-II									
	Open Elective Courses (OEC-I)									
S.N	0	Course Code	Course Title							
1	•	OE301	Optimization Techniques							
2	2.	OE302	Remote Sensing & GIS							
3	3.	OE303	Introduction to JAVA							
4		OE304	Internet of Things							
5	5.	OE305	Scientific Programming with Python							
6	.	OE306	Introduction to Database Systems							
7	΄.	OE307	Ethical Hacking							
8	8.	OE308	Entrepreneurship Development							
9).	OE309	Introduction to Information Systems							
1	0.	OE310	Neural Networks & Fuzzy Logic							

	Open Elective Courses (OEC-II)								
S.No	Course Code	Course Title							
1.	OE311	Renewable Energy Sources							
2.	OE312	Industrial Safety							
3.	OE313	Web Technologies							
4.	OE314	Introduction to Cyber Security							
5.	OE315	Nano Technology							
6.	OE316	Disaster management							
7.	OE317	Project management							
8.	OE318	Advanced Information Systems							
9.	OE319	Product Lifecycle Management							
10.	OE320	Industry 4.0							

3

	Open Elective Courses (OEC-III)								
S. No	Course Code	Course Title							
1	OE401	Multimodal Transportation Engineering							
2	OE402	Air pollution and control							
3	OE403	Industrial Robotics							
4	OE404	Quality & Reliability Engineering							
5	OE405	Smart Grids Technologies							
6	OE406	Artificial Intelligence and Machine Learning							
7	OE407	Distributed Embedded Systems							
8	OE408	Natural Language processing							
9	OE409	Design Thinking							
10	OE410	Cloud, Micro services & Application							
11	OE411	Block Chain Technologies							
12	OE412	Agile Methodologies							
13	OE413	Augmented Reality & Virtual Reality							

List of Open Electives - OEC-III & OEC-IV

	Open 2	Elective Courses (OEC-IV)
S. No	Course Code	Course Title
1	OE414	Composite Materials
2	OE415	Image Processing
3	OE416	Mobile Computing
4	OE417	Enterprise systems
5	OE418	Modern Web Applications
6	OE419	Cognitive Radio
7	OE420	Automation & Control
8	OE421	Human Resources Management
9	OE422	Design Patterns
10	OE423	Pre stressing Systems
11	OE424	Additive Manufacturing Technology
12	OE425	Drone Technology
13	OE426	Infrastructure for Smart City Development

	MIC.	ROPRO	CESSC	JKS A	AND MIC	ROCONTROLLE	RS (MPMC)				
V Semester	:: ECE	1					Sche	me: 2020			
Course	Category	Hours/	Week		Credits	Max	imum Marks				
Code			[-							
				_		Continuous					
EC301	РСС	L	Т	Р	С	Internal	End Exam	TOTAL			
20001	100					Assessment	<u></u>	10.0			
~ ~ ~ ~ ~ ~		2	1	-	3	40	60	100			
Sessional E	xam Duratio	on: 11/2 H	Irs			E	nd Exam Dura	ation: 3 Hrs			
Course O	outcomes: At	the end	of the co	ourse	the student	will be able to					
CO1:Under	rstand the def	inition, a	rchitect	ure ar	nd special f	eatures of 8086 mic	croprocessor				
CO2: Appl	CO2: Apply the programming model of 8086 microprocessor to frame assembly language programs.										
CO3: Analy	yze the interfa	acing cor	icepts o	t 8086	5 micropro	cessor for various p	eripherals.				
CO4: Unde	erstand the def	tinition, a	architec	ture a	nd working	g details of 8051 mi	crocontroller.				
CO 5:Utiliz Perip	the Program the Program te the Program te the Program te the program te the term of te	nming m	odel an	d port	interfacing	g concepts of 8051	to control vario	ous			
1					UNIT-I						
Introductio	on of Microp	rocessor	s: Micro	oproc	essors evol	ution from 8-bit to	64-bit micropro	ocessors,			
Comparisor	n of architectu	res used	in diffe	rent d	lomains, 80)86 architecture, se	gmented memo	ory, Physical			
Memory Or	rganization.										
UNIT-II											
8086 Prog	ramming mo	del:,									
Addressing	modes, 8086	instruct	ion set,	Basi	c Assembl	er Directives, Simp	ole programs or	n Arithmetic			
operations S	Sorting, Searc	hing, Co	de conv	versio	ns, and Str	ing manipulations.					
UNIT-III											
Peripheral	Interfacing:	8255 (P	rogram	mable	e Periphera	l Interface), 8255	applications – 1	Basic Mode			
Application	s - Stepper M	lotor inte	rfacing,	DAC	C interfacin	g Waveform generation	ation and ADC	interfacing.			
Introduction	n to 8251(US)	ART), 82	259 (Pro	gram	mable Inter	rrupt Controller).					
UNIT-IV											
Introductio	on to MCS51	family:	8051 M	licro	controller .	Architecture, Input	/ Output ports a	and circuits,			
External me	emory, counte	ers and T	imers, S	Serial	data input/	output, interrupts.					
UNIT-V											
Programm	ing and Inte	erfacing:	Addre	ssing	Modes, Ir	struction set. Basi	c Programming	, with 8051			
Micro contr	oller. Interfac	eing LCL	, LEDS	, Step	per Motor.						
Text Books		1' 4	1 1								
1. A K Kay	, K M Bhurch	handi, Ad	ivanced	MICI	roprocesso	rs and Peripherals,	2nd Edition, Ta	ita McGraw			
Hill Educat	Ion Private Li	$\frac{1}{1}$ Mori	di Tamia	- Cill	lagria P- N	La Vinlay Dalin D	The 9051 Mie				
2. Maziai N	dad Systems	ni, Mazi 2nd Edit	in Janic		Education	$\frac{10000}{2000}$	The 8051 Mic	rocontroller			
	Beelver		ion, Pea	urson .	Education,	2008.					
1 John Liff	DUUKS:	0002/000	0 Eami	I. D	nian Drog	momming and Inter	ufacing 2nd Ed	ition			
Pearson Ed,	, 2006.	8080/800	oo raiiii	IY: De	esign, Prog	gramming, and mue	riacing, siù eu	ulon,			
2. Barry B.	Brey, The In	ntel Micr	oproces	sors-	Architectu	e, Programming ar	nd Interfacing.	8th Edition,			
Princeton H	lall India, 200	9.	•			2 0	2,	· · · ·			
3. Kenneth	J. Avala, The	8051 M	icrocon	roller	. Penram I	nternational Publica	ation Ltd. 2006	47			

Web References:

- 1. <u>www.nptel.onlinecourseac.in/.microprocessorsandmicrocontrollers</u>
- 2. https://onlinecourses.nptel.ac.in/noc18_ec03/

Question Paper Pattern:

Sessional Exam: The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination: The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub questions and the student should answer any one question from each unit. Each Question carries 12 marks.

LINEAR AND DIGITAL IC APPLICATIONS (LDICA)

V Semes	ter: ECE						5	Scheme: 2020
Course	Course	Hours/	Wee	k	Credits	Maximum Marks		
Code	Category							
EC302 PCC		L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL
		2	1	-	3	40	60	100
Sessiona	l Exam Dura	ation: 1 ¹ /	2 Hr	S		E	Ind Exam Du	aration: 3 Hrs

Course Outcomes : At the end of the course the student will be able to

CO1: Understand basic concepts and characteristics of differential amplifier and opamp.

CO2: Analyze basic linear and non-linear application circuits of opamp.

CO3: Design various opamp application circuits using special ICs namely 555 timer, IC565 PLL

CO4: Understand the principle of operation and applications of IC regulators and data converters.

CO5: Design various application based digital circuits using Digital ICs.

UNIT – I

ICs and Op-Amp Fundamentals

Classification of ICs, Differential amplifier- Basic operation and Characteristics,

Operational Amplifier- Ideal Op-amp, internal circuit, Inverting and non-inverting amplifiers, DC and AC characteristics, op-amp parameters, Features of 741 op-amps.

$\mathbf{UNIT} - \mathbf{II}$

Applications of Op-Amp

Linear applications of Op-Amp:

Summing amplifier, Difference amplifier, I to V and V to I converters, Instrumentation amplifier, Precision AC to DC converters, Integrator, Differentiator,

Non-Linear applications of Op-Amp:

Log & antilog amplifiers, Sample and hold circuits, Comparators, Schmitt trigger, Pulse, Square and triangle wave generators, Wien Bridge oscillator, Active filters (Butterworth filters up to second order only).

 $\mathbf{UNIT} - \mathbf{III}$

Timer and Phase Locked Loop (PLL)

555 Timer: Astable and Monostable modes, Applications.

Phase Locked Loops: Principle of operation, Lock and capture ranges, detailed study of different blocks of PLL, IC 565 PLL, and Applications of PLL.

UNIT – IV

Voltage Regulators and Converters

Voltage Regulators: General form of series Regulators, Fixed voltage regulator (78XX, 79XX), IC 723 voltage regulator, switching regulators (SMPS).

D to *A* and *A* to *D* Converters :

DACs: Weighted resistor, R-2R ladder type and inverted R-2R ladder, ADCs: Parallel comparator type, Successive approximation and dual slope types, Specifications of converters.

$\mathbf{UNIT} - \mathbf{V}$

Digital ICs

Introduction to Logic Families- Specifications of logic gates, DTL &TTL NAND gates *Combinational Circuits Using TTL 74XX ICs:* Study of logic gates using 74XX ICs, 4-bit parallel adder (IC 7483), Comparator (IC 7485), Decoder (IC74138), BCD-to-7- segment decoder (IC 7447), Encoder (IC 74147), Multiplexer (IC 74151), De multiplexer (IC74154).

Sequential Circuits Using TTL 74XX ICs: Flip Flops (IC 7474, IC 7473), Shift Registers, Universal Shift Register (IC 74194), 4- bit asynchronous binary counter (IC 7493).

CMOS Logic: CMOS logic levels, CMOS Inverter, NAND and NOR gates, implementation of any function using CMOS logic.

Text Books:

1. Roy Choudhury & Shail B.Jain, Linear Integrated Circuits, 4/e, New Age Int. Pub. 2010. 2. Ramakanth A. Gayakwad, Op-Amps & Linear ICs, 4/e, PHI, 2003.

3. Moris Mano, Digital Logic and Computer Design, Pearson Ed., 2011.

4. Floyd, John, "Digital Fundamentals", 8th edition (2009), Pearson Education, New Delhi.

Reference Books:

1. S. Salivahanan, V.S.K. Bhaaskaran, Linear Integrated Circuits, TMH, 2008.

2. Anand Kumar, Pulse and digital Circuits, PHI, 2/e, 2010.

3. R.P. Jain, Modern Digital Electronics, TMH, 3/e, 2003.

Web References:

1. TL082: Data sheet:http://www.ti.com/lit/ds/symlink/tl082.pdf

2. Application note:http://www.ti.com/lit/an/sloa020a/sloa020a.pdf

3. https://www.youtube.com/watch?v=nb11AipMJd4

4.https://www.youtube.com/watch?v=9Rt7iuqSVJ8

Question Paper Pattern:

Sessional Exam:

The question paper for Sessional examination shall be for 25 marks, covering half of the syllabus for first Sessional and remaining half for second Sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain subquestions and the student should answer any one question from each unit. Each Question carries 12 marks.

ANTENNAS & WAVE PROPAGATION (AWP)

V Semester :E	CCE						Schem	e:2020
Course Code	Course	Hours/Week			Credits	Maxi	Maximum Marks	
	Category		ſ	1			1	1
			_		~	Continuous		
EC303	PCC	L	Т	P	С	Internal	End Exam	TOTAL
			1		2	Assessment	(0)	100
Consistent Lines			1	-	3	40		
Sessional Exa	$\frac{11 \text{ Duration} : 1}{2}$	f the cou	rea tha	studo	nt will be	bla to	u Exam Dura	<u>1011: 51118</u>
Course Outco	tand the basis son	appendix of	Antonn	stude	In will be a	the Electric and Ma	anotic field on	iontotion
from a	ntennas through m	athemati	cal for	as and mulati	n Allalyze (ignetic neid of	lentation
CO2: Unders	stand & Evaluate d	ifferent	Arrays	$\frac{1101201}{8}$ its	parameters	s while designing the	nat.	
CO3: Analyz	the Practical ante	enna des	ign chai	racter	istics to me	et the requirement	of modern	
wireles	ss communications		-6					
CO4: Measu	re the different Par	ameters	of ante	nnas &	& Evaluate	the design perform	nance.	
CO5: Analyze	the wave propagat	tion conc	cepts.					
				UNI	Г_Т			
Antenna Rasia	· C			UNI	1 - 1			
Introduction. 1	Basic Antenna Para	meters -	Patter	ns. Be	am Area.]	Radiation Intensity	. Beam Efficie	ncv.
Directivity-Ga	in, Antenna Apertu	ires, Effe	ective H	Height	. Related I	Problems.	, Dealli Elliole	nej,
Thin Linear W	Vire Antennas	,		0				
Radiation from	n Small Electric D	ipole, Q	uarter	wave	Monopole	e and Half wave D	Dipole – Curre	nt
Distributions, l	Field Components,	Radiate	d Powe	er, Rac	liation Res	sistance.		
			τ	UNIT	– II			
Array of Point	Sources & Linear	Arrays	1 4	1				D
Arrays with Pa	arasitic Elements,	Yagi - U	da Arra	1ys, -1	BSA and E	EFA, Parasitic array	, Point source,	Power
pattern, Examp	Linear array of n I	sotropic	noint s	ource	s of equal	amplitude and space	sources, Pattern	II BSA)
Null directions	Binomial array	souopic	point s	ource	s of equal	amplitude and space	ing (LI'A and	DSA),
	, Dinomiai array.		I	UNIT	– III			
VHF. UHF A	ND Microwave An	tennas -	$\frac{1}{I}$					
Introduction R	esonant Antenna a	and Non	Reson	ant A	ntenna, Lo	ong wire antenna,	V –Antenna Ir	nverted V-
antenna, Rhon	nbic Antenna, Hel	lical An	tenna F	Reflec	tor Anten	nas - Introduction	, Flat Sheet a	nd Corner
Reflectors, Par	abolic Reflectors -	Geomet	ry, Patt	tern C	haracterist	ics, Feed Methods,	,	
Small Loop, C	omparison of Far F	fields of	Small I	Loop a	and Short I	Dipole, Radiation R	lesistances.	
			U	UNIT	- IV			
Micro-strip A VHF, UHF A	ntennas: Introduc ND Microwave Ar	tion, Fea ntennas	atures, <i>I</i> II	Advar	itages and	Limitations, Recta	ngular Patch A	ntennas.
Lens Antennas	, Geometry of Non	-metallie	c Dieleo	ctric L	lenses, Log	g periodic antenna,		
	-							
Antenna Meas	urements:		<u> </u>					
Introduction, Coordinate System, Sources of Errors. Impedance to be Measured, Pattern Measurement								
Methods)	Directivity Measu	iement,	Galii IV	reasul	ements (C	by Comparison, At	solute and 3-	Amenna
wiethous)								
								0

UNIT –V

Wave Propagations-Ground wave, Sky wave and Space wave Propagations

Introduction- Friss free space equation, Different Modes of WavePropagation,

Plane Earth Reflections, Space and Surface Waves, Wave Tilt, Curved Earth Reflections.

Sky wave propagation (neglecting earth's magnetic field), Virtual Height, Critical Frequency, MUF, Skip distance. Field Strength Variation with Distance and Height, Effect of Earth's Curvature, Absorption, Super

retraction, M-Curves and Duct Propagation, Tropospheric Propagation.

Text Books :

1. K.D.Prasad, Antennas and wave propagation, ST India Publications, New Delhi, 2001.

2. C.A. Balanis, Antenna Theory - Analysis and Design, John Wiley, 2005

3 J.D. Kraus, Antennas and Wave Propagation (SIE) | 5th Edition Paperback – 1 November 2017

Reference Books :

6. E.V.D. Glazier and H.R.L, Lamont Transmission and Propagation, The services text book of Radio, vol.5, Standard Publishers Distributors, Delhi

7. Jordan E.C. and Balmain Electromagnetic waves and Radiating Systems, PHI, Reprint 2003

8. R.E.Collins, Antennas and radio propagation, McGraw-Hill

Web References:

1.www.educypedia.org

2. <u>www.edutalks.org</u>

Sessional Exam: The question paper for Sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second Sessional exam. The question paper shall consist of three sections with Two Questions (EITHER / OR Type) in each section. The student shall answer one question from each section.

End Examination: The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub questions and the student should answer any one question from each unit. Each Question carries 12 marks.

LINEAR CONTROL SYSTEMS (LCS)

V Semester : E	Semester : ECE Scheme : 20									
Course Code	Category	Ho	urs/We	eek	Credits	Maximum Marks				
EE317	РСС	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total		
		3	-	-	3	40	60	100		
Sessional Exam Duration : 1 ¹ / ₂ Hrs End Exam Duration: 3 Hrs										
Course Outco	omes : At the e	nd of t	he cour	se the	student will	be able to				
CO1: Understan electrical	nd the behavior and mechanica	of ope l syster	en loop ns.	and c	losed control	systems and matl	hematical m	odel of		
CO2: Apply blo	ock diagram rec	luction	techni	ques a	nd Mason's g	gain formula for f	inding the t	ransfer		
function of	of a given contr	ol syste	em.					and a		
CO3: Understan	nd standard test	t inputs	, contr	ollers,	transient and	l steady state resp	onse for a 2	2 nd order		
control sy	stem for unit s	tep inp	$\frac{\text{ut.}}{1}$		1		. 1 .	• • • •		
CO4: Apply and and freque	alytical and gra	phical	technic	jues to	determine t	he stability of con	trol system	in both time		
CO5: Understa	nd concept of c	ompen	sation	state i	nodel contro	ollability & observ	vability of a	systems		
		ompen	surion,	UN	IIT – I		uonity of a	systems.		
Equations	and Open-lo	op and	closed	-loop	systems, con	trol system com	ponents, ser	vomotor,		
Models of Lin	near Transfer	func	tions,	Deter	mination of	transfer funct	ion of elect	rical and		
Systems	mechani	cal sys	tems.							
Block Diagran	n & Block di	iagram	represe	entatio	n and manip	ulation, signal flo	w graphs-N	/lason's gain		
Signal flow gra	ph formula	to dete	rmine	overal	l system gain	of control system	1.			
				UN	IT – II					
Feedback	Feedbac	k and r	ion-fee	dback	systems, effe	ects of feedback, 1	regenerative	e feedback.		
Characteristics	5	<u>c :</u>			C	1 1 .	1	<u> </u>		
Time Response	Types o	t input	, transi	ent re	esponse of se	cond order contr	ol system 1	for unit step		
	nput, ti	me-dol	nain sp rivotiv	becilic ve and	integral cont	y state error and	error consu	ants,		
UNIT – III	proportio	Jilai, u	2110 at 1 v	c and	megrarcom	1015.				
Concept	of Stability	of sys	stems -	Rout	h Hurwitz c	riterion to detern	nine stabilit	v of control		
Stability	systems,	Relati	ve stab	ility.				<i>y or control</i>		
Root Locus	Concept	of roo	t locus	, Proc	edure to plo	t root locus, Stab	oility analys	is of control		
	system b	y root	locus to	echniq	lue.					
				UN	IT – IV					
Frequency	Frequen	cy Res	ponse	of sec	cond order c	ontrol systems, I	Frequency	Jomain		
Response:	specifica	ations:	resona	nt pea	ak (Mp) and	resonant frequer	ncy (Wp) f	or a second		
	order sy	stem, (Co-relat	tion be	etween time	and frequency res	sponse, Gai	n cross over		
Energy on our Dist	trequence trequence	y, pha	se cross	sover 1	trequency, ga	in margin (GM) a	and phase n	hargin(PM).		
Frequency Plot	s Bode plo	ots, Pol	ar plot	s, inyq	uist stability	criterion for conti	roi system.			
Componentian	The nee	ossitu	of com	UN	$\mathbf{II} - \mathbf{v}$	nd parallal comp	onaction P	alization of		
(Without Desig	\mathbf{m}) basic lea	id. Lag	and les	ad-Lao	z compensato	ors.	ciisatioii, K			
State Vari	able Introduc	tion. c	oncept	$\frac{1}{s \text{ of } s}$	state, state v	ariables, state ve	ector, state	space, state		
Analysis	space re	presen	tation.	state	model, state	transition matrix	, solution of	of state		
	equation	s. Con	cept of	Contr	ollability and	l Observability.	,			
Text Books					•	•				
1. Nagrath and	Gopal, "Contro	ol system	ns Eng	ineeri	ng", New Ag	ge International Pu	ublications,	2003. <u>11</u>		

- 2. B.C.Kuo, "Automatic Control Systems", Oxford, 2003.
- 3. K. Ogata, "Modern control Engineering", Pearson, 2003.
- 4. Naresh K.Sinha, "Control Systems", New Age International Publishers, 1998.
- 5. B.S.Manke, "Linear Control Systems", 1996.

Reference Books

- 1. Madan Gopal, "Control Systems", TMH. 2003.
- 2. Dorf, Bishop, "Modern Control systems", Addison Wesley, 1998.
- 3. Shaum"s out line series, "Feedback control systems", TMH, 1986.
- 4. R.C.Shukla, "Control Systems", Dhanpat Rai, 2004.
- 5. Ashok Kumar, "Control Systems", TMH, 2006.

Web References:

- 1. https://nptel.ac.in/courses/108106098/
- 2. https://onlinecourses.nptel.ac.in/noc18_ee41/preview
- **Question Paper Pattern:**

Sessional Exam: The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination: The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub questions and the student should answer any one question from each unit. Each Question carries 12 marks.

ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE (EITK)

V Semester: ECH	E						Scheme	e:2020
Course Code	Category	Ηοι	ırs/W	'eek	Credits	Maximum Marks		
MC105	МС	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL
		2	0	0	0	100	0	100

Course Outcomes: At the end of the course students will be able to

CO1: Understand the concept of Traditional knowledge and its importance.

CO2: Explain the need and importance of protecting traditional knowledge.

CO 3: Illustrate the various enactments related to the protection of traditional knowledge.

CO 4: Interpret the concepts of Intellectual property to protect the traditional knowledge.

CO 5: Understand the traditional knowledge in different sectors.

UNIT-I

INTRODUCTION TO TRADITIONAL KNOWLEDGE

Define traditional knowledge, nature and characteristics, scope and importance, kinds of traditional knowledge, the physical and social contexts in which traditional knowledge develop, the historical impact of social change on traditional knowledge systems. Indigenous Knowledge (IK), characteristics, traditional knowledge vis-à-vis indigenous knowledge, traditional knowledge Vs western knowledge traditional knowledge vis-à-vis formal knowledge

UNIT-II

PROTECTION OF TRADITIONAL KNOWLEDGE

Protection of traditional knowledge: The need for protecting traditional knowledge Significance of TK Protection, value of TK in global economy, Role of Government to harness TK.

UNIT-III

LEGAL FRAME WORK AND TK

- A. The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, The Protection of Plant Varieties and Farmers' Rights Act, 2001 (PPVFR Act).
- B. The Biological Diversity Act 2002 and Rules 2004, the protection of traditional knowledge bill, 2016. Geographical indicators act 2003.

UNIT-IV

TRADITIONAL KNOWLEDGE AND INTELLECTUAL PROPERTY

Systems of traditional knowledge protection, Legal concepts for the protection of traditional knowledge, Certain non IPR mechanisms of traditional knowledge protection, Patents and traditional knowledge, Strategies to increase protection of traditional knowledge, global legal FORA for increasing protection of Indian Traditional Knowledge.

UNIT-V

TRADITIONAL KNOWLEDGE IN DIFFERENT SECTORS

Traditional knowledge and engineering, Traditional medicine system, TK and biotechnology, TK in agriculture, Traditional societies depend on it for their food and healthcare needs, Importance of

conservation and sustainable development of environment, Management of biodiversity, Food security of the country and protection of TK. 139.

TextBooks:

1. 'Traditional Knowledge System in India' by Amit Jha, 2009.

ReferenceBooks:

- 1. 'Traditional Knowledge System and Technology in India' by Basanta Kumar Mohanta and Vipin Kumar Singh, Pratibha Prakashan 2012.
- 2. 'Traditional Knowledge System in India' by Amit Jha Atlantic publishers, 2002.
- 3. 'Knowledge Traditions and Practices of India' by Kapil Kapoor and Michel.

Web References:

- 1. www.youtube.com/watch?v=LZP1StpYEPM
- 2. https://nptel.ac.in/courses/121106003

MICROPROCESSORS AND MICROCONTROLLERS LAB (MPMC(P))

V Semes	ster : ECE		02000					Scheme: 2020		
Course Code	Category	Hours/	Week		Credits	N	Maximum Marks			
EC307	PCL	L	Т	Р	С	ContinuousInternalAssessment		TOTAL		
		-	-	3	1.5	40	60	100		
		End Exam Du	ration: 3 Hrs							
Course Outcomes: At the end of the course the student will be able to										
CO1: E	xecute 8086 p	orograms	using A	Addre	ssing mode	es and instruction so	et on trainer kit			
CO2:U	tilize environi	nents lik	e Turbo	Asse	mbler and	debug to execute p	rograms			
CO3: C	Compile progra	ams of 80	051 usir	ig Ke	il software	and Interface 8086	with peripheral	S.		
CO4: I	mplement 805	1 Micro	controll	er-int	erfacing ap	plications on embe	dded trainer boa	ard.		
		Ι	LIST O	FEX	PERIMEN	NTS				
CYCLE	– I: Introduct	tion to A	ssembly	Lang	guage Prog	rams Using 8086 k	Kits (8086 RELA	ATED		
PROGR	AMS)					Ū.				
1. E	Execute the 80	86 assem	bly lang	guage	programs	on arithmetic operation	ations.	[CO 1]		
2. E	Execute the 80	86 assem	bly lang	guage	programs	on series of data of	perations.	[CO 1]		
3. i)	Execute the 8	3086 asse	embly la	ingua	ge progran	ns on factorial of a	number	[CO 1]		
ii) Execute the	8086 ass	embly l	angua	age program	ms on Fibonacci ser	ries generation			
4. E	Execute the 80	86 assem	bly lang	guage	programs	using Debug Envir	onment	[CO2]		
5. E	xecute the 80	86 I	CASM P	rogra	Imming Us	ing Strings		[CO 2]		
6. E	Execute the 80	86 T	CASM P	rogra	mming Us	ing Procedures		[CO 2]		
CYCLE	– II: Introduc	ction to N	Aicroco	ntroll	er Program	ming and Usage of	f Software and H	Boards		
(Interfac	ing Programs))			•			[000]		
7. In	nterface and e	xecute L	CD fund	ctioni	ng using80	86Microprocessor		[CO3]		
8. I	nterface and e	xecute p	eriphera	IS US1	ng Keil Co	mpiler.	11	[CO3]		
9. Ii	nterface and e	xecute D	ancing	LEDS	s pattern us	ingA189852Micro	controller	[CO4] [CO 4]		
10. I	nterface and e	xecule L	CD ope	ration	using A 1 8	TSOS52Microcontroll	rollor	[CO 4] [CO 4]		
11. 1 $12 I_1$	nterface and e	vecute th	$\sim 7 \mathrm{cerr}$	nent	Dis usingA Display usi	ing AT89852Micro	controller	[CO 4]		
12. 1			ic 7 segi	nem	Display usi	ingA107552ivitero	controller	[004]		
ADDIT	ONALEXPE	RIMEN	TS							
13. U	Jsing Debug E	Invironm	ent per	form	the addition	n, multiplication &	division on no's	. [CO2]		
14. U	Using 8086 boa	ards disp	lay the	depar	tment and	college name in two	o rows.	[CO3]		
15. U	Jsing AT89S5	2 board i	interfac	e a tei	mperature	sensor and display	the value on LC	D. [CO4]		
16. U	Using AT89S5	2 interfa	ce a sw	tches	& LEDs &	the count	of LEDs ON.	[CO4]		

LINEAR AND DIGITAL IC APPLICATIONS LAB (LDICA(P))

V Semeste	er: ECE						S	cheme: 2020
Course	Course	H	ours/	Wee	Credits	Maximu	m Marks	
Code	Category	k						
						Continuous		
		т	т	D	С	Internal	End	ΤΟΤΑΙ
EC308	PCL	L	1	1	C		Exam	IOTAL
		-	-	3	1.5	40	60	100
				•		End	Evon Dun	ation: 2 Ung
Course Or	itcomes: At	the e	nd of	the co	urse the stud	ent will be able to	Exam Dur	
CO1: Desi	ign and verif	fv op	eratio	n of li	near applicat	tion circuits using Op-	Amp IC741	
CO2: Desi	ign and verif	fy op	eratio	n of no	onlinear appl	lication circuits using I	C 741	
CO3: Desi	ign and verif	fy op	eratio	n of va	rious Appli	cation circuits using I	C 555, IC 72	3 and
data	converters				11		,	
	an various	annlia	ration	based	digital circu	uits using Digital ICs		
Lincon IC			cation	Juseu	uigitai circe	ints using Digital ICs.		
1 Invert	ing and not	us: n_inv	ortin	a omn	lifiors			
	design and	verif	v the	operat	ion of ampli	fiers using onamp IC74	11 in	
u. 10	verting and r	ion-	invert	ing m	ode	tions using optimp rev	, , , ,	
b. To	obtain frequ	uency	v resp	onse a	nd bandwidt	h of amplifiers.		
2. Summ	ing and dif	ferer	ice ar	nplifie	ers	1		
a. To	design appl	icatio	on cire	cuits u	sing IC 741	to perform mathematic	al	
op	erations suc	h as a	additio	on, suł	otraction.			
b. To	study the op	perat	ion of	circui	ts by compa	ring the theoretical value	ues with prac	ctical values
3. Integr	ator and D	iffere	entiat	or	2		2	
a. To	design circi	uits u	ising I	C 741	to perform	mathematical operation	is of	
Int b To	egration and	1 diff	erenti	ation	avita hu ann	lying different input w	avafarma	
0. 10	ion D octific	re	mance		cuits by app	Tynig unterent input w	aveiornis.	
a To	study the or	nerati	ion of	Half-v	vave and Fu	ll-wave rectifier circuit	ts constructe	h
u. 10 Jisino	IC741	perat	1011 01	11an-			is constructe	u
5. Schmi	tt trigger a	nd so	mare	wave	generator			
a. To	design Schi	nitt t	rigger	and s	quare wave	generator circuits for g	iven specific	ations.
b. To	conduct co	mpar	ative	study	of the circuit	performance for the pa	arameters su	ch
as	UTP,LTP a	nd ou	itput f	requei	ncy.	1 1		
6. Triang	gular wave	gene	rator		•			
a. To	b design the	circu	it of t	riangu	lar wave ger	nerator for given specif	ications and	
ve	rify the out	put fo	or its c	closen	ess to theore	tical value.		
7. Active	e filters: Lov	w Pa	ss Fil	ter &	High Pass F	Tilter		
a. To	o design a Se	econd	l orde	r Butte	erworth LPF	& HPF for given cut o	off frequency	
b. To	o obtain freq	uenc	y resp	onse a	and practical	value of cut off freque	encies.	
8. Multiv	vibrators us	sing 1	IC 55	5 Tim	er		1 / 11	1 6
a. To gi	ven specific	ltivib: ation	rator (s.	circuit	s using IC 5:	55 Timer in monostable	e and astable	modes for
b. To	study the p	erfor	manc	e of at	ove circuits	and obtain pulse width	n from monos	stable and
ou	itput frequer	ncy o	f astal	ble cir	cuit.			
9. Voltas	e regulator	•						
	Buintol	-						

a. To study the regulation operation of IC 723 in low and high voltage modes.

10. R-2R ladder type Digital to Analog Converter

a. To study the performance of R-2R ladder type Digital to Analog Converter

Digital IC Experiments:

1. Decoder and Multiplexer
a. Realization of 4 bit variable Boolean expression using 3 to 8 line Decoder(IC74138) and 8
to 1 Multiplexer(IC74151).
2. 4-bit comparator
a. To construct 4-bitcomparator circuit using IC7485 and verify its operation.
3. 7-segment display
a. To construct 7-segment display circuit using IC7447 and 7-segment LED and test
its performance.
4. Mod-N ripple counter
a. To design a Mod-N ripple counter, construct the circuit using T flip-flops and verify its
performance.
5. Ring and Johnson counters
a. To construct 4 bit Ring counter using D flip-flops/J-K flip-flops and verify its
operation
b. To construct 4 bit Johnson counter using D flip-flops/J-K flip-flops and verify its
operation

Note: At least 12 (9 Linear IC + 3 Digital IC) experiments should be conducted.

PCB DESIGN LAB

V Semester: ECI	E				Scheme:202						
Course Code	Category	Hou	ırs/We	eek	Credits	Ma	aximumMark	S			
SCEC03	SC	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL			
				4	2	40	60	100			
						•	End Exam D	uration: 3 Hrs			
Course Outcomes	: At the end of t	he co	urse th	e stud	lent will be	able to					
CO1: Understand	the concepts of Po	CB De	esign, D	Develop	pment and te	esting using Soft	ware and CNC N	Machine.			
CO2: Design, develop and test the Rectifier circuits											
CO3:Design, dev	elop and test the	e appl	1cation	is of N	E 555 and	LM /41 op am	p				
CO4:Design, develop and test the Digital Circuits and its applications											
COS: Design the Foot Print Creation of the components to support Library functions.											
S	LIST OF E	XPEI ired:	EAG	NTS (LE_C	Perform a	ny Five Exper	iments) 1 Mac3 Mill				
1. Introduction	to PCB design.	deve	lopme	nt.&]	Testing.	, nuto Leve					
Installation	Installation of Eagle Software, Copper CAM, Auto Level,										
Operation of CNC Machine using Mac3 Mill software.											
2. Half Wave	Rectifier (Single	Side	Board	l)							
3. Bridge Rect	ifier (Single Sid	e Boa	ard)								
4. LED Blinki	ng Circuit using	NE5	555IC	(Sing	le Side Boa	urd)					
5. Darkness D	etector using LN	/ 1741	Op-Ar	np IC							
6. Multiplexer	(Single Side Bo	oard)									
7. Bridge Rect	ifier (Double Si	de Bo	oard)								
8. Foot print (Creation (NE55	5IC-T	HT Co	ompor	ent)						
9. Foot print (Creation (NE555	5IC-S	MD C	ompo	nent)						
10. Half Adder	Using Logic ga	ites (S	Single S	Side E	loard)						
	Additiona	l Exp	erimei	nts (F	Perform an	y Two Experiı	ments)				
1. Foot Print C	Creation LM741	-IC T	HT Co	mpon	ent						
2. Foot Print C	Creation LM741	-IC SI	MD Co	ompor	nent						
3. LM741 Fire	e Alarm Circuit (Dout	ole Sid	ed Bo	ard)						
4. De-multiple	exer (Double Sid	ed Bo	oard)								
5. Full Adder	using Logic Gat	es (Si	ngle S	ide Bo	Dard)						
6. 4-bit Binary	Counter using	D-Flij	p Flop	s (Sing	gle Side Bo	ard)					

				V	LSI DESIG	N (VLSI)					
VI -Semester	ECE							Scheme: 2020			
Course Code	Category	Hou	rs/We	ek	Credits	Ma	Maximum Marks				
EC 309	РСС	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL			
		2	1	-	3	40	60	100			
Sessional Exa	m Duration: 11/	2 Hrs					End Exam	Duration: 3 Hrs			
Course Out	comes : At the	end of	the co	ourse	the student	will be able to					
CO1: Absorb	the ASIC classif	icatio	n and	detail	ed steps foll	owed in moder	n IC fabricatio	n.			
CO2: Derive t	he MOSFET I-V	/ char	acteris	tics fi	rom basic u	nderstanding of	f n, p channel d	levices.			
CO3: Analyze	the CMOS circ	uits, t	heir ch	$\frac{aracte}{\cdot}$	eristics dela	ys, power and t	ransistor sizing				
CO4: Compre	hend other logic	varia	tions v	'1z. pa	ISS-transisto	r, dynamic, pse	$\frac{1}{2}$	ogic.			
COS: Grasp tr	le semiconducto	r men	iories	name	IY KAMS, R	OWIS, for their	leature set.				
					LINIT_I						
VLSI Fabrica	tion Technolog	v.			0111-1						
Introduction to	ASICs. ASICs	class	ificatio	on. Ty	vpical ASIC	/VLSI Design	Flow. IC Fabri	cation Steps. Art			
of miniaturiza	ation, VLSI Pro	cesse	s: Tw	in-We	ell CMOS	Process, MOSI	FET, Resistors	S. Capacitors, pn			
junction Diod	es, BiCMOS Pi	ocess	, Late	ral pr	p Transisto	or, p-Base and	Pinched-Base	Resistors, VLSI			
Design Rules,	VLSI Layout, I	Layou	ts for	CMO	S Inverter, 0	CMOS NAND	and NOR gate	es, Beyond 20nm			
Technology- I	FinFET	•					-				
					UNIT-II						
Introduction, I Introduction, I Circuits at D Problems	to MOSFETs: Device Structure C, The Body E	and l	Physic and C	al Op Other	eration, Cur Topics, Co	rent–Voltage C mparison of N	Characteristics, IOSFET and	MOSFET BJT, Summary,			
					UNIT -III						
CMOS Digita	al Logic Circuit	s:									
Introduction, Operation of t	CMOS Logic-G he CMOS Inver	ate Ci ter, Ti	rcuits, ansist	Digi or Siz	tal Logic In ing, Power	verters, The Cl Dissipation, Su	MOS Inverter, ummary, Proble	Dynamic ems.			
					UNIT–IV						
Advanced Top Introduction, I Logic-Circuit Circuits, Dyna	Advanced Topics in Digital IC Design: Introduction, Implications of Technology Scaling in Deep Submicron Designs, Digital IC Technologies, Logic-Circuit Families, Design Methodologies, Pseudo-NMOS Logic Circuits, Pass-Transistor Logic Circuits, Dynamic MOS Logic Circuits, Bipolar and BiCMOS Logic Circuits, Summary, Problems.										
					UNIT– V						
Memory Circu Introduction, L Access Memor CMOS Image S	iits: atches and Flip y (RAM) Cells, Sensors, Summa	-Flop Sense ry, Pr	s, Sen e Amp oblem	niconc lifiers s.	luctor Mem and Addre	nories-Types an ss Decoders, R	nd Architectur ead-Only Men	es, Random- nory (ROM),			
TextBooks :											
1. Neil We (4 th ed)	este and David F Addison-West	Iarris. ev Pu	2010. blishir	CMC	DS VLSI Des mpany US	sign: A Circuits A.	and Systems H	Perspective			
	,		5115HIII	-5 -0							

2. Wayne Wolf. 2008. *Modern VLSI Design: Ip-Based Design* (4th ed.). Prentice Hall PTR, Upper

Saddle River, NJ, USA.

Reference Books:

- 1. Jan M. Rabaey, Anantha Chandrakasan, and Borivoje Nikolic. 2008. Digital IntegratedCircuits (3rded.). Prentice Hall Press, Upper Saddle River, NJ, USA.
- 2. Michael John Sebastian Smith. 2008. *Application-Specific Integrated Circuits* (1st ed.). Addison-Wesley Professional.

3. Adel S. Sedra and Kenneth C. Smith. 2015. *Microelectronic Circuits Revised Edition* (7thed.). Oxford University Press, Inc., New York, NY, USA.

Web References:

1.https://nptel.ac.in/courses/117101058/

- 2. https://www.intel.in/content/www/in/en/company-overview/intel-museum.html
- 3. http://global.oup.com/us/companion.websites/9780199339136/

QuestionPaperPattern:

Sessional Exam: The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination: The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain subquestions and the student should answer any one question from each unit. Each Question carries 12 marks.

DIGITAL SIGNAL PROCESSING (DSP)

CE			Sche	me:2020						
Course Category	Ho	urs/Wee	k	Credits	Maxim	Maximum Marks				
РСС	LTPCContinuous Internal AssessmentEn Exa21-34060					End Exam	Total			
	2 1 - 3 40 60									
Sessional Exam Duration : 1 ¹ / ₂ Hrs						End Exam Duration: 3 Hrs				
mes: On completion c	f this su	bject, the	e stude	ent will be	able to:					
and Digital Signal pro	ocessing	and ana	lyze tl	he Signals	and Systems u	sing				
r analyzing Tools.	-		-	-	-	-				
nd the significance of	FFT Alg	gorithms	and re	ealization of	of filters.					
R digital filters with t	he given	specific	ations							
IR digital filters with t	he giver	n specific	cations	3.						
nd the need for Multi-	rate Sigi	nal Proce	essing	and DSP A	Architecture.					
UNIT-I										
Introduction:										
	CE Course Category PCC n Duration : 1 ¹ / ₂ Hrs mes: On completion of and Digital Signal pro- t analyzing Tools. Ind the significance of R digital filters with the IR digital filters with the nd the need for Multi-	CE Ho Course Category Ho PCC L 2 2 n Duration : 1½ Hrs 2 mes: On completion of this su 14/2 Hrs mes: On completion of this su 15/2 Hrs mes: On completion of this su 16/2 Hrs mes: On completion of this su 16/2 Hrs mes: On completion of this su 16/2 Hrs mes: On completion of this su 17/2 Hrs mes: On completion of this su 16/2 Hrs model of	CEHours/WeePCCLT 2 1n Duration : 1½ Hrsmes: On completion of this subject, the und Digital Signal processing and ana c analyzing Tools. nd the significance of FFT Algorithms R digital filters with the given specific IR digital filters with the given specific ind the need for Multi-rate Signal ProcesUNIT	CECourse CategoryHours/WeekPCCLT 2 1 2 1 $1^{1/2}$ Hrsmes: On completion of this subject, the studemes: On completion of this subject, the studeand Digital Signal processing and analyze the c analyzing Tools.and the significance of FFT Algorithms and redR digital filters with the given specificationsIR digital filters with the given specificationsIR digital filters with the given specificationsINIT-I	CEHours/WeekCreditsPCCLTP21-3n Duration : $1\frac{1}{2}$ HrsI-mes: On completion of this subject, the student will beImod Digital Signal processing and analyze the SignalsIanalyzing Tools.Imd the significance of FFT Algorithms and realization ofR digital filters with the given specifications.IR digital filters with the given specifications.IR digital filters with the given specifications.INIT-I	CE Hours/Week Credits Maxim PCC L T P C Internal Assessment 2 1 - 3 40 m Duration : 1 ½ Hrs End Exam Duration End Exam Duration mes: On completion of this subject, the student will be able to: End Exam Duration mod Digital Signal processing and analyze the Signals and Systems uranlyzing Tools. End Exam Outration of filters. R digital filters with the given specifications. IR digital filters with the given specifications. IR digital filters with the given specifications. UNIT-I	CE Scher Course Category Hours/Week Credits Maximum Mar PCC L T P C Internal Assessment End Exam 2 1 - 3 40 60 n Duration : 1 ½ Hrs End Exam Duration: 3 End Exam Duration: 3 mes: On completion of this subject, the student will be able to: main analyzing Tools. and Digital Signal processing and analyze the Signals and Systems using r analyzing Tools. main the significance of FFT Algorithms and realization of filters. R digital filters with the given specifications. IR digital filters with the given specifications. IR digital filters with the given specifications. Internal Assessing and DSP Architecture. UNIT-I			

Review of discrete time signals and systems, Introduction to Digital Signal Processing, Representing the Discrete Time System as Mathematical Model using Linear Constant Coefficient Difference Equation, Frequency Domain analysis of Discrete Time Signals and Systems using DFS and DTFT.

Discrete Fourier Transforms:

Introduction to DFT, Relationship of DFT with DFS, DTFT and Z-Transforms, Properties of DFT, Circular Convolution, Linear Convolution using circular convolution, Filtering of long data sequences using DFT-Over-Lap Add Method, Over-Lap Save Method.

Fast Fourier Transforms:

UNIT-II

Computational complexity of direct computation of DFT, Introduction to Fast Fourier Transforms, Radix-2 Decimation-in-Time and Decimation-in-Frequency FFT Algorithms, Radix-2 Inverse FFT algorithms, Split Radix FFT algorithms,

Realization of Digital Filters:

Realization of IIR Digital filters-Direct form I & Direct form II, Cascade form and Parallel form realization, Realization of FIR digital filters- Direct form, Cascade form and Parallel form realization, Linear Phase realization.

UNIT-III

IIR Digital Filters:

Introduction, Design of Analog Butterworth and Chebyshev filters, Design of IIR Digital Filters from Analog Filters using Approximation of derivatives method, Impulse Invariant method, Bilinear Transformation Method and Matched z-transform, Filter transformations in Analog Domains and Digital domains.

UNIT-IV

FIR Digital Filters:

Characteristics of FIR Digital Filters, Frequency Response, Design of FIR Filters using Fourier Series Method, Windowing Method and Frequency Sampling method, Comparison of IIR & FIR filters.

Multirate Digital Signal Processing:

Introduction, Down Sampling, Up-sampling, Sampling Rate Conversion, Multistage decimator and interpolator.

UNIT-V

Introduction to DSP Processors:

Introduction to programmable DSPs: Multiplier and Accumulator (MAC), Modified Bus Structures and Memory Access schemes in DSPs, Multiple access memory, VLIW Architecture, Pipelining, Special addressing modes, On-Chip Peripherals.

TMS320C67XX Processor and Architecture:

Features of TMS320C67XX processors, Internal architecture, Addressing modes, External memory access, Peripherals.

Text Books:

1. Digital Signal Processing, Principles, Algorithms, and Applications: John G. Proakis, Dimitris G. Manolakis, Pearson Education, PHI, 2007

2.Discrete Time Signal Processing-A.V.Oppenheim and R.W.Schaffer, PHI, 2009

3. Fundamentals of Digital Signal Processing- Loney Ludeman, JohnWiley, 2009

4.B.VenkataRamani and M. Bhaskar, Digital Signal Processors, Architecture, Programming and Applications, TMH, 2004.

Reference Text Books:

1. Digital Signal Processing –Fundamentals and Applications –LiTan, Elsevier, 2008

2. Fundamentals of Digital Signal Processing using MATLAB – Robert J. Schilling, Sandra Harris, Thomson, 2007

3. Digital Signal Processing - A Computer based approach, Sanjit K Mitra, 3nd Edition,McGraw Hill,2008

Web References:

http://www.nptelvideos.in/2012/12/digital-signal-processing.html

https://nptel.ac.in/courses/108105055/34

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/OR Type) in each section. The student shall answer one question from each section.

End Examination:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either-or-Type) from each unit. Each of these questions may contain subquestions and the student should answer any one question from each unit. Each Question carries 12 marks.

MICROWAVE AND OPTICAL COMMUNICATIONS (MWOC)

VI - Semester :	ECE	· · · ·					Sche	eme: 2020
Course Code	Course	Hours	Week		Credits	Maxi	mum Marks	
	Category							
						Continuous		
EC311	PCC	L	Т	Р	С	Internal	End Exam	TOTAL
ECJII	ree					Assessment		
		2	1	-	3	40	60	100
Sessional Exan	Duration : 1 1/2	2 Hrs				End	l Exam Durati	on: 3 Hrs
Course Outcon	nes : At the end of	f the cou	rse the	stude	nt will be a	ble to		
CO1: Apply the	properties of S p	arameter	s to stu	dy the	e character	istics of microwave	e components.	
CO2: Understan	d the concepts of	Various	Micro	wave	Solid state	Components		
CO3: Understan	d the concepts of	Conven	tional N	Aicro	wave Tube	s and the procedure	e to measure va	arious
Microway	ve Parameters						1. (15)	
CO4: Learn basi	c optical laws tha	t govern	the Pro	pagat	ion of light	t in optical fibres ai	nd types of Fibe	ers and
CO5: The signal	Igurations	hanisms	lika Ar	tonus	tion & dis	persion in optical F	libers	
COJ. The signa	ruegradation med	11411151115	IIKC A	lienua			10015	
				UNI	т_т			
Microwaya Con	nonants and Tw	o Port N	Totwork	<u>.</u>	1 - 1			
Introduction to	Microwayes:	Microwa	ve fre	s. menc	ies _Intro	duction to Wave	guides and it	s modes-
advantages and	applications	Scatterin	σ mati	rix fo	ormulation	· Concept of N	port scatteri	ng matrix
representation -	S parameters pro	perties	Passive	micr	owave dev	ices: attenuators -	por seatern	S Matrix
Calculations for	2 port Junction:	E plane	and H	plane	e Tees - M	agic Tee - Directio	nal Coupler -	Circulator
and Isolator.		2 plane	und II	Piulie	1005 111		inar coupler	enculator
				UNI	Γ – ΙΙ			
Microwave Tub	es:							
Microwave vacu	um tube based d	evices(Q	ualitati	ve stu	ıdy),Limita	tions of convention	nal tubes at UF	IF &
Microwave, Kly	stron: Two cavity	y Klystro	on - velo	ocity	modulation	n – Multi-cavity kly	stron -Reflex	klystron,
Traveling wave	tube, Magnetron	•		•				
			ו	UNIT	-III			
Microwave Soli	d State Devices &	. Measu	rements	5:				
Transit time lin	nitations in Micro	owave B	ipolar '	Trans	istors, Pov	ver frequency limit	tations Microv	vave Field
Effect Transisto	ors, Gunn effect:	RWH t	heory -	Higl	n-field dor	nain and modes o	f operation - 1	nicrowave
amplification, A	Avalanche transit	time de	vices:	IMPA	ATT and T	RAPATT diode.M	leasurement of	f Power –
Frequency-Wav	elength –Impeda	nce-SW	R– Atte	nuati	on.			
				UNIT	$\Gamma - IV$			
Introduction to	Optical Fibers:							
Introduction to	Telecommunicati	ons and	Fiber C	Optics	: The Evol	ution of Fiber Opt	ic Systems, Ba	sic Optical
Laws and Defin	itions: Propagation	on of lig	ht insid	e fibe	er - Critical	I-Angle - Numerica	al Aperture - A	Acceptance-
Angle -Cut-off	Angle -Cut-off wavelength, Mode Field Diameter, Mode Theory: V-Number, Fiber Types, Splicing							
Techniques and	Techniques and Connectors.							
		1 5 11		UNI	Г –V			
Losses and Disp	persion in Optica	l Fibers:			1	· , •	A	т
Abasentian I	erits of Fiber Op	otics ove	r conve	ntion	al copper v	wire systems, Loss	es: Attenuation	n Losses -
Adsorption Los	ses - Scattering	Losses -	Bendil	ig Lo	DSSES - COI	ie and Cladding L	usses - 10tal (ortion
Losses, Dispers	ion. Group-Delay	- mater	iai Disp	01510	n - wavegi	inde Dispersion - In		
Text Books :								
1. Samuel Y	Liao, Microwave	e devices	and cit	rcuits	, 3 rd Editio	n, PHI 2003.		

2. M. Kulkarni, *Microwave & Radar Engineering*, 3rd Edition, Umesh Publications 2003.

3. John M.Senior, Optical Fiber Communication, 2nd Edition, Pearson Education, 2007

Reference Books :

1. O P Gandhi, Microwave Engineering and Applications, Pergamon Press 1989.

2. R.E. Collins, *Foundation of Microwave Engineering*, 2nd Edition, Wiley 2003.

3. E.C. Jordan and Balmain, *EM Fields & Waves and Radiating System*, 2nd Edition, PHI 2003.

4. Sushrut Das, *Microwave Engineering*, 1st Edition, Oxford University Press, 2014

5. J.Gower, Optical Communication System, Prentice Hall of India, 2001

6. Gerd Keiser, Optical Fiber Communication, McGraw-Hill, 4th Edition, 2010

Web References:

1. https://en.wikipedia.org/wiki/Microwave_engineering

2. http://www.microwaveeng.com

3. http://www.meslmicrowave.com/microwave-integrated-circuits/overview/

4. www.nptelvideos.in/2012/12/advanced-optical-communication.html

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Exam:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain subquestions and the student should answer any one question from each unit. Each Question carries 12 marks

PROFESSIONAL ETHICS (PE)

VI Semeste	r: ECE						Scher	ne: 2020		
Course Code	Category	Но	urs/W	eek	Credits	N	laximum M	arks		
MC104	MC	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL		
		2	-	-	-	100	-	100		
Course Out	tcomes: At the	e end o	of the c	ourse	students w	ill be able to				
CO1: Unde	rstand the imp	portanc	ce of E	thics &	& Human	Values and become	Humane.			
CO2: Know the moral autonomy and uses of Ethical theories.										
CO 3: Know	w the responsi	bilities	s of the	Engin	eer toward	ls the society.				
CO 4: Asse	ss environmer	ntal iss	ues to	take P	rotective n	neasures to evade ri	sks.			
CO 5: Deter	rmine various	roles o	of Engi	ineer a	nd help the	em make the world	a better plac	e.		
				τ	UNIT-I					
HUMAN V Morals – Va Peaceful Lif	HUMAN VALUES Morals – Values - Ethics – Morals vs Laws - Integrity - Work Ethics - Respect for Others - Peaceful Life - Honesty - Courage - Valuing Time- Empathy - Character - Spirituality									
				U	NIT-II					
ENGINEERING ETHICS: Definition of Engineering Ethics - Varieties of Morals - Types of Inquiry – Kohlberg's Theory –Gilligan's Theory - Consensus & Controversy - Models of Professional Roles - Customs and Religion - Uses of Ethical Theories										
				U	NIT-III					
ENGINEER	RING AS SO	CIAL	EXPI	ERIMI	ENTATIC	N: Engineering as	Social			
Experimenta - Engineers Challenger o	ition as responsible case study	e exper	imente	ers - Co	odes of Etl	hics - A balanced O	utlook on L	aw -The		
0	2			U	NIT-IV					
SAFETY, F Reducing Ris Crime - Prof	RESPONSIB sk - Collegialit essional Right	ILITI ty and l ts - Em	ES & I Loyalty ployee	RIGH y - Resj e Right	TS: Safety pect for Au ts - Intellec	y and Risk - Risk B athority - Confidentia ctual Property Right	enefit Analy ality - Occup s (IPR)	sis and ational		
				U	JNIT-V					
GLOBAL I Multinationa Managers - 0 ASCE, IEEI Text Books	ISSUES al Corporation Consulting Er E, Institute of	s - En nginee Engin	vironm rs - Mo eers, Ii	nental 1 oral Le ndian I	Ethics - Co adership - Institute of	omputer Ethics -En Sample Code of Et Materials Manage	gineers as hics like AS ment, IETE	SME, etc.,		
1. Jayashree Suresh, B.S.Raghavan, "Human Values and Professional Ethics", S. Chand Publications										
Reference Books:										
1. Mike Martin and Roland Schinzinger, "Ethics in Engineering", McGraw Hill, New York., 1996										
2. Charles D	.Fleddermann	ı, "En	gineeri	ing Eth	nics", pren	tice Hall, New Mex	tico., 1999.			
3. S. Dinesh	Babu, "Profe	essiona	al Ethio	cs & H	luman Val	ues", Laxmi public	ations.			

E-CAD LAB (P)

VI - Semester: EC	E						Schem	e:2020		
Course	Course	Hou	rs/We	eek	Credits	Maximun	n Marks			
Code	Category									
EC 315	PCL	L	Т	Р	C	Continuous Internal Assessment	End Exam	TO TAL		
		-	-	3	1.5	40	60	100		
Course Outcome	At the and of	haaa	maa at	udant u	vill he chle	End Exar	n Duration:	3 Hrs		
Course Outcomes	s: At the end of t		irse si	ing Vor		10				
CO1: Design of Soc	nontial logic circ	vite II	lis Us	Vorilog	nog					
CO2. Design of Fini	te State Machine	$\frac{1}{2}$ (FSM) usin	g Veril	00					
CO4: Design of Memory cell Using Verilog										
CO4. Design of Mer	LIST OF EXPERIMENTS									
		CYCLE I								
1. Arithmetic Ci	rcuits {Adders, \$	Adders, Subtractors}								
2.Digital Circuit	s {MUX, DEMI	DEMUX, DECODER,ENCODER}								
3. Code Converters-I {BIN2GRAY, GRAY2BIN}										
4. Flip-Flops {D	, T, S-R, J-K}	,								
5. Counters {UP	/DOWN, Ring, .	Johnso	n}							
6. FSMs {Mealy	/Moore Machine	e}								
7. Shift Register	s-I {SISO, SIPO)}								
8. Memories {R	OM, RAM }									
9. Simple ALU	Design									
				CY	CLE II					
10.Code convert	ers-II { BCD2E	XCES	S3, E2	XCESS	3 2BCD }	Using Verilog				
11. Shift Registe	ers-II PISO, PIPO	O Usin	g Ver	ilog						
12.AOI2,OAI2	Using Verilog									
13. Interfacing of	of on board led u	sing ti	va pro	cessor'	TM4C1230	GXL				
14. Interfacing o	of On- Board But	tton LI	ED us	ing tiva	processor '	TM4C123GXL				
15. Interfacing o	of RGB LED usin	ng tiva	proce	essor Th	M4C123GX	KL				
				$\frac{\text{T OF }1}{12}$	OOLS US	SED				
HDL used	Verilo	g in be	havio	ral/Dat	a-flow/Stru	ctural modeling styles v	where application	ble		
Platform	REDH	IAT EI	nterpr	ise LIN	$\frac{\text{UX 6.5/W1}}{\text{W1}}$	ndows 10 (64-bit)	(7) (1) (1)			
EDA Tools	Cader	ice NC	(SIM	(Simul	ation), Xil	inx Vivado 2019.2 IDE	(Synthesis a	and		
FPGA Board	Xiliny	Nevv	$\frac{100}{3}$ A7 h	oard 7	ED Board	TIVA Processor				
	Verilo		Codi	$\frac{1}{n\alpha \rightarrow 9}$	imulation 1	$\frac{11}{1000000000000000000000000000000000$	TI Synthesis	\rightarrow		
Steps Followed	Implei	5 NIL nentat	ion \rightarrow	\rightarrow FPGA	Configura	tion $rest benches \rightarrow \mathbf{K}$	IL Synthesis	, /		

DIGITAL SIGNAL PROCESSING LAB (DSP (P))

VI - Semester : E	CCE						Scheme	: 2020
Course Code	Course Category	Hours	s/Week		Credits	Maxi	mum Marks	
EC316	PCL	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL
		-	-	3	1.5	40	60	100
						End Exa	am Duration	3 Hrs
Course Outcon	nes: At the end of	of the co	urse the	e stud	ent will be	able to		
CO1: Perform t	he convolution a	nd corre	lation o	f give	en signals u	sing SciLab.		
CO2: Design II	R and FIR digita	l filters f	or the g	given s	specificatio	ons using SciLab.		
CO3: Use DFT-	-IDFT to perform	<u>n linear a</u>	ind circu	ular c	onvolution	of given sequence	s using SciLa	b.
CO4: Compute	impulse response	e and Fr	equency	/ resp	onse of a sy	ystem using SciLa	b.	
CO5: Use DSK	(TMS320C6713) to imp	lement	real ti	me signal p	processing applicat	tions.	
		T	• 4 0 7	_	• •			
			ist of I	<u>Expe</u>	riments			
	Note : At least	t 12 of tl	ie follo	wing	experiment	ts shall be conduc	eted	
SciLab Experime	ents:	DT						
1. Linear Convolu	ition of the given	DT seq	uences.	- 4	- f A f a - a - a	In the Descention	_	
2. Autocorrelation	n & Cross correla	ition and	verifica	ation	of Auto col	rrelation Properties	8.	
3. IIR Filter Desig	<u>gn – Butterwortn</u>							
4. IIR Filter Desig	<u>gn – Chebyshev</u>	Mathad						
6 Circular Convo	lution using DFT		method					
7 Impulse respon	se and Frequency	respons	e of a sy	vstem				
8. Computation of	f N-point DFT of	f given se	equence	and	to compute	IDFT		
9. Response of giv	ven difference eq	uation	equenee	una				
Using DSP Start	er Kit (TMS320	C6713)	:					
10. Linear convol	ution & Circular	Convolu	ition.					
11. N-Point DFTo	of a sequence							
12. Design of FIR	Filters.							
Additional Exper	riments:							
13. Linear Convol	lution using DFT	'-IDFT n	nethod	(using	g SciLab)			
14. Implementation	on of audio loopb	ack. (TI	MS3200	C 671 3	B)			
15. Z-transform of	f a sequence(usi	ng SciLa	ab)					
Text Books:								
1. Digital Signal F G.Manolakis, Pea	Processing, Princ: rson Education /	iples, Al PHL 20	gorithm 07	ns, and	d Applicati	ons: John G. Proal	kis, Dimitris	
2. Discrete Time S	Signal Processing	$\frac{1}{2} - A.V$. Oppen	heim	and R.W. S	Schaffer, PHI. 200	9	
3. Fundamentals of	of Digital Signal	Processi	ng - Lo	nev L	udeman, Jo	ohn Wiley, 2009		
4.Digital Signal P McGrawHill,2008	rocessing - A Co	mputer l	based ap	oproa	ch, Sanjit 1	K Mitra, 3nd Editi	on,	

MICROWAVE OPTICAL COMMUNICATIONS LAB (MWOC (P))

VI Semester : EC	CE					Scheme :	2020			
Course Code	Course Category	Hour	s/Week	<u>c</u>	Credits Maximum Marks					
EC 317	PCL	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL		
		-	-	3	1.5	40	60	100		
						End Ex	am Duratio	n: 3 Hrs		
Course Outcon	nes : At the end of	the cour	se the s	tudent	will be able	e to				
CO1: Understand	the working princi	ple and	measure	e chara	cteristics of	various microwa	ve active dev	vices.		
CO2: Measure fre	quency, wavelengt	th and V	SWR at	t micro	wave freque	encies.				
CO3: Measure the	e S-Matrix of vario	us micro	wave p	assive	devices.					
CO4: Demonstrate analog and digital fiber optic communication link and measure propagation loss Numerical Aperture of a fiber optic cable.										
			List of	Exper	iments					
1. Reflex klyst	tron oscillator char	acteristic	CS							
2. Frequency,	Wave length and V	VSWR n	neasure	ment						
3. Gunn diode	characteristics									
4. Impedance	measurement of an	unknow	vn load							
5. S - Matrix of C = Matrix	of E- Plane tee and	H- Plan	e tee							
6. S - Matrix of 7. S - Matrix of 7. S - Matrix	of magic tee									
7. S - Matrix (of directional court	lor								
0 Rediction n	attern of Horn ante									
10 A) Apalog	and digital fiber o	ntic com	munica	tion li	nk B)Measu	rement				
of Propaga	ation loss, Numeric	al apertu	are and	study of	of bending l	oss				
11. Radiation	pattern of Helix an	itenna								
12. Radiation	pattern of Cut Para	ıboloid R	Reflecto	r Ante	nna					

MOBILE APP DEVELOPMENT AND EMBEDDEDSYSTEMS PROGRAMMING (MEP (P))

VI Semester : E	СЕ					Scheme :	2020	
Course Code	Course Category	Hours	s/Week	X	Credits	Maxir	num Marks	
SCEC04	SC	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL
		-	-	4	2	40	60	100
		1				End Ex	am Duratio	n: 3 Hrs
Course Outcon	mes: At the end of t	he cour	se the s	student	will be able	e to		
CO1: Install and c	configure Android A	pplicati	on Dev	elopme	ent tools			
CO2: Design and	develop user interfa	ces for t	he And	lroid Pl	atform			
CO3: Design And	troid Applications	.1.34	<u>(D 4 2 0</u>					
CO4: Interfacing	various I/O Devices	with M	SP430	Launci	n Pad			
			T : 4 F	T	• 4			
1 Installation	of Android studio		LIST OF	Exper	iments			
2 Developme	ent Of Hello World A	nnlicati	on					
3. Create an a	pplication that takes the	ne name	from a t	textbox	and shows h	ello message along	with the nam	e entered
in text box	, when the user clicks	the OK	button				,	
4. Create a scr female), A button, pri	reen that has input boy ge (numeric), Date of nt all the data below t	tes for U Birth (D he Subm	ser Nan ate Pick it Butto	ne, Pass ket), Sta n (use a	word, Addre ate (Spinner) any layout)	ss, Gender (radio b and a Submit butto	uttons for main on. On clickin	le and g the submit
5. Design an at to second A	ndroid application to o	create pa	ge using	g Intent	and one But	ton and pass the V	alues from on	eActivity
6. Design an a	android application Se	nd SMS	using Ir	ntent				
7. Create an a	android application	using Fr	agmen	ts				
8. Design an a	android application Us	ing Rad	io butto	ons				
9. Design an	android application	tion that	nu.	houser	dotaile in a d	latabasa		
table.	ser registration applica	uon mai	Stores t	lieusei		latabase		
11.Write a C p	program for configura	ation of (GPIO p	orts for	MSP430 to	interface LEDs.		
12. Write a C p interface p	rogram for configura ushbuttons	tion of (GPIO p	orts for	MSP430 to			
13. Write a C p	program for interfacir	ig a DC	Motor v	with MS	SP430.			
14. Write a C p	rogram for Interface	with onl	ooard T	'empera	ature Sensor			

ELECTRONIC MEASUREMENTS AND INSTRUMENTATION (EMI)

V - Semester :	ECE						Scheme	: 2020	
Course Code	Course	Hours/Week			Credits	Maxir	mum Marks		
	Category								
EC304	PEC-I	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL	
~		3	-	-	3	40	60	100	
Sessional Exam	Duration : $1\frac{1}{2}$ H	lrs	.1	. 1		End Exa	m Duration: 3	Hrs	
Course Outco	mes : At the end	of the co	ourse th	e stud	ent will be	able to	•		
COI: Understan	d the characterist	ics of an	instrun	nentat	ion system	and analyze the err	ors in		
CO2: Understan	d the major comp	onents p	i. resent i	n CR	O and meas	sure amplitude and	frequency utiliz	zing	
OSCILLOSCO	pes.				1	- <i>t</i>			
CO3: Distinguis	in principles of wo	orking of	wave a	inalyz	er and spec	ctrum analyzer.			
C04: Analyze th condition	e functioning of v for various bridge	various ty es.	pes of	bridge	e circuits, d	lerive the balanced			
CO5: Select the	appropriate senso	r/transdu	icer for	the m	neasuremer	nt of physical param	eters.		
D 0			~ .	UNI	$\frac{\Gamma - I}{I}$				
Performance Characteristics of Instruments: Static Characteristics: Accuracy, Precision, Resolution, Sensitivity, Static & Dynamic calibration, Errors in Measurement and their Statistical Analysis, Dynamic Characteristics-Speed of response, Fidelity, Lag & Dynamic Error. DC Ammeters, DC Voltmeters, AC Voltmeters using Rectifiers, Multimeter for voltage, current and resistance measurements, illustrative problems									
-				UNI	Γ – ΙΙ				
Oscilloscopes: S and vertical defl isolation type, D Storage Oscillos	Standard specifica ection systems, T Qual trace/beam Cl acope.	tions of (ime Base RO. Prin	CRO, C e Gener ciples c	RT fe ator, 1 of sam	eatures, Ver Delay line, pling oscil	rtical and horizontal probes for CRO-ac loscope, Storage os	l Amplifiers, ho ctive, passive an cilloscope and	orizontal nd Digital	
				UNIT	' – III				
Signal Generato pulse, random n principles of wo Spectrum Analy	rs and Analyzers: oise, sweep and a rking (Block Diag zers and Logic An	Fixed an rbitrary v gram App nalyzers.	nd Varia wavefor proach)	able fi m gei . Wav	requency A nerators, th re Analyzer	F oscillators, Funct eir standards, speci s, Harmonic distort	tion Generators fications and tion analyzers,	5,	
				UNIT	$\Gamma - IV$				
Bridges: Wheats Measurement of bridge, Kelvin b	stone bridge, Wein inductance-Maxy ridge and Q- Met	n Bridge well's bri er.	, errors idge, A	and p	recautions on Bridge,	in using bridges, A Measurement of Ca	C bridges: pacitance-Sche	ering	
	UNIT – V								
Sensors and Tra	nsducers: Active a	and passi	ive tran	sduce	rs: Measure	ement of displacem	ent(Resistance,		
Capacitance, inc	luctance; LVDT)	Force(St	rain Gu	lages)	Pressure (Piezoelectric transd	ucers)		
Temperature (re	sistance thermom	eters, the	ermoco	uples	and thermi	stors), velocity, Acc	celeration,		
Text Books ·	easurement.								
1. William Γ). Cooper & Alber	t D. Hel	frick N	loder	n Electroni	c Instrumentation a	nd Measureme	nt	
Technia	ues, PHI. 2 nd Edit	ion. 1990).			- mon amontation a			
2. H.S.Kals	i, "Electronic Inst	rumenta	tion", S	econd	l Edition, T	ata McGraw Hill, 2	.004.		
								20	

Reference Books :

1. K. Lal Kishore, Electronic Measurements and Instrumentation, Pearson Education, 2012.

2. A.K. Sawhney, A course in Electrical and Electronic Measurements and Instrumentation, Dhanpat Rai & Co., (Pvt). Ltd., Nineteenth Edition, 2011.

Web References:

1.https://nptel.ac.in/courses/108105153

2. online courses.nptel.ac.in/noc19_ee44/preview

3. archive.nptel.ac.in/courses/108/105/108105153

Question Paper Pattern:

Sessional Exam: The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub-questions. and the student should answer any one question from each unit. Each Question carries 12marks.

OPERATING SYSTEMS (OS)

VI - Semester :	ECE				GDIDIL		Scheme	e: 2020
Course Code	Course	Hours	/Week		Credits	Maxi	mum Marks	
	Category							
						Continuous		
	PEC-I	L	Т	P	C	Internal	End Exam	TOTAL
EC305	I LO I					Assessment	<i>(</i>)	100
		3	-	-	3	40	60	100
Sessional Exam	Duration : $1\frac{1}{2}$	Irs				End	l Exam Durati	on: 3 Hrs
Course Outcom	es: At the end of	the cour	se the s	tuden	$\frac{1}{1}$ t will be al	ble to		
COI: Understan	id the concepts of	operatin	ng syste	ms ar	nd Memory	/ Management.		
CO2: Analyze th	ne virtual Memor	ry and Fi	le Syste	ems.				
CO3: Analyze t	he concepts of De							
CO4: Understar	id the concepts of	Distribu	ited Sys	stems				
COS: Apply the	concepts of Dead	llock han	aling in	distrit	buted system	ns		
				TINIT	тт			
Introduction, Co	maanta of onoroti	na avata	ma Dr		$\frac{\mathbf{I} - \mathbf{I}}{\mathbf{Eilos} \mathbf{S} \mathbf{v}}$	stam calla Shall O	namating awatan	<u></u>
introduction: Co	alithic laward an	ng syste	IIIS — PI	ocess	, riles, Sys	stem cans, Shen, O	perating system	11
Structure – Mon	omunic layered sy	stems, v	irtuai n		Desident N	Agnitan Surver model.	Martin la manti	
Desing and Security	mantation Comb	ries, Bai		imes,	Resident N	nonitor, Swapping,	Multiple parti	tions,
Faging and Segi	mentation, Comb	med sys	tems.	TINIT	r tt			
Mamory Hierory	aby and Virtual N	Iomoru	Mamor		roroby in m	adarn avatama I a	val 1 aaaba I.a	$\frac{1}{2}$
welliory Hierard	momory Overlay	domo	nd nogi	y mei na D	arformono	of domand magine	Daga raplaca	mont
Virtual man	achieve Description (1997)	ys, dema	nu pagi	ng, P orithr		ing algorithms. The	g, Page replace	ment,
File Systems: Fi	la concepts, Fage I	support		Math	iis, Allocat	ing algorithms, The	ashing.	File
protection and in	ne concepts, The	support,	ALLESS	Meth	ious, Anoc	ation methods, Di	ectory Systems	, I'lle
		sues.		UNIT	' _ III			
Deadlocks: Dea	dlock problem D	eadlock	charact	erizat	ion Deadle	ock prevention De	adlock avoidar	ice
Deadlock detect	ion and Deadlock		rv	CIIZai	ion, Deach	oek prevention, De		icc,
				TINITT				
Distributed syst	ame: Motivation	Topolog	w Com	muni	-1v	tem type File syste	me Mode of	
computation Ex	ents. Wouvation,	ropolog	gy, Coll	mum	cation, sys	tem type, the syste	ins, mode of	
	vent ordering, sy		ation.					
				UNI	$\Gamma - V$			
Deadlock handl	ing: Deadlock ha	ndling i	n distrib	outed	systems, R	Robustness, Reaching	ng agreement,E	Election
algorithms.								
]	ſext l	Books :			
1. Abraham Sill	berschatz, Operat	ing Syste	em Cono	cept, 6	5 th Edition,	, John Wiley.		
2. Andrew S.Ta	nenbaum, <i>Moder</i>	n Opera	ting Sys	stem,	3 rd Edition	n, Pearson Ed.		
		*	0.					
			Ref	erenc	e Books :			
1. James L.Peters	son, Abraham Sill	berschatz	z, Oper	ating	System Col	ncepts, Addison We	esley.	
				We	b Reference	ce		
1. https://online	courses.swavam2	2.ac.in/ce	ec20 cs	06/pr	eview			
2. https://www.c	coursera.org/course	s?querv=	operatir	1g%20	system			
		/		<u></u>	<u>,</u>			
								32

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/OR Type) in each section. The student shall answer one question from each section.

End Examination:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either-or-Type) from each unit. Each of these questions may contain sub-questions and the student should answer any one question from each unit. Each Question carries 12 marks.

SATELLITE COMMUNICATIONS (SCN)

V Semester: ECE	2				Scheme: 2	2020			
Course Code	Category	Hours/Week		Credit s	Maximum Marks				
EC306	PEC-I	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL	
		3	-	-	3	40	60	100	
Sessional Exam Du	lxam Dura	xam Duration:3Hrs.							
Course Outcomes: At the end of the course the student will be able to									
CO1: Understand l	basic concepts a	nd fre	quenc	ey allo	cations for	satellite comm	unication,	orbital	
mechanics an	d launch vehicles	S	1 1 '		- 11:4 - 1: - 1 4	<u></u>	т		
CO2: Envision the	CO2: Envision the satellite sub systems and design satellite links for specified C/N.								
earth station technologies									
CO4: Known the concepts of LEO. GEO Stationary Satellite Systems									
CO5: Known the co	oncepts of satellit	e navi	gatior	1					
	1		0						
			τ	U NIT -	Ι				
Communications, Frequency Allocations for Satellite Services, Applications, Future Trends of Satellite Communications. Orbital Mechanics and Launchers: Orbital Mechanics, Look Angle determination, Orbital Perturbations, Orbit determination, Launches and Launch vehicles, Orbital Effects in Communication Systems Performance									
-			U	NIT-I	Ι				
Satellite Subsystems: Attitude and Orbit Control System, Telemetry, Tracking, Command And Monitoring, Power Systems, Communication Subsystems, Satellite Antennas, Equipment Reliability and Space Qualification.									
	UNIT –III								
 Satellite Link Design: Basic Transmission Theory, System Noise Temperature and G/T Ratio, Design of Down Links, Up Link Design, Design Of Satellite Links For Specified C/N, System Design Examples. Multiple Access: Frequency Division Multiple Access (FDMA), Inter modulation, Calculation of C/N, Time Division Multiple Access (TDMA), Frame Structure, Examples, Satellite Switched TDMA Onboard Processing, DAMA, Code Division Multiple Access (CDMA), Spread Spectrum Transmission and Reception. 									
UNIT-IV									
Earth Station Technology: Introduction, Transmitters, Receivers, Antennas, Tracking Systems, Terrestrial Interface, Primary Power Test Methods.									

Low Earth Orbit and Geo-Stationary Satellite Systems: Orbit Considerations, Coverage and Frequency Consideration, Delay & Throughput Considerations, System Considerations, Operational NGSO Constellation Designs.

UNIT– V

Satellite Navigation & Global Positioning System: Radio and Satellite Navigation, GPS Position Location Principles, GPS Receivers and Codes, Satellite Signal Acquisition, GPS Navigation Message, GPS Signal Levels, GPS Receiver Operation, GPS C/A Code Accuracy, Differential GPS

Text Books:

- 1. Satellite Communications Timothy Pratt, Charles Bostian and Jeremy Allnutt, WSE, Wiley Publications, 2nd Edition, 2003
- 2. Satellite Communications Engineering Wilbur L. Pritchard, Robert A Nelson and Henri G. Suyderhoud, 2nd Edition, Pearson Publications, 2003

Reference Books:

- 1. Satellite Communications : Design Principles M. Richharia, BS Publications, $2^{n\alpha}$ Edition, 2003.
- 2. Satellite Communication D.C Agarwal, Khanna Publications, 5th Ed.
- 3. Fundamentals of Satellite Communications K.N. Raja Rao, PHI, 2004.
- 4. Satellite Communications Dennis Roddy, McGraw Hill, 4th Edition, 2009.

Web References:

1.<u>https://onlinecourses.nptel.ac.in/noc22_ce97/preview&sa=D&source=editors&ust=165571409648643</u> 3&usg=AOvVaw0-Mnlx8bMgJey_mxDaxXt2

- 2. https://www.youtube.com/watch?v=S22u7_Eq26g
- 3. <u>https://www.coursera.org/learn/satellite-communications</u>

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub- questions. and the student should answer any one question from each unit. Each Question carries 12 marks.

EMBEDDED SYSTEMS AND IOT (EIOT)

VI- Semester : ECE Scheme: 2020									
Course Code	Category	ry Hours/Week			Credits	Maximum Marks			
EC312	PEC-II	L	Т	Р	C	Continuous Internal Assessment	End Exam	TOTAL	
Sectional E	vom Durotic	J	- Inc	-	3	40	OU End Exam	100 Duration: 2 Um	
Sessional E	xam Durau	$\frac{11}{2} \mathbf{f}$	115 the cou	rea th	a student v	will be able to		Duration: 5 mis	
CO 1: Understand the observatoristics, attributes and applications of Embedded Systems									
CO 2: Analyze the architecture & embedded C programming model of MSP430 in peripheral interface									
CO_3 : Illustrate the architecture and programming model of ΔRM processors									
CO 4: Unde	CO 4: Understand the basic and advanced levels in Internet of Things technology								
CO 5: Crea	ate programs	based on	the pro	gram	ming mode	el of Arduino.			
	1 0		1	0		`-I			
Introductio	n to Ember	lded Sv	stems	Defin	ition of E	mbedded System	Embedded Sys	tems Vs General	
Computing Systems History of Embedded Systems Classification Major Application Areas Purpose of									
Embedded Systems, Characteristics and Quality Attributes of Embedded Systems.									
	•			-	UNIT	-II			
MSP430: Fa	amily, Archite	cture – N	1SP430,	Addr	ess Space,	On Chip Peripherals	and Register set	ts, Addressing	
Modes, Prog	ramming GPI	O Interfa	ices in C	langı	uage-LED	, Switches, Motor.		_	
					UNIT	·III			
ARM Processor : ARM Design Philosophy, RISC vs CISC, Evolution of ARM architecture till date 16-bit to 64- bit, ARM 7 and 9 processor family, Block Diagram, Registers, Program Status Register, Five Stage Instruction Displine and Architecture Devision Instruction Set									
I ipenne, and Arenneeture Revision. Instruction Set IINIT-IV									
Introduction to Internet of Things - Definition and Characteristics of IoT, Sensors, Actuators, Physical Design of IoT – IoT Protocols, IoT communication models, IoT Communication APIs, Domain Specific IoTs – Home, City, Environment, Energy Agriculture and Industry									
UNIT-V									
Controlling Hardware - Introduction to Arduino, Connecting LED, Buzzer, Speed control of DC Motor. Sensors- Light sensor, temperature sensor with thermistor, voltage sensor, ADC and DAC, Temperature and Humidity Sensor DHT11, Motion Detection Sensors, Bluetooth Sensors, Sensors, Distance Measurement with ultrasound sensor Introduction to Raspberry Pi- Installation									
Text Books:									
1. Shibu K.V, Introduction to Embedded Systems ,Mc Graw Hill ,1 st Edition,2009.									
2. Frank Vahid, Embedded System Design, 2nd Edition Wiley Publications, 2009									
3. Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015									
4. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014									
5. Raspberry Pi Cookbook, Software and Hardware Problems and solutions, Simon Monk, O'Reilly (SPD), 2016									
1 Pai Kamal Embadded Systems Architecture Dreagramming and design and Edition TMU 2006									
1. Kaj Kamai, Embeudeu Systems Architecture, Programming and design, 2nd Edition, 1 MH, 2006.									
 Arnold S Burger, Embedded System Design An Introduction to Processes, Tools and Techniques, 1st Edition, CMP Books, 2007. 									
3. Peter Waher, 'Learning Internet of Things', Packt Publishing, 2015 3. Editors Ovidiu Vermesan									

Web References:

- 1. https://onlinecourses.nptel.ac.in/noc22_cs93/preview
- 2. <u>https://www.coursera.org/courses?query=embedded%20systems</u>

Question Paper Pattern:

Sessional Exam: The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination: The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain subquestions. and the student should answer any one question from each unit. Each Question carries 12 marks.

CODING THEORY AND TECHNIQUES (CTH)

VII Semester: ECE							1	Scheme: 2020	
Course Code	Category	Hours/Week		Credits	Maxim	num Marks			
EC313	PEC -II	L	Т	Р	С	Continuous Internal Assessment Marks	End Exam Marks	TOTAL Marks	
		3	-	-	3	40	60	100	
Sessional Exam Duration: 11/2 HrsEnd Exam Duration: 3 Hrs									
Course Outcomes: At the end of the course the students are able to									
CO1:Understand	mathematical	conce	pts rela	ited to s	source-cod	ing			
CO2:Analyze end	coding and de	ecodin	g of th	e linea	r block co	les			
CO3:Analyze end	coding and de	ecodin	g of th	e cycli	c codes.				
CO4: Familiar w	ith encoding	and de	ecoding	g of Co	nvolutiona	l Codes.			
CO5: Explain the concepts involved in formulation and computation Codes Binary BCH Codes.									
UNIT – I									
Source Coding:	Review of Ir	nforma	ation T	heory,	, Coding f	for discrete sources: C	oding for di	screte	
memory less sources discrete stationary source, Shannon-Fano coding, Huffman code, Huffman code									
applied for pair of symbols, efficiency calculations, Lempel-Ziv codes.									
UNIT – II									
Linear Block Codes: Introduction to Linear Block Codes, Syndrome and Error Detection, Minimum									
Distance of a Block code, Error-Detecting and Error-correcting Capabilities of a Block code, Standard									
array and Synur	array and Syndrome Decoding, Nonbinary block codes and concatenated block codes, Interleaving of								
Cyclic Codes: Description Generator and Parity-check Matrices Encoding Syndrome Computation									
and Error Detection Decoding Cyclic Hamming Codes Shortened cyclic codes Error-trapping									
decoding for cyclic codes, Majority logic decoding for cyclic codes.									
UNIT – IV									
Convolutional Codes: Convolutional encoder: code tree, state transition diagram, trellis diagram.									
Decoding: Maximum likelihood decoding, Wozencrafts sequential decoding, Viterbi Decoding, fans									
decoding. Application of Viterbi Decoding and Sequential Decoding, Applications of Convolutional									
codes in ARQ system.									
UNIT – V									
BCH Codes: Idempotent and Mattson – Solomon Polynomials, Reed-Solomon Codes, Justin Codes,									
MDS Codes, Alternate, Goppa and Generalized BCH Codes, Spectral properties.									
Text Books:									
1.1.John G.Proakis, Digital Communications, 3rd edition, McGraw Hill, 1995.									
2. S. Haykin, Di	gital Commu	inicati	ons, Jo	ohn W	iley & Soi	ns, 2009.			
3. Error Control Coding- Fundamentals and Applications –Shu Lin, Daniel J.Costello, Jr, Prentice all.									
Reference Books:									
1. Shu Lin, Daniel J. Costello, Jr., -Error Control Coding, Pearson Publications, Second Edition, 2011.

2. Digital Communications-Fundamental and Application - Bernard Sklar, PE.2010, TMH

3. K. Sam Shanmugam, —Digital and Analog Communication Systems^{II}, Wisely Publications, 2009 Web Reference:

1. https://www.tutorialspoint.com/programming_methodologies/programming_methodologies_correct_programming_techniques.htm

2. https://www.youtube.com/watch?v=dhBEP24bzFM

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub questions. and the student should answer any one question from each unit. Each Question carries 12 marks

BIO-MEDICAL ELECTRONICS (BME)

VI SEMES	STER: EC	E					S	cheme:2020		
Course Code	Category	Hours/Week Credits Maximum Marks					arks			
EC314	PEC-II	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total		
		3	-	-	3	40	60	100		
Sessional E	xam Dura	tion: $1\frac{1}{2}$	Hrs			End E	xam Dura	ation: 3 Hrs		
Course Ou	Course Outcomes: The student is expected to know the working and design of instruments used in									
Heath care.										
CO1: Introd	uction to v	arious Co	ncepts of	Medica	al Instrumenta	ttion.	uladaa ah	ant Dia		
Electrodes	spose the su	udents to	the conce	epts of o	organisation o	and know	viedge abo	Dut B10-		
CO3: To pr	ovide adecu	uate know	ledge abc	nut med	hanical functi	ion and cardiac	instrume	ntation		
CO4 : To pr	ovide adequ	uate know	ledge abc	out Neu	ro-Muscular]	Instrumentation).	itution		
CO5 : To pr	ovide adequ	uate know	ledge abo	out Cor	nputer in Bio-	Medical Instru	mentation	and		
Electrical sa	afety of Med	dical Equi	pment.		F					
		1	-	UN	IT – I					
Componen	ts of Me	dical In	strument	ation	System: Bio	o amplifier. S	Static an	d dynamic		
characterist	ics of medi	cal instrui	nents. Bi	o signa	ls and charact	teristics. Proble	ems encou	intered with		
measureme	nts from hu	man being	gs.							
		-		UNI	T - II					
Organisati	on of cell: I	Nernst equ	lation for	memb	rane Resting F	Potential Gener	ation and	Propagation		
of Action P	otential, Co	nduction 1	inrough n Electrode	erve to	neuromuscula mal alastrada	ar junction.	atradas 1	Diaghamigal		
Electrodes	Daes: B10	potential	Electrode	s-Exte	mai electrode	s, internal Ele	ctrodes.	Biochemical		
Liectiodes.				UNI	т. Ш					
Mechanica	l function:	Electrical	Conduct	ion svs	stem of the he	art. Cardiac cv	cle. Relat	ion between		
electrical an	nd mechanic	cal activiti	es of the	heart.		5				
Cardiac In	istrumenta	tion: Blo	od pressi	ure and	d Blood flow	measurement	and Car	diac output.		
Measureme	nt of Heart	Sounds,	Specifica	tion of	ECG machin	ne. Einthoven	triangle, S	Standard 12-		
lead configu	urations, In	terpretatio	n of ECG	i wave	form with resp	pect to electro i	mechanica	al activity of		
the heart.										
	. I. T. 4		·		$\frac{\Gamma - IV}{\Gamma - IV}$		1 .			
Neuro-Mus	Scular Inst	rumentai	ording L	ecificat	totion of EEG	and EMG	machines.	Electrode		
	OI EEO and		Jorunig. 1		IT- V	and ENIO.				
The Comp	uter in Rio	Medical	Instrume	ntatio	n • The Digita	Computer M	icronroces	ssors		
Interfacing	the Comput	ter with M	ledical Eq	uinme	nt. Biomedica	l Computer, M	plications			
Electrical s	Electrical safety of Medical Equipment: Shock Hazards from Electrical Equipment. Methods of									
Accident Prevention.										
TEXT BOOKS:										
1. Hand-book of Biomedical Instrumentation – by R.S. Khandpur, McGraw-Hill, 2003.										
2. Medical	Instrument	ation, App	olication a	and De	sign – by John	n G. Webster, J	ohn Wiley	/.		
3. Biomed	lical Instrun	nentation	and Meas	urment	ts – by Leslie	Cromwell, Free	d J.Weibe	ll & Erich		

A. Pfeiffer (PHI)

REFERENCES:

1.Principles of Applied Biomedical Instrumentation – by L.A. Geoddes and L.E. Baker, John Wiley and Sons.

2. Biomedical Equipment Technology – Carr& Brown, Pearson.

Web References

- 1. https://www.biomedicalinstrumentationsystems.com/the-introduction-to-biomedical-instrumentation/
- 2. https://pubmed.ncbi.nlm.nih.gov/17299744/
- 3. https://www.sanfoundry.com/best-reference-books-therapeutic-equipments/

Question Paper Pattern:

Sessional Exam: The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination: The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub questions. And the student should answer any one question from each unit. Each Question carries 12 marks.

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CELLULAR AND MOBILE COMMUNICATIONS (CMC)

VII - Semester							Scheme	:2020				
Course Code	Course Category	Hou	rs/Wee	k	Credits	Maximum Marks						
EC401	PEC-III	L	Т	р	С	Continuou s Internal Assessmen t	Continuou s EndExam TOT Internal Assessmen t					
		3	-	-	3	40	60	100				
Sessional Exam	Duration: 1 ¹ / ₂ I	Irs.			•	End	Exam Durati	on:3 Hrs.				
Course Outcon	nes : At the end of	of the	course	the st	udent will	be able to						
CO1: Understand	l the fundament	al con	cepts of	f wire	eless & ce	llular communica	ation.					
CO2: Understand	cell coverage, in	terfer	ence in	cellula	ar commu	nications.						
CO3: Analyze the	e concepts of Fr	equen	icy man	nagem	ent, chanı	nel assignment an	d various han	doff				
mechanisms.												
CO4: Analyze th	ne architecture o	f digit	tal cellu	ılar sy	stem and	protocol model.						
CO5: Understand	various multiple	acces	s techni	iques	in wireless	communications.						
			1	UNI	Г-І							
and Grade of Serv	vice, Improving (Covera	ige and	Capac	cells, Fle	ular Systems- Cel	l Splitting, Sec	ctoring.				
				UN	NIT-II							
Cell Coverage fo Radio wave pro Elevation angles Flat Open Area, Co-Channel & N Measurement of Interference, Cro	r signal and tra pagation mecha , Phase Differen Path Loss From Ion-Co channel Real Time Co- oss Talk, Effects	tfic: nisms, ce Bet a Poin Interf Chanr on Co	Signal tween I to Poi erence: nel Inte verage	l Refl Direct nt Pre erferen and Ir	ections in and Reflec diction Mo ce, Adjac nterference	Flat and Hilly eted Paths, Mobile odel in Different C ent Channel Inte	Terrain, Incid e Propagation Conditions. rference, Nea	lent, Reflection, Over Water and r End Far End				
				Uľ	NIT-II							
Frequency Mana	agement & Char	nnel A	ssignm	ent:			~					
Types of channels Sectorization, No Handoffs:	s, Channel Assign on Fixed Channel	nment Assig	s to Cel gnment.	I Sites	and Mobi	le Units, Channel	Sharing and B	sorrowing,				
Handoff Initiatior Forced Handoff, I and their Evaluati	n, Types of Hand Mobile Assisted on.	loff, A and S	Advanta oft Har	ges of idoff,	Handoff, Intersyster	Delayed Handoff m Handoff, Introc	s, Power Diff luction to Dro	erence Handoff, pped Call Rates				
			τ	J NIT	-IV							
L												

Digital Cellular System:

Global system for mobile communication (GSM), GSM architecture, layer modeling, Transmission, GSM channels & channel modes, Radio resources management, Mobility management, Communication management, Network management.

UNIT-V

Multiple Access Techniques:

TDMA, FDMA, Spread Spectrum Modulation: Introduction, Pseudo-noise sequence, Direct Sequence spread spectrum, Processing gain, Frequency Hopping spread spectrum, Spread Spectrum Multiple Access.

TextBooks:

1.LeeWilliam.C.Y,*MobileCellularTelecommunicationsAnalog and Digital System*, McGraw Hill,2nd Edition.

2.T.S.Rappaport, *Wireless communications*, PearsonEd, 2ndEdition.

ReferenceBooks:

1.PandyaRaj, *Mobile and Personal Communication Services and Systems*, PHI,2ndEdition, March,2004.

2. Jochen SchillerH, Mobile Communications, PearsonEd, 2ndEdition, 2008.

Web References:

1.https://onlinecourses.nptel.ac.in/noc21_ee66/preview

2.https://www.youtube.com/watch?v=4R1qHE0E8IE

3.https://www.youtube.com/watch?v=tt1-Ohe9QQU

QuestionPaperPattern:

Sessional Exam:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section. **End Exam:**

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub-questions. and the student should answer any one question from each unit. Each Question carries 12marks.

RADAR SYSTEMS (RS)

V- Semester : ECE			Scheme : 2020									
Course Code	Course Category	Hours/Week			Credits	Max	imum Ma	rks				
EC402	PEC-III	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL				
	1 1/2 11	3	-	-	3	40	60					
Sessional Exam Duratio	n: 1 1/2 Hrs	na tha at	udant v		able to	End Exa	am Durati	on: 3 Hrs				
Course Outcomes : At the ba	CO1: Understand the basic concepts of Radar system.											
CO2: Understand the Ra	CO2: Understand the Radar range equation and its parameters.											
CO3: Understand the basic operation of CW, MTI and Pulse Doppler radar systems.												
CO4: Understand the various Tracking radars.												
CO5: Understand the Ra	CO5: Understand the Radar antennas , receivers and duplexer											
Induction to Dedeer	Description of t		UNIT	<u>– I</u>		to Delan and in	D - 1 1 1	1-				
diagram and operation, 1	Introduction to Radar : Description of basic radar system and its elements, Radar equation, Radar block diagram and operation, Radar frequencies, Application of radar											
			UNIT	– II								
The Radar Equation: I Signal to noise ratio. Pro power, Pulse repetition	The Radar Equation : Predictions of range performance, Minimum detectable signal, Receiver-noise and Signal to noise ratio. Probability of detection and false alarm, Radar cross-section of target. Transmitter power, Pulse repetition frequency and range ambiguities.											
			UNIT -	- III								
CW and FMCW Rada	r: Doppler effect	, CW rac	dar, FM	CW	radar, Mul	tiple frequency CV	V radar.					
MTI and Pulse Dopple radar with power oscilla Doppler radar.	er Radar: Descri tor transmitter, D	ption of Delay line	operati e cancel	on, M llers, 1	ITI radar v Blind spee	vith power amplified ds, multiple or stag	er transmit ggered PR	tter, MTI Fs, Pulse				
			UNIT -	- IV								
Tracking Radar: Track and phase comparison tr	cing with radar, S racking radars, Co	equentia ompariso	l lobing on of tra	g, Cor cking	nical scan, radars.	Monopulse amplit	ude Comp	arison				
			UNIT	$-\mathbf{V}$								
Radar Antennas: Antenn Radar Displays :A-Scope	a parameters, Para e, B-Scope and PPI	bolic refle radar dis	ector ant plays.	tennas	, Cassigrain	antennas. Radar rec	ceiver.					
Text books :												
1. M.I.Skolnik, Introdu	ction to Radar Sy	stems, 3	rd Editi	on, T	MH, 2008.							
2. F.E. Terman, Radio I	Engineering, Fou	rth Editio	on Mc (Graw	Hill Book	Co. 1955 .						
Reference Books :												
1. Kulkarni M, Microw	ave and Radar Ei	ngineerii	<i>ng</i> , 4th	Editio	n, Umesh	Pub, 2010.						
2. Simon Kingsley & S	haun Quegan, Un	derstand	ling RA	DAR	Systems, 1	McGraw Hill, 1993	3.					

Web References :

- 1. https://www.ll.mit.edu/outreach/radar-introduction-radar-systems-online-course
- 2. https://onlinecourses.nptel.ac.in/noc19_ee58/preview

Question Paper Pattern:

Sessional Exam: The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub-questions. and the student should answer any one question from each unit. Each Question carries 12marks.

GLOBAL POSITIONING SYSTEM (GPS)

	GL	ODAL	105		IIIG 515	$\mathbf{IEWI}(\mathbf{GIS})$	C	1 2020
VII Semester:	ECE						S	cheme: 2020
Course Code	Category	Hou	rs/We	eek	Credit s	Ma	ximum Ma	rks
EC403	PEC-III	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL
		3	-	-	3	40	60	100
Sessional Exam	Duration:1 1/2 Hr	s.		1		End H	Exam Dura	tion:3Hrs.
						1.1 .		
Course Outcom	es: At the end of t	he cours	se the	studer	nt will be a	ble to		
CO1: Understand	the CDS signal ab	of Glob	al Pos	itioning	g System			
CO2: Understand	a the GPS signal cha	data am						
CO3: Analyse the	Differential Globa	1 Positio	ning S	vetem				
CO5: Understan	d the various applic	ations of	Glob	al Posit	ioning Syste	em		
	d the various applied		01000	ui i 05h	ioning byst			
				UNI	Г-І			
GPS Receivers & sources, SA erro estimation using clock errors.	Ser position and Equipment, Space ecture. istics: GPS signal lavigation information calculation, Signal d GALILEO satell to Data Errors: Rec rs, propagation error dual frequency G	l compo ation ex nal stru lite cons ceiver A cors, ion	UN rchite osphe	JNIT-I ased d JNIT-I a, purp- ion, ps a, anti ion NIT –II ecture, eric err Metho	II receiver de or, troposp ds of mult	rties and power estimation, free (AS), selective esign options, An oheric error, mul ipath mitigation	level, sign quency esti availability ntenna desig tipath, iono , Ephemeri	al acquisition al acquisition imation, GPS y, Difference gn, GPS error spheric error, s data errors,
	T . 1 . . T .	DODO		TT-IN	/			
Differential GPS subsystem , GEC GPS /INS Integra	: Introduction, LA downlink system ation Architecture	ADGPS, 1s , Geo s.	WA Orbit	DGPS, deterr	, Wide Are	ea Augmentation Geometric analy	n systems , sis , covaria	GEO Uplink ance analysis,
			U	JNIT-	V			
GPS Application approach Aircraf orbital parameter navigation messa Text Books:	ns: GPS in surv t landing system, rs, description of r rge data parameter	eying, Military eceiver rs, GPS	Mapp and indep positi	oing an Space bendent on dete	nd Geogra applicatio t exchange ermination	aphical Informa n, intelligent tra format (RINEX , least squares m	tion System nsportation (C), Observa- tethod.	m, Precision system. GPS ation data and
1. Mohinder	S.Grewal, Lawre	nce R.V	Veill,	Angus	P.Andrew	s, "Global positi	oning syste	ems, Inertial
Navigatic	on and Integration'	', Wiley	2007	7.				

 E.D.Kaplan, Christopher J. Hegarty, "Understanding GPS Principles and Applications", Artech House Boston 2005.

Reference Books:

- 1. B.Hofmann Wollenhof, H.Lichtenegger, and J.Collins, "GPS Theory and Practice", Springer Wien, newYork, 2000.
- 2. Pratap Misra and Per Enge, "Global Positioning System Signals, Measurements, and Performance," Ganga-Jamuna Press, Massachusetts, 2001.
- 3. Ahmed El-Rabbany, "Introduction to GPS," Artech House, Boston, 2002. WITH EFFECT FROM THEACADEMIC YEAR 2010-2011
- 4. Bradford W. Parkinson and James J. Spilker, "Global Positioning System: Theory and Applications," Volume II, American Institute of Aeronautics and Astronautics, Inc., Washington, 1996.

Web References:

- 1. <u>https://www.coursera.org/courses?query=gps</u>
- 2. <u>https://www.youtube.com/watch?v=sOP6VibhtgU</u>
- 3. <u>https://www.btechguru.com/courses--nptel--- global-positioning-system-(under-review)-video-lecture--CE--CE105107062W.html</u>

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain subquestions. and the student should answer any one question from each unit. Each Question carries 12 marks.

COMPUTER NETWORKS (CN)

Course Code Course Category Hours/Week Credits Maximum Marks EC404 PEC-IV L T P C Continuous Internal Assessment End Exam TOTAL Sessional Exam Duration : 1½/ Hrs. End Exam Ouration : 3 Hrs End Exam Duration : 3 Hrs Concres Outcomes : At the end of the course the student will be able to C01: Acquire the knowledge about the layered structure of reference models for computer networks, the concepts of Physical Layer like data communication circuits, serial and parallel data transmission, transmission media, data modems, switching and multiplexing standards. C02: Understand the principles of Error detection, error correction, Flow control, medium access control in the Data Link Layer and IEEE standards for LANs. C03: Understand the principles of Error detection, error correction, Flow control, medium access control and avoidance and addressing schemes in Network Layer. C04: Analyze the Process to Process Delivery using TCP, UDP in transport layer and the cryptography algorithms like DES and RSA in session layer. C05: Understand twarious application layer protocols like DNS, FTP, HTTP, WWW, SMTP. Protocols and Standards, Network Models: Layered Tasks, OSI Reference model, TCP/IP Protocol suite, Data communication network services and Architecture. The Internet, Protocols and Standards, Network Models: Layered Tasks, OSI Reference model, CCR, Hamming Chan modems, Switching and Multiplexing (FDM, TDM & WDM). UTT - II </th <th>VII - Semester</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>Scheme</th> <th>e: 2020</th>	VII - Semester							Scheme	e: 2020		
Ected PEC-IV L T P C Continuous Internal Assessment End Exam TOTAL Sessional Exam Duration : 1½ IFrs. End Exam Duration : 3 Hrs End Exam Duration : 3 Hrs End Exam Duration : 3 Hrs Course Outcomes : At the end of the course the student will be able to End Exam Duration : 3 Hrs End Exam Duration : 3 Hrs CO1: Acquire the knowledge about the layered structure of reference models for computer networks, the concepts of Physical Layer like data communication circuits, serial and parallel data transmission, transmission media, data modems, switching and multiplexing standards. CO2: Understand the principles of Error detection, error correction, Flow control, medium access control in the Data Link Layer and IEEE standards for LANs. CO3: Understand the various types of static and dynamic routing algorithms, congestion control and avoidance and addressing schemes in Network Layer. CO4: Analyze the Process to Process Delivery using TCP, UDP in transport layer and the cryptography algorithms like DES and RSA in session layer. CO5: Understand various application layer protocols like DNS, FTP, HTTP, WWW, SMTP. UNIT – I Introduction to Data Communication Network: Network Services and Architecture. The Internet, Protocols and Standards, Network Models: Layered Tasks, OSI Reference model, TCP/IP Protocol suite, Data communication circuits, Serial and parallel data transmission, Data communication circuit, aranagements, Transmission media, Data modems, Switching and Multip	Course Code	Course	Hours	Week		Credits	Maxi	Maximum Marks			
EC404 PEC-IV L T P C Internal Assessment End Exam TOTAL Sessional Exam Duration : 1½ Hrs. - 3 40 60 100 Sessional Exam Duration : 1½ Hrs. End Exam Duration : 3 Hrs End Exam Duration : 3 Hrs Course Outcomes : At the end of the course the student will be able to CO1: Acquire the knowledge about the layered structure of reference models for computer networks, the concepts of Physical Layer like data communication circuits, serial and parallel data transmission, transmission media, data moderns, switching and multiplexing standards. CO2: Understand the various types of static and dynamic routing algorithms, congestion control and avoidance and addressing schemes in Network Layer. CO4: Analyze the Process to Process Delivery using TCP, UDP in transport layer and the cryptography algorithms like DES and RSA in session layer. CO5: Understand the various type protocols like DNS, FTP, HTTP, WWW, SMTP. End Exam End Link Layer introduction Layer rotocols like DNS, FTP, HTTP, WWW, SMTP. Data Link Layer introduction Networks: Network Services and Architecture. The Internet, Protocols and Standards, Network Models: Layered Tasks, OSI Reference model, TCP/IP Protocol suite, Data communication circuit, Serial and parallel data transmission, Data communication circuit arrangements, Transmission media, Data moderns, Switching and Multiplexing (FDM, TDM & WDM). UNIT - II Data Link Layer: Introduction, Framing, Error Detection		Category					Continuous				
3 - 3 40 60 100 Sessional Exam Duration : 1½ Hrs. End Exam Duration : 3 Hrs End Exam Duration : 3 Hrs Course Outcomes : At the end of the course the student will be able to CO1: Acquire the knowledge about the layered structure of reference models for computer networks, the concepts of Physical Layer like data communication circuits, serial and parallel data transmission, transmission media, data modems, switching and multiplexing standards. CO2: Understand the principles of Error detection, error correction, Flow control, medium access control in the Data Link Layer and IEEE standards for LANs. CO3: Understand the various types of static and dynamic routing algorithms, congestion control and avoidance and addressing schemes in Network Layer. CO4: Analyze the Process to Process Delivery using TCP, UDP in transport layer and the cryptography algorithms like DES and RSA in session layer. CO5: Understand various application layer protocols like DNS, FTP, HTTP, WWW, SMTP. UNIT - I Introduction to Data Communication circuits. Serial and parallel data transmission, Data communication circuit arrangements, Transmission media, Data modems, Switching and Multiplexing (FDM, TDM & WDM). UNIT - I Data Link Layer: Introduction, Framing, Error Detection and Correction- Parity, LRC, CRC, Hamming code, Flow and Error Control Protocols, HDLC, Multiple Access: Aloha, Controlled Access, Channelization. Introduction to IEEE standards: MAC sub layer (specifications and frame structure),	EC404	PEC-IV	L	Т	Р	С	Internal Assessment	End Exam	TOTAL		
Sessional Exam Duration : 1½ Hrs. End Exam Duration : 3 Hrs Course Outcomes : At the end of the course the student will be able to Course Outcomes : At the end of the course the student will be able to Course Outcomes : At the end of the course the student will be able to COI: Acquire the knowledge about the layered structure of reference models for computer networks, the concepts of Physical Layer like data communication circuits, serial and parallel data transmission, transmission media, data modems, switching and multiplexing standards. CO2: Understand the various types of static and dynamic routing algorithms, congestion control and avoidance and addressing schemes in Network Layer. CO4: Analyze the Process to Process Delivery using TCP, UDP in transport layer and the cryptography algorithms like DES and RSA in session layer. CO4: Static and dynamic routing algorithms, congestion control and avoidance and addressing schemes in Network Layer. CO4: Analyze the Process to Process Delivery using TCP, UDP in transport layer and the cryptography algorithms like DES and RSA in session layer. CO4: Analyze the Process to Process Delivery using TCP, UDP in transport layer and the cryptography algorithms like DES and RSA in session layer. CO4: Analyze the Process to Process Delivery using TCP, UDP in transport layer and the cryptography algorithms like DES and RSA in session layer. CO4: Analyze the Process to Process Delivery using TCP,			3	-	-	3	40	60	100		
Course Outcomes : At the end of the course the student will be able to CO1: Acquire the knowledge about the layered structure of reference models for computer networks, the concepts of Physical Layer like data communication circuits, serial and parallel data transmission, transmission media, data modems, switching and multiplexing standards. CO2: Understand the principles of Error detection, error correction, Flow control, medium access control in the Data Link Layer and IEEE standards for LANs. CO3: Understand the various types of static and dynamic routing algorithms, congestion control and avoidance and addressing schemes in Network Layer. CO4: Analyze the Process to Process Delivery using TCP, UDP in transport layer and the cryptography algorithms like DES and RSA in session layer. CO5: Understand various application layer protocols like DNS, FTP, HTTP, WWW, SMTP. UNIT – I Introduction to Data Communication Networks: Network Services and Architecture. The Internet, Protocols and Standards, Network Models: Layered Tasks, OSI Reference model, TCP/IP Protocol suite, Data communication circuits, Serial and parallel data transmission, Data communication circuit arrangements, Transmission media, Data modems, Switching and Multiplexing (FDM, TDM & WDM). UNIT – II Data Link Layer: Introduction, Framing, Error Detection and Correction- Parity, LRC, CRC, Hamming code, Flow and Error Control Protocols, HDLC, Multiple Access: Aloha, Controlled Access, Channelization. Introduction to IEEE standards: MAC sub layer (specifications and frame structure), & Physical layer for IEEE 802.3 (CSMA/CD) standard, IEEE 802.4 (Token bus) standard, IEEE802.5 (Token ring) standard, Introduction to Wireless LANs, Networking and internetworking devices. UNIT – IV Transport Layer: Transport services, addressing, upward and downward multiplexing, TCP and UDP, Session Layer: FTP, HTTP- Transaction, Request messages, Response message, Headers. WWW: Introduction to Browser architecture, Types of documents. DNS: Introduction to mane spaces, DN	Sessional Exam	Duration : 1 ¹ / ₂	Hrs.		•		End I	Exam Duration	n: 3 Hrs		
 CO1: Acquire the knowledge about the layered structure of reference models for computer networks, the concepts of Physical Layer like data communication circuits, serial and parallel data transmission, transmission media, data modems, switching and multiplexing standards. CO2: Understand the principles of Error detection, error correction, Flow control, medium access control in the Data Link Layer and IEEE standards for LANs. CO3: Understand the various types of static and dynamic routing algorithms, congestion control and avoidance and addressing schemes in Network Layer. CO4: Analyze the Process to Process Delivery using TCP, UDP in transport layer and the cryptography algorithms like DES and RSA in session layer. CO5: Understand the various application layer protocols like DNS, FTP, HTTP, WWW, SMTP. UNIT – I Introduction to Data Communication Networks: Network Services and Architecture. The Internet, Protocols and Standards, Network Models: Layered Tasks, OSI Reference model, TCP/IP Protocol suite, Data communication circuits, Serial and parallel data transmission, Data communication circuit arrangements, Transmission media, Data modems, Switching and Multiplexing (FDM, TDM & WDM). UNIT – II Data Link Layer: Introduction, Framing, Eror Detection and Correction- Parity, LRC, CRC, Hamming code, Flow and Error Control Protocols, HDLC, Multiple Access: Aloha, Controlled Access, Channelization. Introduction to Wireless LANs, Networking and internetworking devices. UNIT – II Network Layer: Virtual circuit and datagram approach in subnets, Shortest path routing, Flooding, Hierarchical routing, Broadcast routing, multicast routing and distant vector routing algorithms, Congestion control algorithms. IP Addressing schemes, Subhetting, CIDR Transport Layer: Transport services, addressing, upward and downward multiplexing, TCP and UDP. Session Layer: En	Course Outco	omes : At the end	of the c	ourse th	ne stu	dent will b	e able to				
concepts of Physical Layer like data communication circuits, serial and parallel data transmission, transmission media, data modems, switching and multiplexing standards. CO2: Understand the principles of Error detection, error correction, Flow control, medium access control in the Data Link Layer and IEEE standards for LANs. CO3: Understand the various types of static and dynamic routing algorithms, congestion control and avoidance and addressing schemes in Network Layer. CO4: Analyze the Process to Process Delivery using TCP, UDP in transport layer and the cryptography algorithms like DES and RSA in session layer. CO5: Understand various application layer protocols like DNS, FTP, HTTP, WWW, SMTP. UNIT - I Introduction to Data Communication Networks: Network Services and Architecture. The Internet, Protocols and Standards, Network Models: Layered Tasks, OSI Reference model, TCP/IP Protocol suite, Data communication circuits, Serial and parallel data transmission, Data communication circuit arrangements, Transmission media, Data modems, Switching and Multiplexing (FDM, TDM & WDM). UNIT - II Data Link Layer: Introduction, Framing, Erro Detection and Correction- Parity, LRC, CRC, Hamming code, Flow and Error Control Protocols, HDLC, Multiple Access: Aloha, Controlled Access, Channelization. Introduction to IEEE standards: MAC sub layer (specifications and frame structure), & Physical layer for IEEE 802.3 (CSMA/CD) standard, IEEE 802.4 (Token bus) standard, IEEE802.5 (Token ring) standard, Introduction to Wireless LANs, Networking and internetworking devices. UNIT - IV Transport Layer: Transport services, addressing, upward and downward multiplexing, TCP and UDP. Session Layer: FTP, HTTP- Transaction, Request messages, Response message, Headers. WWW: Introduction to Browser architecture, Types of documents. DNS: Introduction to Browser architecture, Types of documents. DNS: Introduction to anne spaces, DNS in the internet, Resolution, DNS messages. SMTP. Text Books	CO1: Acquire t	he knowledge abo	out the la	ayered s	structu	ure of refer	ence models for co	mputer networ	ks, the		
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2. Deniouz.A. Forouzan, Data communications and Networking, Second cutton, TMIT, 2005.	2. Behrouz.A. F	orouzan, Data co	mmunic	ations a	nd Ne	etworking,	Second edition, TN	и н , 2003.			

Reference Books :

3. Wayne Tomasi (2005), Introduction to Data Communications and Networking, Pearson Education, India.

4. William Stallings, Data and Computer Communications, 3rd edition, Pearson, 2007.

Web References:

- 1. https://nptel.ac.in/courses/106105081
- 2. https://nptel.ac.in/downloads/106105080/
- 3. https://nptel.ac.in/courses/106106091/

Question Paper Pattern:

Sessional Exam: The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination: The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub questions. and the student should answer any one question from each unit. Each Question carries 12marks.

WIRELESS COMMUNICATIONS (WCM)

VII - Semester :	ECE						Schem	ne : 2020			
Course Code	Course Category	Hours	/Week		Credits	Maxi	mum Marks				
EC405	PEC-IV	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL			
~ ~ ~ ~ ~ ~		3	-	-	3	40	60	100			
Sessional Exam	Duration : $1\frac{1}{2}$	Hrs				End	Exam Duratio	on: 3 Hrs			
Course Outcon	mes: At the end	of the co	ourse th	e stuc	lent will be	e able to					
CO1: Understa	nd various multip	ple acces	s techn	iques.	•						
CO2: Understand the characteristics of mobile radio propagation.											
CO3: Analyze factors influencing small scale multipath propagation.											
CO4: Analyze t	CO4: Analyze the necessity of equalization and diversity.										
CO5: Analyze t	the concepts of m	ulticarri	er mod	ulatio	n and tech	nical challenges inv	volved.				
				UNI	ľ – I						
<i>Multiple Access Techniques:</i> TDMA, FDMA, Spread Spectrum Modulation: Introduction, Pseudo-noise sequence, Direct Sequence spread spectrum, Processing gain, Frequency Hopping spread spectrum, Spread Spectrum Multiple Access.											
				UNIT	I - II						
Introduction to R <i>Large scale fadir</i> Free Space Propa Diffraction-Fresm Scattering.	adio Wave Propa ng: agation Model, R ael Zone Geome	agation, elating I etry, Kni	Basic P Power t fe-edge	Propag o Elec e Diff	gation Mec etric Field, fraction M	hanisms, Types of Ground Reflectior odel, Multiple kni	fading. n (Two-Ray) M ife-edge diffra	Iodel, ction,			
			J	UNIT	– III						
Small Scale Fada Small Scale Mult Parameters, Cohe Fading effects du	<i>ing in Mobile Ra</i> tipath propagatic erence Bandwidt e to Multipath T	adio Proj on-Facto h, Dopp ime Dela	pagations influter ler Spreay Spre	on: encing ead an ad, Fa	g small sca nd Cohere adingeffect	ale fading, Dopple nce Time, Types o s due to Doppler S	r shift, Time D of Small- Scal pread.	Dispersion e Fading-			
				UNIT	- IV						
<i>Equalization and</i> Introduction, Fu communication F equalization-Zero Diversity Techni MRC, EGC, Pola	<i>Equalization and Diversity:</i> Introduction, Fundamentals of Equalization, Training a Generic Adaptive Equalizer, Equalizers in a communication Receiver, Linear Equalizers, Non-Linear Equalizers- DFE, MLSE, Algorithms for adaptive equalization-Zero Forcing, LMS, RLS. Diversity Techniques-Practical Space Diversity Considerations-Selection Diversity, Feedback Diversity, MRC, EGC, Polarization Diversity, Frequency Diversity, Time Diversity, RAKE Receiver.										
LINIT – V											
<i>Multicarrier Mod</i> Data transmission implementation of (OFDM), Matrix ratio, Frequency	dulation : n using multiple of multicarrier m representation and timing offset	carriers, odulatio of OFDI ts, Introc	Multi o n, The M, Cha luction	carrier cyclic llenge to Ml	r modulatio c prefix, O es in Mult MO syster	on with overlapping orthogonal Frequen icarrier systems- H ns.	g sub-channels cydivision mu Peak- to-Avera	, Discrete ltiplexing age power			

Text Books :

1.T.S.Rappaport, -Wireless Communications - Principles & Practice", 2ndEdition, PHI.

2. Andrea Goldsmith, -Wireless Communications", 2nd Edition, Cambridge University Press, 2009.

3. Patrick Marsch- 5G Mobile and Wirless communication technology- Cambridge University Press,2020 **Reference Books :**

1. William Stallings, -Wireless communications & Networks", 2ndEdition, Pearson Education.

2. William C.Y. Lee, -Mobile Cellular Telecommunications", 2nd Edition, McGraw-Hill.

3. Simon Haykin, -Modern wireless communications, 1st edition, Pearson, 2004.

Web References :

- 1. https://nptel.ac.in/courses/117102062/
- 2. https://www.youtube.com/watch?v=8CKZ_icPea0
- 3. <u>https://www.youtube.com/watch?v=XUXmfrbNJns</u>

Question Paper Pattern:

Sessional examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/OR Type) in each section. The student shall answer one question from each section.

End Examination:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either-or-Type) from each unit. Each of these questions may contain sub-questions and the student should answer any one question from each unit. Each Question carries 12 marks.

	A	RTIF	CIAL N	NEUR	L NETWO	RKS(ANN)					
VII Semester: EC	E						Scher	ne: 2020			
Course Code	Category	Η	ours/W	eek	Credits	Maximu	m Marks				
						Continuous	End	ТОТА			
EC406	DEC IV	L	Т	Р	С	Internal	Exam	L			
EC400	FEC-IV					Assessment Marks	Marks	Marks			
		3	-	-	3	40	60	100			
Sessional Exam Du	uration : 1 ¹ / ₂	Hrs				End Exam Dura	tion: 3 Hrs				
Course Outcomes:	At the end of	f the co	ourse the	e studen	its are able to)					
CO1: Understand t	he similarity o	of Biol	ogical n	etworks	s and Neural	networks					
CO2: Perform the	training of net	ural ne	tworks 1	using va	arious learni	ng rules.					
CO3: Understanding and analyse the concepts of forward and backward propagations.											
CO4: Understand	CO4: Understand and Construct the SOM models.										
CO5: Analyze the	steps needed	to imp	rove per	forman	ce of the sel	ected neural network.					
				UNI	IT – I						
Introduction to A	rtificial Neura	al Netv	vorks: /	A Neura	al Network.]	Human Brain. Models	of a Neuron.				
Neural Networks vi	Introduction to Artificial Neural Networks: A Neural Network, Human Brain, Models of a Neuron, Neural Networks viewed as Directed Graphs. Network Architectures. Knowledge Representation.										
Artificial Intelligence and Neural Networks Learning Process: Error Correction Learning, Memory											
Based Learning, Hebbian Learning, Competitive, Boltzmann Learning, Credit Assignment Problem,											
Memory, Adaption	, Statistical Na	ature o	f the Lea	arning l	Process						
UNIT – II											
Single Laver Percer	ntrons [.] Adapti	ve Filt	ering Pr	oblem	Unconstrain	ed Organization Techn	iques Linea	r			
Least Square Filters	s. Least Mean	Squar	e Algori	thm. Le	earning Curv	es. Learning Rate Ann	ealing				
Techniques, Enviro	nment, Multil	ayer P	erceptro	n: Bacl	· Propagatio	n Algorithm XOR Prob	olem,				
Heuristics, Output l	Representation	n and I	Decision	Rule, O	Computer Ex	periment, Feature Dete	ection				
UNIT – III					-	-					
Back Propagation:	Back Propaga	tion an	d Differ	entiatic	on, Hessian N	Matrix, Generalization,	Cross Valida	ation,			
Network Pruning T	echniques, Vi	rtues a	nd Limi	tations	of Back Pro	pagation Learning, Acc	celerated				
Convergence, Supe	rvised Learnin	1g .									
UNIT – IV											
Self-Organization N	Maps (SOM):	Two B	asic Fea	ature M	apping Mod	els, Self-Organization	Map, SOM				
Algorithm, Properti	ies of Feature	Map, (Compute	er Simu	lations, Lear	ning Vector Quantizati	on, Adaptive	e Patter			
Classification.											
UNIT – V											
Neuro Dynamics: E	Dynamical Sys	tems,	Stability	of Equ	ilibrium Sta	tes, Attractors, Neuro I	Dynamical				
Models, Manipulati	ion of Attracto	ors as a	Recurr	ent Net	work Paradig	gm Hopfield Models –	Hopfield				
Models, restricted b	ooltzmen mac	hine.									
Text Books:											
1. Laurence Fausett	Fundamenta	uls of N	leural N	etwork	s Architectu	res Algorithms and					
Applications. Pears	on Ed. 2004.	us 0j 1	curat iv	erwork	, 111 стиссти						
2. Neural Network	s a Comprehe	nsive F	Foundati	ons. Si	mon S Havk	in. PHI Ed.,					
3 Introduction to A	rtificial Neura	1 Syste	ms Jace	k M. Z	urada. JAIC	O Publishing House Ed	l. 2006.				
Reference Books:		J				8					
1.Neural Networks	1.Neural Networks in Computer Intelligence, Li Min Fu TMH 2003										
2. Neural Network	s -James A Fr	eeman	David N	M S Kaj	pura Pearsor	n Ed., 2004.					
3 Artificial Neural I	Networks – B.	. Vegn	anaraya	na Pren	tice Hall of I	India P Ltd 2005		50			
								52			

1. Introduction to Artificial Neural Systems- Jacek M.Zurada, Jaico Publishing house, 1992 Web References:

1.https://www.tutorialspoint.com/artificial_intelligence/artificial_intelligence_neural_networks.htm

2. Andrew Ng, "Machine Learning Yearning" https://www.deeplearning.ai/machine-learning- yearning/

3. https://www.youtube.com/watch?v=ob1yS9g-Zcs

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub questions. and the student should answer any one question from each unit. Each Question carries 12 marks.

VLSI SIGNAL PROCESSING (VSP)

VII - Semester: ECE							Scl	neme: 2020		
Course Code	Category	Hours/Week			Credits	MaximumMarks				
EC 407	PEC-V	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL		
		3	-	-	3	40	60	100		
Sessional Exam Du	iration: 11/2 Hi	rs			End Exam Duration:3Hrs					
Course Outcomes :	At the end of t	he cou	rse the	stude	nt will be a	ble to				
CO1: Analyze the role	of DSP algorith	nms in	VLSI							
CO2: Apply the principles of DFG,SFG for DSP architectures and Compute iteration ,loop bound										
CO3: Apply pipelining and parallel processing for FIR and IIR systems to achieve high speed and										
low power.										
CO4: Solve Register minimization, retiming, folding techniques for the given digital filter.										
CO5: Understand the overview of FIR filter Systolic architecture design										
UNIT-I										
Introduction to Digit Introduction, Typical Representation of DSF	al Processing S DSP Algorithm P Algorithms.	S ystem ns, DS	: P App I	olicatio	on demand	s and scaled C	CMOS technol	ogies,		
Iteration Bound: Introduction, Data Flo computing iteration bo	ow Graph Repr ound, Iteration b	esentat bound (tions, 1 of mult	Loop tirate	Bound and data flow g	l Iteration Bour raphs.	nd, Algorithm	s for		
			U	NIT ·	·III					
Pipelining and Parall Introduction, Pipelinin low power	lel Processing: ng of FIR Digit	al Filte	ers, Pa	rallel	Processing	, Pipelining and	d Parallel Proc	cessing for		
			U	NIT-	-IV					
Folding and Unfolding: Introduction, Definitions and properties, Retiming Techniques, An algorithm for unfolding, Critical path, Unfolding and retiming, Applications of unfolding, Folding techniques. Register minimization techniques, Register minimization in folded architecture, Folding of multirate systems.										
			l	JNIT-	- V					
Systolic Architecture Design: Introduction, System array design methodology, FIR systolic arrays, selection of scheduling vector, Matrix-matrix multiplication and 2-D systolic array design, Systolic Design for space representations containing delays.										
TextBooks:										
Science. 1998.		Signal		-sing						
2.Kung S.Y.H. J.W	Vhite House, T. k	Kailath,	,VLSI	and N	Aodern Sign	nal Processing,I	Prentice Hall,1	985		

Reference Books:

- 1. Jose E. France, Yannis Tsividis, Design of Analog, Digital VLSI Circuits for Telecommunications and Signal Processing, Prentice Hall,1994.
- 2. Medisetti V. K, VLSI Digital Signal Processing, IEEE Press (NY), USA, 1995.

Web References:

- 1. https://nptel.ac.in/courses/117106093/
- 2. https://nptel.ac.in/courses/117102060/

QuestionPaperPattern:

Sessional Exam: The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination: The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub questions. and the student should answer any one question from each unit. Each Question carries 12 marks.

FPGA & ASIC ARCHITECTURES AND APPLICATIONS (FPGA & ASIC)

VII Semester :ECE Scheme: 2020									
Course Code	Category Hours/Week Credits Maximum Marks								
EC408	PEC-V	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL	
		3	-	-	3	40	60	100	
Sessional Exar	n Duration :	1 1/2 H	rs			End	Exam Duratio	on: 3 Hrs	
Course Outc	comes: At the	end of the	he cours	se the	student wi	ll be able to			
CO1: Implementation of ROMs, PALs, PLAs, CPLDs									
CO2: Apply &Get exposure to industry standard FPGAs.									
CO3: Analyze the concepts of FPGAs design Flow and its I/O Blocks									
CO4: Understa	and the conce	pts of AS	ICs and	d its d	esign Flow				
CO5: Analyze	system partiti	ioning, fl	oor-pla	nning	Placement	t & Routing and ass	ociated algorith	nms	
					UNIT-I				
Programmable	logic, Progra	immable	read or	nly m	emory (PR	OM), programmab	le logic array (PLA),	
Programmable	array logic (PAL). S	equenti	al pro	ogrammabl	e logic devices (SI	PLDS), Program	nmable gate	
arrays (PGAS),	CPLD								
D 11		1						. 1 1	
Programmable logic FPGA general structure, Anti fuse - Static RAM: EPROM and EEPROM technology,									
TFUA Logic of	OCK - ZINQ	7000		т	INIT_III				
FPGA Design	flow DC &	AC inpu	its and a		s Clock a	nd Power inputs Xi	liny I/O blocks		
11 UA Design	now, DC &	AC IIIpu		<u>Juipui</u> I		id i ower inputs, Ai	IIIIA I/O DIOCKS	•	
ASIC construe	ction Physics	l Design	flow	Goal	s and object	tives of all the ASI	C physical desi	σn	
steps, System	partitioning,	Partition	ing met	hod—	-Constructi	ive partitioning. Iter	ative partitioni	ng, K-L	
algorithm.	F8,						······	-8,	
				1	UNIT-V				
Floor planning, Eigenvalue plac	, its tools, P cement algori	lacemen thm, Iter	t : Me ative Pl	thods	and types ent Improv	s constructive: m rement.	in-cut placeme	ent method,	
Text Books:									
1. Michael J	ohn Sebastia	n Smith,	Applica	ation s	specific Int	egrated Circuits, 3 ^r	^d Edition, Pearso	on	
Education	n, Asia, 2001.								
2. Pak and	Chan, Samih	a Moura	nd, <i>Dig</i>	ital L	Design usi	ng Field Programi	nable Gate Ar	rays, ^{1st}	
Edition P	earson Educa	tion, 200	9.		0				
Reference Boo	oks:	·							
1. S. Trimberg	er, Edr, Field	Program	mable	Gate A	Array Tech	nology, 1st Edition	Kluwer Acade	emic	
Publications,1994.									
2. John V.Oldfield, Richard C Dore, <i>Field Programmable Gate Arrays</i> , 1 st Edition, Wiley Publications, 1999.									
3. S.Brown, R Francis, J Rose, Z Vransic, Field Programmable Gate Arrays, 1 st edition, Kluwer Publications, 1992									
Web Referenc	es:								
1. <u>http</u>	s://nptel.ac.in	/courses/	/117108	3040/					
2. http	s://www.cour	sera.org	/learn/ir	ntro-fr	oga-design	-embedded-systems	:/		
-					-				

- 3. http://www.cpld.com/
- 4. www.asic.co.in/

Question Paper Pattern:

Sessional Exam: The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination: The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub questions. and the student should answer any one question from each unit. Each Question carries 12 marks.

NETWORK SECURITY AND CRYPTOGRAPHY (NSC)

VII Semeste	r : ECE				Scheme: 202					
Course Code	Category	Hou	rs/We	eek	Credits	Maximum Marks				
EC409	PEC-V	L	Т	P	С	Continuous Internal Assessment	End Exam	TOTAL		
		3	-	-	3	40	60	100		
Sessional Exam Duration: 1 ¹ / ₂ Hrs.						End I	Exam Dura	tion: 3Hrs.		

Course Outcomes: At the end of the course the student will be able to

CO1: Illustrate the concepts and principles of computer network security.

CO2: Understand various classical encryption techniques and block cipher structure.

CO3: Analyze advanced encryption standard.

CO4: Understand block cipher operations and Various Asymmetric Ciphers.

CO5: Understand cryptographic hash functions and digital signatures.

UNIT-I

Introduction to Security concepts

Computer security concepts, OSI Security, Architecture, and Security attacks, Security services, Security mechanisms, Fundamental security design principles, A model for Network Security. Number Theory Euclidean Algorithm, Modular Arithmetic, Fermat's and Euler's Theorem, Testing for primality.

UNIT-II

Introduction to Security concepts

Computer security concepts, OSI Security Architecture, Security attacks, Security services, Security mechanisms, Fundamental security design principles, A model for Network Security. Number Theory Euclidean Algorithm, Modular Arithmetic, Fermat's and Euler's Theorem, Testing for primality.

UNIT-III

Advanced Encryption Standard

AES Structure, AES transformation functions, AES Key Expansion, AES Example, AES Implementation. Block Cipher Operation Multiple Encryption and Triple DES, Electronic code book, Cipher Block Chaining Mode, Cipher feedback mode, output feedback mode.

UNIT-IV

Asymmetric Cipher s and Public key crypto systems

Public-Key Cryptography and RSA: Principles of Public-key crypto systems, RSA Algorithm.

Diffie-Hellman Key Exchange, Elgamal Cryptographic systems.

UNIT-V

Introduction, Basics of Blockchain Architecture – Challenges – Applications – Block chain Design Principles -The Blockchain Ecosystem - The consensus problem - Asynchronous Byzantine Agreement - AAP protocol and its analysis - Nakamoto Consensus on permission-less, nameless, peer-to-peer network.

Text Books:

1. William Stallings, [7th Edition], Cryptography and Network Security, Pearson.

2. Behrouz A. Forouzan, D Mukhopadhayay, [2nd Edition], Cryptography and Network Security, MC Graw Hill

3. Melanie Swan, "Block Chain: Blueprint for a New Economy", O"Reilly, first edition – 2015. **Reference Books:**

- Eric Cole, Dr. Ronald Kurtz and James W. Conley, Network Security Bible, Wiley 1. Publishers.2009.
- 2. Bruce C. Berndt, Number Theory in the Spirit of Ramanujan, University Press
- 3. V.K. Jain, Cryptography and Network Security, Khanna Publishing House.
- 4. Atul Kahate, Cryptography and Network Security, TMH.

Web References:

- https://nptel.ac.in/courses/106105031 1.
- https://www.coursera.org/lecture/managing-network-cybersecurity/cryptography-and-network-2. security-w9SuJ
- https://www.vssut.ac.in/lecture notes/lecture1428550736.pdf 3.

Question Paper Pattern:

SessionalExam:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with TwoQuestions(EITHER/ORType)ineachsection.Thestudentshallansweronequestionfromeachsection.

EndExamination:

The question paper for End examination shall be for 60 marks. The Question paper shall contain FiveUnits with Two Questions (Either or Type) from each unit. Each of these questions may contain sub-questions.andthestudentshouldansweranyonequestionfromeachunit.EachQuestioncarries12marks.

	UNIVERSAL HUMAN VALUES-2 (UHV-2)												
VII Semester :	Common to a	all bra	nches		Scheme : 2020								
Course Code	Category	Hou	ırs/We	eek	Credits	Maxim	um Marks	5					
		_			~	Continuous	End						
HSSC701	HSSC	L	Т	Р	С	Internal	Exa	Total					
						Assessment	m						
		3	0	0	3	40	60	100					
Sessional Exan	n Duration : 1	¹ / ₂ Hr	S			End Exa	m Duratio	on: 3 Hrs					
Course Outco	omes : At the o	end of	the co	urse t	he student v	vill be able to							
CO1: Develop a holistic perspective based on self-exploration about themselves (human													
being), family, society and nature/existence.													
CO2: Understand the harmony in the human being, family, society and nature/existence													
CO3: Strengthe	en of self-reflec	ction.					_						
CO4: Develop	a commitment	and co	ourage	towa	rds impleme	enting Human va	lues						
				UNI	<u>[–]</u>								
Course Introd	uction - Need,	Basic	Guide	elines	, Content a	nd Process for	Value Edu	cation					
Fulpose and m Exploration_wh	ouvation for t	ontent	and n	roces	s. 'Natural	Acceptance' and	Fxperienti	s. sen- al					
Validation- as t	he process for	self-e	xplora	tion.	Continuous	Happiness and F	Prosperity-	A look					
at basic Human Aspirations. Right understanding, Relationship and Physical Facility- the													
basic requirements for fulfilment of aspirations of every human being with their correct													
priority. Understanding Happiness and Prosperity correctly- A critical appraisal of the current													
at various level	s Include prac	above	numai	n aspi	rations: und	erstanding and in al acceptance in	human be	rmony					
the innate accept	ptance for living	ng wit	h resp	onsibi	ility (living	in relationship,	harmony a	ind co-					
existence) rathe	r than as arbiti	arines	s in ch	existence) rather than as arbitrariness in choice based on liking-disliking									
UNIT - II													
Understanding Harmony in the Human Being - Harmony in Myself													
Understanding	Harmony in 1	the Hu	ıman l	UNIT Being	<mark>- II</mark> - Harmony	v in Myself							
Understanding Understanding	Harmony in the human being	t he Hu as a c	iman l co-exis	UNIT Being stence	- II - Harmony of the sen	v in Myself tient 'I' and the	e material	'Body'.					
Understanding Understanding Understanding	Harmony in the needs of	t he Hu as a c f Self	iman l co-exis	UNIT Being stence and	· - II - Harmony of the sen 'Body' -	v in Myself tient 'I' and the happiness and	e material physical	'Body'. facility.					
Understanding Understanding Understanding Understanding	Harmony in the human being the needs of the Body as	the Hu as a c f Self an in	iman l co-exis ('I')	UNIT Being stence and ent o	- II - Harmony of the sen 'Body' - f 'I' (I be	y in Myself tient 'I' and the happiness and ing the doer, s	e material physical eer and e	'Body'. facility. enjoyer).					
Understanding Understanding Understanding Understanding	Harmony in the human being the needs of the Body as the characteris	the Hu as a c f Self an in tics ar	iman l co-exis ('I') istrume nd acti	UNIT Being stence and ent o vities	• II • Harmony of the sen 'Body' - f 'I' (I be of 'I' and	y in Myself tient 'I' and the happiness and ing the doer, s harmony in 'I'.	e material physical seer and e Understand	'Body'. facility. enjoyer). ding the					
Understanding Understanding Understanding Understanding harmony of I	Harmony in the human being the needs of the Body as the characterist with the Body	the Hu as a c f Self an in tics ar : Sany	uman l co-exis ('I') nstrumo nd acti yam an	UNIT Being stence and ent o vities nd Ho	· - II - Harmony of the sen 'Body' - f 'I' (I be of 'I' and ealth; corre	y in Myself tient 'I' and the happiness and ing the doer, s harmony in 'I'. ct appraisal of	e material physical seer and e Understand Physical	'Body'. facility. enjoyer). ding the needs,					
Understanding Understanding Understanding Understanding harmony of I meaning of Pro	Harmony in the human being the needs of the Body as the characterist with the Body opperity in determined to the characterist of the body opperity in determined to the provide the second to the provide the second to the provide the second to the second t	the Hu as a c f Self an in tics ar : Sany tail. P	iman l co-exis ('I') istrume ind acti yam au rogram	UNIT Being stence and ent o vities nd He ns to	• - II - Harmony of the sen 'Body' - f 'I' (I be of 'I' and ealth; corre- ensure San	y in Myself tient 'I' and the happiness and ing the doer, s harmony in 'I'. ct appraisal of yam and Health	e material physical seer and e Understand Physical . Include	'Body'. facility. enjoyer). ding the needs, practice					
Understanding Understanding Understanding Understanding Understanding harmony of I meaning of Pro- sessions to diso	Harmony in the human being the needs of the Body as the characterist with the Body osperity in det cuss the role of	the Hu as a c f Self an in tics an r: Sany tail. P others fa Di	iman l co-exis ('I') nstrume nd acti yam an rogram have	UNIT Being stence and ent o vities nd He ns to playe	- II - Harmony of the sen 'Body' - f 'I' (I be of 'I' and ealth; corre- ensure San d in making	y in Myself tient 'I' and the happiness and ing the doer, s harmony in 'I'. ct appraisal of yam and Health g material goods	e material physical seer and e Understand Physical a. Include s available	'Body'. facility. enjoyer). ding the needs, practice to me.					
Understanding Understanding Understanding Understanding harmony of I meaning of Pro- sessions to disc Identifying from	Harmony in the human being the needs of the Body as the characteriss with the Body osperity in det cuss the role of n one's own lite	the Hu as a c f Self an in tics an : Sany tail. P others fe. Dif	uman l co-exis ('I') nstrume nd acti yam an rogram have fferent	UNIT Being stence and ent o vities nd Ho ns to played iate b	• - II • Harmony of the sen 'Body' - f 'I' (I be of 'I' and ealth; corre- ensure San d in makin, between pro-	y in Myself tient 'I' and the happiness and ing the doer, s harmony in 'I'. ct appraisal of yam and Health g material goods sperity and accu	e material physical seer and e Understand Physical a. Include s available mulation. I	'Body'. facility. enjoyer). ding the needs, practice to me. Discuss					
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UNIT - IV

Understanding Harmony in the Nature and Existence - Whole existence as Coexistence Understanding the harmony in the Nature. Interconnectedness and mutual fulfilment among the four orders of nature- recyclability and self-regulation in nature. Understanding Existence as Co-existence of mutually interacting units in all-pervasive space. Holistic perception of harmony at all levels of existence.

Include practice sessions to discuss human being as cause of imbalance in nature (film "Home" can be used), pollution, depletion of resources and role of technology etc.

UNIT - V

Implications of the above Holistic Understanding of Harmony on Professional Ethics

Natural acceptance of human values. Definitiveness of Ethical Human Conduct. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order. Competence in professional ethics. a. Ability to utilize the professional competence for augmenting universal human order. b. Ability to identify the scope and characteristics of people friendly and eco-friendly production systems. c. Ability to identify and develop appropriate technologies and management patterns for above production systems. Case studies of typical holistic technologies, management models and production systems. Strategy for transition from the present state to Universal Human Order: a. At the level of individual: as socially and ecologically responsible engineers, technologists and managers **b**. At the level of society: as mutually enriching institutions and organizations. Sum up. Include practice Exercises and Case Studies will be taken up in Practice (tutorial) Sessions eg. To discuss the conduct as an engineer or scientist etc.

Text Books

R R Gaur, R Asthana, G P Bagaria, "A Foundation Course in Human Values and Professional Ethics", 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1

R R Gaur, R Asthana, G P Bagaria, "Teachers' Manual for A Foundation Course in Human Values and Professional Ethics", 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-53-2

Reference Books

1. Jeevan Vidya: Ek Parichaya, A Nagaraj, Jeevan Vidya Prakashan, Amar kantak, 1999.

2. A. N. Tripathi, "Human Values", New Age Intl. Publishers, New Delhi, 2004.

3. The Story of Stuff (Book).

4. Mohandas Karamchand Gandhi "The Story of My Experiments with Truth"

5. E. FSchumacher. "Small is Beautiful"6. Slow is Beautiful –Cecile Andrews

7. J C Kumarappa "Economy of Permanence"

8. Pandit Sunderlal "Bharat Mein Angreji Raj"

9. Dharampal, "Rediscovering India"

10. Mohandas K. Gandhi, "Hind Swaraj or Indian Home Rule"

11. India Wins Freedom - Maulana Abdul Kalam Azad

12. Vivekananda - Romain Rolland(English)

13. Gandhi - Romain Rolland (English)

Web References:

https://nptel.ac.in/courses/109/104/109104068/

https://aktu.ac.in/hvpe/ResourceVideo.aspx

Question Paper Pattern:

Internal Assessment: The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Exam: The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub questions and the student should answer any one question from each unit. Each Question carries 12 marks.

DATA SCIENCE LAB (DSL)

VII - Semeste	r :ECE						Sch	eme:2020		
Course Code	Category	Hou	Hours/Week		Credits	redits Maximum Marks				
SCEC05	SC	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total		
		-	-	4	2	100		100		
						End Exa	am Duratio	on: 3 Hrs		
Course Outcomes: On completion of this subject, the student will be able to:										
CO1:Develop Environment setup to work with Data Science										
CO2:Implement various operations on Arrays using NumPy										
CO3:Implementprograms using Pandas and Matplotlib										
CO4:Perform p	rograms using	g Date a	and T	ime D	ata types.					
			List a	of Exp	periments					
1. Python Envir	onment setup	to wor	k with	n Data	iscience					
2.NumPy: Arith	nmetic Operat	ions on	Array	/S						
3.Generate Pseu	udo Random r	numbers	s using	g vari	ous metho	ods in NumPy				
4.Perform Linea	ar search, bina	ary sear	ch usi	ng N	umPy array	ys.				
5. Loading and	extracting dat	a from	diffe	rent d	ata frames					
6. Pandas: Prog	ram to deal w	ith miss	sing d	ata by	y reading d	ata from a file.				
7. Implement data wrangling functions on raw data										
8. Matplotlib: Visualize data by plotting a scatter plot.										
9. Program to vi	9. Program to visualize data using pie and bar graphs.									
10. Implement	programs on I	Date and	d Tim	e Dat	a Types					

	OPTIMIZATIONTECHNIQUES (OT)										
V Semester	: B.Tech							Scheme : 2020			
Course Code	Category	Но	urs/W	eek	Credits	Maximum Marks					
OE301	OEC - I	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total			
		2	1	-	3	40	60	100			
Sessional E	xam Duration:1.	5 Hrs					End Ex	xam Duration: 3 Hrs			
Correct Oracle		- 6 (1) -				1 1 1. 1					
Course Outcomes: At the end of the course the student will be able to											
CO2: Solve	the engineering n	roblen	punniz 19 meir	ation a	and solve I	mming techniq	ning problem	18			
CO3: Solve	the engineering p	roblen	ns usir	ig mee	n tucker c	onditions and I	agrangean n	nultiplier method			
CO4: Solve	the engineering	oroblei	ns usi	ng dyi	namic prog	ramming techn	ique				
CO5: Apply	y non-traditional o	ptimiz	ation	technie	ques to sol	ve engineering	problems.				
					UNIT-I						
Optimizatio Classificatio	on: Introduction, on of Optimization	, Hist proble	orical ems.	Dev	elopment,	Engineering	Application	ns of Optimization,			
I incor Pro	aromming Proble	me									
Simplex me	thod Rig-M meth	od Se	nsitivi	tv An	alvsis Dua	lity Dual simp	lex method	Interpretation			
	thou, big wi meth	ou, se	11511111	<i>cy</i> 7 m	ary 515, Duc	inty, Duai shiip	iex method,	interpretation.			
					UNIT-2						
Integer Pro	Integer Programming Technique										
Simple appl Algorithm,	ications of integer Cutting Plane Alg	r progr orithm	ammi	ng, so	lution met	hods of integer	programmir	ng-Branch and Bound			
					UNIT-3						
Classical O	ptimization Tech	nique	s:								
Single varia constraints,	ble optimization methods of Lagra	with and mu	nd wit 1ltiplie	hout c ers, Ku	constraints 1hn-Tucke	, multi – variat r conditions	ole optimizat	ion with and without			
					UNIT-4						
Dynamic P	rogramming Tec.	hniqu	e:	D 1							
Elements of Programmir	dynamic program ig to Linear program	amming 1 ammin	model g and	, Back Capita	al budgetin	rsive equation,	Application	s of Dynamic			
	•41				UNIT-5						
Genetic Alg	gorithm:	C.		A 1 ~ ~ ~	Thursday	The dition of Mode	ada Cimenta	Canatia Alaquithura			
Similarity T applications	Introduction, Difference between Genetic Algorithm and Traditional Methods, Simple Genetic Algorithms, Similarity Templates (Schemata), Genetic algorithm operators –selection, crossover and mutation. Simple applications of GA.										
Evolutiona	ry Algorithms:										
Evolutionar algorithm.	y Algorithums: A	nt colo	ony alg	gorithi	n, Tabu se	arch algorithm	and Particle	swam optimization			
TextBooks:	<u> </u>										
1.Rao S.S, -	Optimization, Wi	ley Eas	stern,	New I	Delhi, 1995						
2. S.D. Sarn	na, -Operations Re	esearch	, Ked	arnath	Ramnath	& Co					
3. David E.O	Goldberg,-Genetic	Algor	ithms	, Pears	on Educat	ion					
ReferenceB	ooks:							58			

1. HamdyA.Taha, -Operations Research, Prentice Hall of India.

2. Kalyanmoy Deb,-Optimization for Engineering Design, Prentice Hall, New Delhi, 2000

Question Paper Pattern:

Sessional Exam: The question paper for sessional examination is for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of Three Sections with Two Questions (EITHER / OR type) in each section. The student shall answer one question from each section.

End Exam: The question paper for end examination is for 60 marks. It shall consist of Five Units, each containing Two Questions (EITHER / OR type) from each unit of the syllabus, with a weightage of 12 marks. Each of these questions may contain sub-questions. The student shall answer one question from each unit.

REMOTE SENSING & GIS (RSGIS)											
V Semester: I	3.Tech.				Scheme : 2020						
Course Code	Category	Hours/Week		eek	Credits	ts Maximum Marks					
OE302	OEC-I	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total			
			-	-	3	40	60	100			
Sessional Exam Duration: 1.5 Hrs End Exam Duration: 3 Hrs											
Course Outcomer At the and of the source the student will be able to											
Course Outcomes : At the end of the course the student will be able to											
surveying prob	alle the Fliolog	proprie	eu y, ate to	ols and	and Total s Etechnique	station surveyin	ig principies	to solve			
CO2: Underst	and the concer	ots of r	emote	e sensi	ng and inte	rpretation meth	nods.				
CO3: Unders	tand the impor	tance of	of ma	ps, cor	ncept of ma	p projections.					
CO4: Understanalysis.	tand the conce	ept of	GIS	and it	s applicati	ons, different	data models	s, spatial			
CO5: Under	rstand the prin	ciples	used	in G	NSS and	Drone surveyi	ing, data co	ollection			
		is und	00110	UNI	Γ – Ι						
<i>Aerial Photog</i> Bar– Digital E	grammetry:Ste	ereosco el (DEN	ру— (М) — S	3-D N Slope.	Iodel – H	eight determin	ation using	Parallax			
<i>Land Surveyi</i> principle – P Traversing – T	<i>Land Surveying:</i> Various Levels – Levelling methods–Total Station– EDM– Working principle – Parts of Total Station – Capabilities and applications of Total Station– Traversing – Triangulation and Trilateration.										
UNIT - II											
<i>Remote Sensing:</i> Basic concept– Electromagnetic spectrum– Spectral signature – Resolutions –Spectral. Spatial, Temporal and Radiometric – Platforms and Sensors – Remote Sensing Data Products – PAN – Multispectral, Microwave, Thermal, Hyper spectral– Visual and digital interpretation methods.											
				UNIT	' – III						
<i>Maps:</i> Import Plotting accu geographical,	<i>Maps:</i> Importance of maps to engineering projects – Types of maps– Scales and uses– Plotting accuracy – Map sheet numbering – Coordinate systems – Cartesian and geographical, map projections, mapdatum–MSL, Geoid, Spheroid, WGS-84.										
				UNIT	$\mathbf{I} - \mathbf{IV}$						
<i>GIS:</i> Introduction– Data Sources – Data Models and Data Structures– Algorithms, DBMS – Creation of Databases (spatial and non-spatial) – Spatial analysis – Interpolation–Buffer, Overlay – Terrain Modelling and Network analysis.											
<i>Remote Sensing and GIS Applications:</i> Land use / Land cover classification – Rainfall- runoff studies – Flood and drought impact assessment and monitoring – Regional and urban planning and management – GIS based highway alignment.											
	UNIT - V										
<i>GNSS:</i> Prince Errors in obse	iple used – C ervations and c	Compo correct	nents ions.	of G	NSS– Da	ta collection r	nethods – 1	DGPS –			
								60			

Drone Surveying: Working principle – Benefits of drones in surveying – Applications – Interior and exterior drone surveying – Calculation of length, area and stockpile volume.

Text Books:

1. M. Anji Reddy, *Text Book of Remote Sensing and Geographic Information System*, BSPublication.

2. Lo C.P. &Yeung A.K.W., *Concepts and Techniques of GIS*, Prentice-Hall of India, New Delhi.

3. Thomas Lillesand, Ralph W Kiefer and Jonathan Chipman, *Remote Sensing and Image Interpretation*, John Wiley & Sons, India.

4. Hofmann-Wellenhof, Lichtennegger and Wasle, *GNSS: Global Navigation Satellite Systems*, Springer - Verlag Wein, New York.

Reference Books:

1. B.Bhatta, Remote sensing and Geographic Information System, Oxford Publications.

2. Siddiqui M.A., Introduction to Geographical Information System, ShardaPustakBhavan, Allahabad.

3. Curran, Paul J, Principles of Remote Sensing, Longman, London.

4. Floyd F Sabins Jr., *Remote Sensing Principles and Interpretation*, Freeman and Co., San Francisco.

Web References:

1. https://nptel.ac.in/courses/105/101/105101206/

2. https://nptel.ac.in/courses/105107155

3. https://nptel.ac.in/courses/105/107/105107194/

Question Paper Pattern:

Sessional Exam: The question paper for sessional examination is for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of Three Sections with Two Questions (EITHER / OR type) in each section. The student shall answer one question from each section.

End Exam: The question paper for end examination is for 60 marks. It shall consist of Five Units, each containing Two Questions (EITHER / OR type) from each unit of the syllabus, with a weightage of 12 marks. Each of these questions may contain sub-questions. The student shall answer one question from each unit.

	INTRODUCTION TO JAVA (ITJ)									
V Semester :	B.Tech				Scheme : 2020					
Course Code	Category	Hours/Week		Credits	Maximum Marks					
OE303	OEC- I	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL		
		3	-	-	3	40	60	100		
Sessional Exam Duration 1½ HrsEnd Exam Duration: 3 H										
Course Outcomes : At the end of the course the student will be able to										
CO1: Understa	and fundamentals of o	oops o	conce	pts, inj	put and out	put				
CO2: Understa	and the classes and o	bjects								
CO3: Understa	and the Inheritance ar	nd int	ertace	es						
CO4: Understa	and the string handling	ig me	lnous							
COS. Ondersta		lunng		TINIT	T					
Object orient	tad concenter Fund	mont	olo		$-\mathbf{I}$	o Doto typos	voriablas	Operators		
controlstateme	nts Reading console	innut	ais, writ	ing co	nsole outpu	a, Data types,	variables	, Operators,		
	nus, neuding console	mput	,		– II	it, ulluys.				
Introducing Classes: Class fundamentals, declaring objects, introducing methods, Constructors, thiskeyword finalize										
			I	UNIT -	– III					
Inheritance: I	nheritance basics, usir	ng sup	er, m	ethod of	overriding,	abstract class, us	sing final v	with		
inheritance,Inte	erfaces: Defining inte	erface,	imp	lementi	ing interfac	e				
			• •	UNIT ·	- IV					
String Handli	ing: String constructo	ors, Sp	becial	string	operations	, character extra	iction, stri	ng		
comparison,sea	arcning strings, moun	rying	string	gs. Stri	N	lass and its metr	10 0 \$.			
Exception Ha	ndling: Fundamental	s, exc	eptio	n type	s, try, cate	h, throw, throws	s, finally.	Java built-in		
Text Books		ption	Suber	usses.						
1 Herbert Sc		ition]	The	Comp	lete Refere	nce Java2 TAT	'A McGra	w-Hill		
2. E Balagurus	wamy [2007]. [3 rd E	dition	1. Pro	gramn	ning with Ja	va. A Primer. TA	ATA McG	raw- Hil.		
Reference B	ooks:		1/	0	0	, ,				
1. Bruce Ecke	el [2008], [2nd Editio	on], T	hinki	ng in J	ava, Pearso	on Education.				
2. H.M Dietel	and P.J Dietel [2008], [6tł	n Edi	tion], J	ava How to	o Program, Pear	son Ed.			
Question Pap	Question Paper Pattern:									
Sessional Exa	mination:									
The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three										
sections with	I wo Questions (Ef	THEF	V OF	стуре) in each	section. The stu	udent shal	answer one		
question from	each section.									
The question t	naper for End examin	nation	shall	l be foi	r 60 marks	The Question r	aper shall	contain Five		
Units with Tw question and	vo Questions (Either the student should ar	or Ty	pe) fi any	rom ea one qu	ich unit. Ea	mch of these que m each unit. Ea	stions may ch Questi	y contain sub on carries 12		

marks.

		IN	FERNI	ET O	F THINGS	5 (IoT)							
V - Semeste	r:B.Tech						Sch	eme : 2020					
Course	Course	Hours/Week			Credits	Maximum Marks							
Code	Category												
		т	т	D	C	Continuous	Fnd	ΤΟΤΑΙ					
OE304	OEC-I		1	1	C	Assessment	Exam	IUIAL					
		3	-	-	3	40	60	100					
Sessional Exa	Sessional Exam Duration : 1 ½ HrsHrsEnd Exam Duration: 3 Hrs												
Course Outcomes : At the end of the course the student will be able to													
CO1: Understand the basic knowledge of Internet of things and its design													
CO2: Under	CO2: Understand the purpose of sensors and Actuators in IoT												
CO4: Design	1 IoT Projects Usin	o Ardui	no										
CO5: Under	stand Raspberry-Pi	i Process	sor and	Rast	bian Opera	ting Systems							
	1 7				1	0,							
				UN	IT – I								
Introduction	n to IoT:												
Definition a	nd Characteristics of	of IoT, P	hysical	Des	ign and Log	gical Design, IoT Enab	ling Tech	nologies,					
IoTLevels and	nd Deployment Te	mplates,	IoT V	s M2	M	_	-	_					
				UN	IT – II								
Sensing and	l Actuation:												
Definition of	f Sensor, Sensor fea	atures, F	Resoluti	on, (Classes, Dif	ferent types of sensors	, Actuator						
Differenttyp	es of Actuators, pu	rpose of	Sensor	rs an	d Actuators	in IoT	,	,					
				UN	T – III								
Wireless Te	chnologies and Da	ata Trai	nsmissi	on f	or IoT:								
Wi-Max. W	i-Fi (802.11), Blue	tooth/B]	uetootł	ı sma	art.Zigbee/Z	Zigbee smart, Cellular.	NFC.Seri	ial					
Transmissio	n, RS-232, RS-485	, I2C In	ter-Inte	grate	ed Circuit, E	Ethernet, CAN bus, US	B, Firewa	.11,					
SerialATA,	Parallel Transmissi	ion		-									
				UN	IT – IV								
Building Io	Γ with Arduino : A	rduino	IDE, Pr	ogra	mming of A	rduino, Interfacing Ll	ED,						
switch,poten	tiometer, Sensors,	LCD, B	luetoot	h, W	ï-Fi, ,GPS,	RFID with Arduino							
				UN	IT –V								
Raspberry	Pi :												
Linux basics	s. Linux File system	n. Navig	ating th	ne Fi	le system. T	Fext Editors. Accessin	g Files. Pe	ermissions					
, Processes,	Linux Graphic use	r Interfa	ce, Ra	spbe	rry Pi Proce	ssor, Raspberry Pi Vs	Arduino,	Operating					
system bene	fits, Raspberry Pi S	Set up, C	Configu	ratio	n,			1 0					
Text Books	:												
1. ArsheepBahga, Vijay Madisetti, Internet of Things: A Hands-On Approach Paperback, 2015													
2. Rajku	ımar Bhuyya ,Inter	net of T	hings :	Princ	ciples and P	aradigms,2016.							
3. Adee	l Javed , Building A	Arduino	Project	s for	the Interne	t ofThings,Apress,201	6.						
4. Wolf	fram Donat, Learn	Raspber	ry-Pi w	ith P	ython, Apre	ess,2016							
Web Referen	ices:												
								63					

- 1. https://nptel.ac.in/courses/106105166/
- 2. https://onlinecourses.nptel.ac.in/noc17_cs22/course
- 3. https://nptel.ac.in/courses/108108098/4
- 4. https://onlinecourses.nptel.ac.in/noc19_ee28

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Exam:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub questions and the student should answer any one question from each unit. Each Question carries 12 marks

SCIENTIFIC PROGRAMMING WITH PYTHON (SPY)											
V Semester:	B.Tech						Schen	ne: 2020			
Course Code	Category	Hou	rs/We	ek	Credits						
OE305	OEC - I	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL			
		3	-	-	3	40	60	100			
Sessional E	xam Duratio	n: 1½	² Hrs			End Exam Duration:3 Hrs					
Course Outcomes. At the and of the course student will be able to											
Course Outcomes: At the end of the course student will be able to											
			$\frac{1}{1}$			$\frac{1}{1}$					
CO2: Apply	the concepts of with Input.	of Loo	ps, lists	s, Func	tions and Bra	anching.					
CO3: WOIK	with input, E	nor r	atical fi	upction	would be and mathe	matical calculati	ions				
CO5: Work	on Dictionari		d Strin								
				gs.	1 Due ensure						
COO: Apply	the concepts	01 00	oject O	rienteo	1 Programm	ing.					
				T	NIT_ I						
Getting Start	ed with Pvt	hon:	The F	First E	xample: He	llo. World!. E	Different Ways	to Use			
Formatting Tex	Python. Computing with Formulas: Programming Simple Mathematics, Variables and Variable Types, Formatting Text Output, Importing Modules, Pitfalls When Programming Mathematics. UNIT-II										
Loops and Lis Store Sequence Tuples.	Loops and Lists: Loops for Automating Repetitive Tasks, Boolean Expressions, Using Lists to Store Sequences of Data, Iterating Over a List with a for Loop, Nested Lists and List Slicing, Tuples										
Functions an Variables, Dep Functions as A Functions to V	Functions and Branching: Programming with Functions, Function Arguments and Local Variables, Default Arguments and Doc Strings, If-Tests for Branching the Program Flow, Functions as Arguments to Functions, Solving Equations with Python Functions, Writing Test Functions to Verify our Programs.										
				UN	III – III						
User Input an exec, Readin Modules.	User Input and Error Handling: Reading User Input Data, Flexible User Input with eval and exec, Reading Data from Files, Writing Data to Files, Handling Errors in Programs, Making Modules.										
				UN	IT–IV						
 Arrays and Plotting: NumPy and Array Computing, Plotting Curves with Matplotlib, Plotting Discontinuous and Piecewise-Defined Functions, Making a Movie of a Plot, More Useful Array Operations. Dictionaries and Strings: Dictionaries, Example: A Dictionary for Polynomials, Example: Reading File Data to a Dictionary String Manipulation 											
UNIT-V											
Classes: Basic Differentiation Object-Orient Numerical Diff	es of Classes, of Functions ted Program ferentiation, l	, Proto , Test ming Examp	ected (Funct Class ole: Cl	Class A ions fo s Hiera asses f	Attributes, S or Classes, E archies and for Numerica	Special Method example: A Poly Inheritance, Ex al Integration.	ls, Example: Au ynomial Class. ample: Classes	itomatic for			
								05			

Text Books :

1. Joakim Sundnes, Introduction to Scientific Programming with Python, Springer Open, 2020.

Reference Books :

1. Christian Hill, Learning Scientific Programming with Python, Cambridge University Press, 2 edition, 2020.

Web References:

1. https://www.tutorialspoint.com/scipy/index.htm

2. https://realpython.com/

3. https://www.w3schools.com/python/scipy/index.php

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.

	INTRO	DUT	ION '	TO D	ATABAS	E SYSTEMS (II	DBS)				
V Semester : B.	Tech					Scheme : 202					
Course Code	Category	Ηοι	ırs/V	Veek	Credits	Ma	ximum Ma	rks			
OE306	OEC - I	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL			
		3	-	-	3	40	60	100			
Sessional Exam	Duration1 ¹ / ₂	Irs				<u>]</u>	and Exam D	ouration: 3 Hrs			
Course Outcomes : At the end of the course the student will be able to											
CO1: Understand the concepts of Database Management Systems and Entity Relationship Modelling.											
CO2: Use SQL commands to create, retrieve, update, and delete data from the Data base.											
CO3: Comprehe	end the concept	s of N	lorma	alizatio	on techniq	ues					
CO4: Understan	d the properties	s of T	ransa	ctions	s in a Data	base System.					
CO5: Understan	d Concurrency	Cont	rol te	chniq	ues and Re	ecovery System.					
				ι	JNIT – I						
Introduction: In	ntroduction to I	OBMS	S, Pui	rpose	of Databas	e Systems, Datab	ase System	Applications,			
View of Data, D	ata Models, Da	tabas	e Use	ers, Da	atabase Ar	chitecture.					
Entity-Relation	ship Model: H	Basic Mode	Conc	cepts,	Cardinalit	y of Relationshi	p, ER Diag	ram Notations,			
Entity-Kelations	nip Diagranis, I	widde	iiig (Ising	EK Diagra	illis, Reduction of	all E-K Sch	enta to Tables			
				U	NIT – II						
Relational Que	Relational Query Languages: SQL, Data Definition Language Commands, Data Manipulation										
Language Comm	nands and Data	a Con	trol L	angua	age Comm	ands, Candidate	Key, Primar	ry key, Foreign			
key, Select Clau	se, Where Clau	ise, L	ogica	ıl Con	nectivity's	s - AND, OR, Ra	inge Search,	Pattern			
Matching, Order	r By, Group By	y, Set	Ope	ration	s - Union	, Intersect and M	inus, Aggre	gate Functions,			
				U	NIT – III						
Relational Data	hase Design• H	Featur	es of	Good	Relationa	l Database Desig	ns Decomp	osition			
Normalization, H	Functional Depe	enden	cy, T	ypes (of Normal	Forms - First No.	rmal Form, S	Second Normal			
Form, Third Nor	mal Form, Boy	ce Co	odd N	lorma	l Form (BC	CNF)	,				
				U	NIT – IV						
Transactions:	ACID propertie	es Ti	ansa	ction	States Im	plementation of	Atomicity a	and Durability			
Concurrent Exec	cutions.	, 11	unou	cuon	States, III	prementation of	r nonnen y e	ina Daraonny,			
Serializability :	Conflict Serial	izabil	ity, V	view S	erializabil	ity					
				U	NIT - V						
Concurrency C	ontrol: Lock-I	Based	Prot	ocols	– Locks, (Granting of Lock	s, The Two-	Phase Locking			
Protocol.				-		<i></i>					
Recovery System	m: Failure Cla	ssifica	ation,	Log-	Based Rec	overy, Shadow P	aging Techn	ique			
1 Detebase Sys	tam Concents	Abrok	om S	libor	ohotz Uor	TTY E Vorth and	Sudarahan	MaGrow			
1. Database System Concepts, Abraham Silberschatz, Henry F. Korth and S. Sudarshan, McGraw Hill, 7 th Edition, 2019.											
Reference Book	Reference Books:										
1. Principles of	Database and K	Knowl	edge	– Bas	e Systems	, J. D. Ullman, V	ol. 1, 2016.				
2. Fundamentals	s of Database S	ystem	<u>is. R.</u>	Elma	sri and S.	Navathe, 7th Edit	ion, 2017.				
3. Data Base Ma	anagement Syst	tems,	Ragh	u Rar	nakrishna	and Johnannes Ge	ehrke, McGr	aw Hill, 3rd			
Edition, 2014	4. • Pattorn•										
Question I aper	1 auci II.							67			

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks.
ETHICAL HACKING (EH)									
V Semester	: B.Tech						S	Scheme : 2020	
Course Code	Category	Н	ours/W	'eek	Credits	Max	ximum Ma	arks	
OE307	OEC - I	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL	
ContorolE		<u>3</u>	-	-	3	40	60 E		
Sessional E	tcomes • At the e	$\frac{72}{9}$ Hrs	e cour	se the st	udent will	be able to	Exam Du	Iration: 5 Hrs	
CO1: Unde	rstand the basics	of secu	ritv and	d ethical	hacking.				
CO2: Unde	erstand about foot	printin	g and t	ypes of	attacks in s	social engineerin	ng.		
CO3: Unde	rstand about snif	fers, hij	acking	and Do	S attacks.	6	0		
CO4: Unde	rstand the import	ance of	web se	erver ha	cking, data	base hacking an	nd SQL Inj	jection.	
CO5: Unde	rstand about Wir	eless te	chnolog	gies, int	rusion dete	ction and firewa	alls.		
				UNI	T – I				
Introductio	on to Ethical Ha	acking:	Introd	luction,	Security f	undamentals, S	ecurity tes	sting, Hackers	
and Cracker	s description, Ell	nical Ha	ackers.	Hacking	nrocass	Information Se	ourity Sys	stame and the	
Stack.	oundations of 1	lacking	. 1110	TIACKIIIE	g process,	information Se	curity Sys	stems and the	
				UNI	Г – П				
Foot printi	ing: Information	Gather	ing Me	ethodolo	by . OS F	Fingerprinting.	Fingerprin	ting Services.	
Enumeration, System Hacking.									
Social Engi	neering: Social I	Enginee	ering, N	/Ialware	threats, Vu	ulnerability anal	ysis.		
				UNII	$\Gamma - III$				
Sniffers: Pa	assive sniffing, A	ctive si	niffing,	ARP,A	RP poison	ing and MAC f	looding, to	ools for	
sniffing, wi	re shark, sniffing	and sport	oofing	counter	measures.	over Uijecking	Session L	lijooking	
Tools.	acking. ITanspo	it layer	Injack	ting, Ap		ayer mjacking,	36881011 1	iijackiiig	
Denial of S	ervice: DoS attac	ck techr	niques,	Distribu	ited DoS, I	DDoS tools.			
				UNII	C – IV				
Web Serve	r Hacking: HT	ΓP prot	ocol, s	canning	web serve	ers, Banner gra	bbing and	Enumeration,	
Web server,	, DoS/ DDoS and	DNS a	ttacks.						
Database H	lacking: Introdu	$\frac{1}{1}$	SQL a	and SQL	injection	and categories,	Finger pri	nting, UNION	
Exploitation	SOL injection tech	hean in	SQL 1	d proce	1 attacks, 0 dure SOL	Jut-of band ex	ploitation,	sol injection	
hacking too	ls.	Innque	, 51010	u proce		injection and in	iligations,	SQL Injection	
				UNI	Γ – V				
Wireless T	echnologies. Mo	bile Se	curity	: Mobil	e device of	peration and sec	curity. Wi	reless LAN's-	
Basics, Wir	eless LAN freque	encies a	nd sign	nalling,	Wireless L	AN security.	,		
IDS - Intrusion Detection and Prevention Systems. Firewalls and Honey pots.									
Text Books	Text Books:								
1. Micheal	Gregg,"Certified	Ethical	Hacke	r (CEH)) Cert Guid	le",Pearson edu	cation, 202	20.	
Reference 1	Books:								
1. EC-Co	uncil,"Ethical Ha	cking a	nd Cou	Intermea	asures(CEF	I)",CENGAGE	Learning,	2020.	
2. Sai Sati	ish,"Hacking Sec	rets Par	t-1",In	dian Sei	vers,2018.				
								69	

3. David Litchfield, Chris Anley"The Database Hackers Handbook: Defending Database Servers", Wiley.

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

	ENTR	EPR	ENE	URS	HIP DEVEL	OPMENT (EDP)				
V Semester:	B.Tech						Schem	e: 2020		
Course		I	Iour	s /	~ ! !					
Code	Category		Wee	k	Credits	Maximum	Marks			
OE308	OEC - I	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total		
		3	-	-	3	40	60	100		
Sessional Ex	am Duration : 1 ½	Hrs	1		En	d Exam Duration : 3 Hr	'S	L		
Course Out	comes: At the end of	f the	cour	se, st	udents will be	able to				
CO1:Analys	CO1: Analyse the role of entrepreneurship in economic development									
CO2:Unders	tand rural entreprene	eursl	nip ar	nd sm	all enterprise	S				
CO3:Examir	ne the project reports	S								
CO4:Unders	tand the ownership	struc	ture	of con	mpany and w	omen entrepreneurship in	India			
CO5:Unders	tand the support by	spec	ified	instit	utions for ent	repreneurship developmer	nt			
					UNIT – I					
Entreprenet	r: Concept of an e	entre	prene	eur;]	Definition of	an entrepreneur; Types	of entrepr	reneurs;		
Characteristi	cs of an entrepreneu	r.								
Entrepreneu	Introduction	on;	Elen	nents	of entrep	eneurship; Six importa	ant segm	ents of		
entrepreneurs	ship environment; A	Adva	intage	es of	entrepreneur	ship; Barriers to entrepre	eneurship;	Role of		
entrepreneurs	ship in economic de	veloj	omen	t.						
		•		1 5	UNIT - II			1 0		
Rural Entre	preneurship: Mean	ing;	Need	1; Re	trospection of	rural industrialization in	India; Prot	plems of		
rural entrepre	eneurship; Developn	nent	plan	for ru	iral entrepren	eurship.				
Small Enter	prises: Definition of	$\frac{153}{2}$	51; Ty	/pes,	Characteristi	cs of SSI; Role of SSI in	economic			
development	; Problems faced by	221	•							
Drainat Dlar	ning. Duciest Ident	fice	tion	Dreak	$\frac{\mathbf{UNII} - \mathbf{III}}{\mathbf{vat} \mathbf{Salaatian}}$	Duciant Danaut Contan	to Pr Form	wlation.		
Mothods of	Project Approject Ident	.111Ca M.	ulon;	Froj	bility Tooh	project Report – Conten	al Ecosibi	luiation;		
Fconomic Fe	asihility	- 101	arket	reas	sionity, Teen	incal reasionity, rinalici	al l'easion	inty and		
	asionity.				INIT – IV					
Ownershin 9	Structures: Sole Pro	nrie	torsh	in P	artnershin: Co	omnany: Co-operative: Se	lection of			
appropriate o	wnership structure.	pric	.0151	пр, 1	arthership, et	Sinpany, eo operative, se				
Women Ent	repreneurship in	Indi	a: In	trodu	ction: Policie	es and Schemes for Worr	nen Entrep	reneurs:		
Factors Influ	encing the Women	Ent	repre	neurs	ship; Types of	of Women Entrepreneurs	; Challeng	ges for		
Women Entr	epreneur.		1		1 / 11	1	·	, ,		
	-				UNIT – V					
Institutional	Finance: Commen	cial	bank	s; O	ther Financia	l Institutions – IFCI, IRI	BI, SFC, S	SIDC &		
EXIM Bank.										
Institutional	Support: Need; S	upp	ort to	Sm	all Entrepren	eurs – DICs, Industrial in	nfrastructu	re		
corporation,	and National institut	e fo	r MS	ME, I	Incubation Ce	enters (Government and pr	rivate).			
Text Books:										
Prof. Satish C. Ailawadi & Mrs. Romy Banerjee, "Principles of Entrepreneurship", Everest Publishing										
House.	House.									
S. S. Khanka	S. S. Khanka, "Entrepreneurial Development", S. Chand, New Delhi.									
Robert D. Hi	srich, Michael P. Pe	ters,	Dear	1 A. S	sheperd, "Ent	repreneurship", McGraw-	H1ll,6 ed.			
Reference B	ooks:				<u> </u>		.			
Poornima M	. Charantimath, "E	ntre	prene	urshi	p Developm	ent and Small Business	Enterprise	s", 2e,		
Pearson.										
								71		

Arya Kumar, "Entrepreneurship", 4 e, Pearson. Ram Chandran, "Entrepreneurial Development", Tata McGraw Hill, New Delhi

estion Paper Pattern:

ssional Exam :

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (Either or Type) in each section. The student shall answer one question from each section.

End Examination:

	INTRO	DUC	TION	TO IN	FORMATI	ON SYSTEMS (IIS)				
V Semester	B.Tech							Scheme : 2020			
Course Code	Category	Н	ours/V	Veek	Credits	Max	ximum Mai	rks			
OE309	OEC-I	L	Τ	Р	С	Continuous Internal Assessment	End Exam	TOTAL			
		3	-	-	3	40	60	100			
Sessional E	xam Duration 1 ¹ /2	Hrs		.1 .	1 / 111	E	nd Exam D	uration: 3 Hrs			
Course Out	tcomes : At the end	$\frac{1 \text{ of th}}{2}$	ne cour	se the st	udent will b	be able to	vistor Coff				
CO2: Unde	CO2: Understand the page replacement and CPU Scheduling Algorithms										
CO3: Understand the phases of software development life cycle and process models.											
CO4: Desig	n ER model for rea	l life	scenar	ios							
CO5: Appl	y SQL commands to	o crea	ate, up	date, mo	dify and ret	trieve data from th	e data bases	5.			
CO6: Apply	y normalization tecl	hniqu	es to n	ormaliz	e the databa	ise					
				U	NIT – I						
Fundament computer, C Memory, In System Sof	UNIT – 1 Fundamentals of Computers & Computer Architecture: Introduction, Organization of a small computer, Central Processing Unit, Execution cycle, Instruction categories, measure of CPU performance, Memory, Input/output devices, BUS, addressing modes										
System Software: Assemblers, Loaders and mikers, Compilers and interpreters.											
UNIT – II											
Software pro	t, CPU scheduling and a software Development of the softwa	on, N algor are en elopn	ithms. gineerinent m	y manag ing: Intro odels.	ement sche	Software enginee	ring, Life cy	ycle of a			
				UN	IIT – III						
Relational I models, Dat Entity Rela Merits and I	Database Manage tabase Users. htionship (E-R) M Demerits of E-R mo	ment odeli	Syste ng: In	m: Intro	oduction to on, Notatio	DBMS, the datab ns, Modeling E-F	ase technolo R Diagrams,	ogy, data Case Studies,			
				UN	IT – IV						
Structured Query Language (SQL): Introduction to SQL, Data types, Data Definition language commands, Data Manipulation Language Commands and Data control Language Commands, Candidate Key, Primary key, Foreign key, Select Clause, Where Clause, Logical Connectives – AND, OR, Range Search, Pattern Matching, Order By, Group By, Set Operations – Union, Intersect and Minus, Aggregate Functions, Join Operations											
				UN	NIT – V						
Normalization: Introduction, Need for Normalization, Process of Normalization, Types of Normal Forms (1NF, 2 NF, 3 NF & BCNF), Merits and Demerits of Normalization.											
Text Books:											
L	73										

- 2. Campus Connect Foundation Program Computer Hardware and System Software Concepts, Programming Fundamentals- Vol. 1, INFOSYS
- 3. Campus Connect Foundation Program Relational Database Management System, Client Server Concepts, Introduction to Web Technologies Vol. 4, INFOSYS
- 4. Henry F. Korth& Abraham Silberschatz, Data Base System Concepts, 5th Edition, 2005, Mc Graw hill

Reference Books:

- 1. M. Morris Mano [2011], [3 rd Edition], Computer system architecture, Pearson Education, 2011.
- 2. Sommerville [2008], [7th Edition], Software Engineering, Pearson education.
- 3. Raghu Ramakrishna and Johannes Gehrke [2003], [3rd Edition], Data Base Management Systems, TATA McGraw Hill
- 4. Tanenbaum [2000], Modern Operating System, Pearson Education

Web References:

- 1. https://www.w3schools.com/sql/
- 2. https://www.geeksforgeeks.org/dbms/
- 3. https://www.tutorialride.com/software-engineering/software-engineering-tutorial.htm

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

	NEURAL	NETW	ORKS	S AN	D FUZZY	LOGIC (NN	FL)				
V Semester: B	3.Tech						Schen	ne: 2020			
Course Code	Course Category	Ho	urs/W	eek	Credits	Max	kimum Marks	5			
OE310	OEC- I	L	T	P	С	Continuous Internal Assessment	End Exam	TOTAL			
C I.F.	D	3	0	U	3	40	60	100			
Sessional Exam	n Duration: 1	$\frac{1}{2}$ Hrs	41				Exam Dura	tion: 3 Hrs			
Course Outo	comes: At the	end of	the co	urse 1	the studen	t will be able t	0				
COI: understai	CO1: understand the basic concepts of Neural networks										
CO2: analyze Supervised Learning feedback networks											
CO3: analyze U	Unsupervised I	earnin	g feedt	back r	networks.						
CO4: understar	nd concepts of	fuzzy l	ogic ar	nd fuz	zy set theo	ory					
CO5: To apply	the knowledge	e of Ne	ural Ne	etwor	ks & fuzzy	logic to real tin	me systems.				
				UNI	T – I						
Biological neu Neural networf examples, Fear representation, unsupervised le Supervised Lea Single layer p propagation at learning, Conc the Networks Unsupervised I Competitive Lea algorithms, RB	Introduction to Neural Networks and its Basic Concepts Biological neurons and McCulloch and Pitts models of neuron, Types of activation functions, Neural networks architectures, Linearly separable and linearly non-separable systems and their examples, Features and advantages of neural networks over statistical techniques, Knowledge representation, learning process, error-correction learning, concepts of supervised, learning, and unsupervised learning UNIT – II Supervised Learning Neural Networks Single layer perceptron and multilayer perceptron neural networks, their architecture, Back propagation algorithm, generalized delta rule, learning factors, step learning, Momentum learning, Concept of training, testing and cross-validation data sets for design and validation of the Networks Competitive Learning Neural Networks Competitive Learning networks, kohenen self-organizing networks, K-means and LMS										
networks, Com networks.	parison of RB	F and N	/ILP ne	twork	ks Learning	g, Hebbian lear	ning, Hopfield				
F				UNII	. – 1V						
Fuzzy logic Basic Fuzzy logic theory, sets and their properties, Operations on fuzzy set, Fuzzy relation and operations on fuzzy relations and extension principle, Fuzzy membership functions and linguistic variables, Fuzzy rules and fuzzy reasoning, Fuzzification and defuzzification and their methods, Fuzzy inference systems											
UNIT – V											
Applications of Applications of recognition, Ima Applications of Simple applica	UNIT – V Applications of Neural Networks & Fuzzy systems Applications of Neural Networks: Pattern classification, Handwritten character recognition, Face recognition, Image compression and decompression Applications of Fuzzy Logic & Fuzzy System: Fuzzy pattern recognition, Fuzzy image processing, Simple applications of Fuzzy knowledge-based controllers like washing machines, traffic										
								75			

regulations, and lift control

Text Books :

- 1. Timothy J. Ross, Fuzzy Logic with Engineering Applications, John Wiley and sons, 3/e, 2010.
- 2. S. Haykin, Neural Networks, A Comprehensive Foundation, Pearson Education Inc.3/e, 2008.
- 3. Jacek. M. Zurada, -Introduction to Artificial Neural Systems, Jaico Publishing House, 2006.
- 4. LaureneFausett, Fundamentals of Neural Networks-Architectures, algorithms and applications, Pearson Education Inc., 2004.
- 5. J.S.R. Jang, C.T. Sun, E. Mizutani,, -Neuro Fuzzy and Soft Computing A computational Approach to Learning and Machine Intelligence, Pearson Education Inc., 2002.

6. Bart Kosko, Neural networks and Fuzzy Systems, Pearson Education

Reference Books :

1. T.Pradeep, Nano: The Essentials Understanding Nano Science and Nano Technology, Tata McGraw Hill, 2013.

2. Richard Booker and earl Boyson, Nanotechnology: The Fun and Easy Way to Explore the Science of Matters Smallest Particle, Wiley Publications, 2011.

Web References:

- 1. S. Rajsekaran and G. A. VijaylakshmiPai, Neural Networks, Fuzzy Logic, and Genetic Algorithms, PHI
- 2. N. Sivanandam, S. Sumathi, and S. N. Deepa, Introduction to Neural Network Using MATLAB11, Tata McGraw-Hill Publications
- 3. S.N.Sivanandam. M.Pau1Raj, Introduction to Artificail Neural Networks, Vikas Publication House Pvt.Ltd, NewDelhi

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

RENEWABLE ENERGY SOURCES (RES)									
VI Semester B.T	ech					-	Scher	ne: 2020	
Course Code	Category]	Hou We	irs/ ek	Credits	Maxim	um Mar	ks	
OE311	OEC - II	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL	
		3	-	-	3	40	60	100	
Sessional Exam I	Duration : 1 ½ H	Irs				End Exam	n Duratio	on : 3 Hrs	
Course Outcome	s: At the end of	the	e co	urse s	students v	will be able to			
CO1:Understand v	various sources of	f ei	nerg	y and	l solar ge	ometry.			
CO2:Describe the	process of harne	ssiı	ng s	olar e	energy in	the form of hea	ıt.		
CO3:Explore basic te	erms of wind and th	ne e	xtra	ction	of energy f	from wind.			
CO4:Understand t	he technologies	inv	volv	ed in	extraction	on of biomass	energy a	and	
geothermal Energy.						• 41 1	1		
emerging technolog	idal, Wave and (Jce	ean e	energ	y convers	sion methods an	id concep	ots of	
	5		U	NIT	-I				
of renewable ene Energy conservation Fundamentals of constant and solat average daily to Measurements of the Solar Thermal S solar passive space thermal power ger	Introduction and Energy Conservation: Classification of energy sources-Importance of renewable energy sources and energy chain-Principles of energy conservation – Energy conservation opportunities. World energy status & Energy Scenario in India. Fundamentals of Solar Energy: Extra-terrestrial and terrestrial radiation- Solar constant and solar radiation geometry- time and day length-Estimation of monthly average daily total radiation on horizontal surface and tilted Solar surface- Measurements of radiation data. Basic principle & classification of PV cell UNIT – II Solar Thermal Systems: Solar collectors & its classification - Solar water heating- solar passive space heating and cooling systems-Solar refrigeration system – Solar thermal power generation-Solar Distillation-solar drier-solar pond.								
Wind Energy: O estimation of wir turbine- horizontal	origin of wind-na nd – power ext laxis wind turbi	atu rac ne	re c tion & v	of wi from ertica	nds-Appl m wind-l al axis wi	ications of win Betz limit-Com nd turbine -Typ	d power ponents bes of bla	-energy of wind des	
Biomass Energy: Photosynthesis process- Biomass conversion technologies- Biogas production - Types of digester- Factors affecting the digester performance – Biomass liquefaction – Biomass to ethanol production. Geothermal Energy: Types of geothermal energy resources-Energy conversion through geothermal energy resources-Environmental consideration UNIT – V Ocean Thermal Energy Conversion: Principle of OTEC- Anderson and Claude									
cycles, Tidal and Wave energy conversion methods Emerging Technologies: Principle of magneto hydro dynamics, Fuel cell,									
								11	

Hydrogen energy

Text Books:

1. B.H. Khan, Non-conventional Energy Sources, 3rd edition TMH Publishers, New Delhi

2. G.D Rai, Non-conventional Energy Sources, Khanna Publishers, New Delhi

Reference Books:

1. Suhas P.Sukhatme., Solar energy: Principles of thermal collection and storage, Tata McGraw Hill publishing Co. Ltd

2. S. Rao and Paulekar, Energy Technology, Khanna Publishers, New Delhi

3. H. P. Garg, J. Prakash, Solar energy fundamentals and applications, Tata McGraw Hill publishing Co. Ltd

Question Paper Pattern:

Sessional Exam: The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (Either or Type) in each section. The student shall answer one question from each section.

INDUSTRIAL SAFETY (IS)

VI Semester	B.Tech						S	cheme : 2020			
Course Code	Category	Hou	rs /We	ek	Credits	Maximun	n Marks				
OE312	OEC - II	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total			
		3	-	-	3	40	60	100			
Sessional Exam	Duration : $1\frac{1}{2}$	2 Hrs				End E	xam Durat	ion: 3 Hrs			
	1	6 .1				1.1					
Course Outcon	nes: At the end	of the \cdot	course	e, studei	nts will be		<u> </u>				
col: To understand the principles of safety management including safety audit, safety education and accident investigation											
CO2:To unders	CO2:To understand the causes and implication of fire and explosion and the preventive measures										
CO3:To under	stand machine	and co	onstruc	ction sa	fety asses	ssment and safeguardi	ng method	S			
CO4:To unders	stand the effect	t of to	xic su	bstance	s and haz	ardous chemicals					
CO5: To underst technology indu	stand the mode ustries	es of e	lectric	al hazar	ds and sa	fety measures in elect	trical and i	nformation			
				U	NIT –I						
Safety in Eng industry, Four Flixborough, R Accident Inve	Safety in Engineering Industry- Safety need, General hazards and control measures in engineering industry, Four significant industrial disasters happened in the world (Bhopal, Chernobyl, Flixborough, Rana plaza),Safety audit- procedure Accident Investigation- Learning from accident, Layered investigations, Investigation process and										
Summary				U	NIT –II						
Fire Safety: 7 characteristics analysis, Preve systems, Explo	The fire triang of liquids and ntion of fire, sion proof equi	gle, Ex vapou Steps pment	xplosio irs, Fi after o and in	ons, Di re prote occurren ostrume	stinction ection tec nce of fir nts	between fire and ex hniques, Fire extingu- re, Fire detection, Fire	plosions, l ishers, Fire e alarmand	Flammability hazard and firefighting			
				UN	III– TII						
Machine Safet equipment, Gua Construction S waterworks, De	ty: Machine gu ards, Safeguard Safety: Scope, emolition work	uarding ling de Safety s.	g, Mac vices, / in -U	chine g Other p Jndergr	uarding a potential s ound wor	ssessment, Safeguardi afeguards ks, Above ground wo	ng machin orks, Unde	es and er			
				UN	NIT –IV						
Chemical Safe with toxins, S Chemical wass Chemicals and	ety: Hazardous toring hazardo te managemen worker health	chemi ous ch at, Ha	cals, l emical zardou	Definiti s, Proc s chen	on of a h cess hazan nical eme	nazardous chemical, T rds, Transportation of ergency procedures,	Foxic effec f hazardou Worker co	ts, Working s chemicals, ontamination,			
				U	VIT – V						
Electrical Safety: Electrical dangers, Electrical pathways, Static electricity, Result of electrical contact, Shockversus electrocution, Electrical burns, Handling electrical hazards, Controlling electrical hazards, Training, Safety and Health program IT Industry Safety: Hazardous in IT industry, General precautions, Employer's responsibility, Employees responsibilities, Office ergonomics, Computer workstation – health & safety tips, Laptop safety precautions											
Text Books1. L. M. Deshr2. D. A. CrowlHall, 2011.3.Reese, Charle4. M. P. Poonia,	nukh. Industria and J. F. Lou S. D. Industria S. C. Sharma. In	al Safe var, C l Safet dustrial	ty and hemic y and Safety	Manag al Proc Health and Ma	gement. N ess Safety for Peopl intenance N	IcGraw Hill Education (Fundamentals with le-oriented Services. C Management. Khanna Bo	n (India) Application CRC Press, pok Publishi	ns), Prentice 2008. ng, 2019.			

Reference Books:

- 1. Reese, Charles D. Industrial Safety and Health for Infrastructure Services. CRC Press, 2009.
- 2. R. K. Jain, Sunil S. Rao, Industrial Safety and Health and Environment Management Systems, Khanna Book Publishing, 2000.
- **3.** K. U. Mistry. Fundamentals of Industrial safety and Health, Siddharth Prakashan Publisher,2008. **Question Paper Pattern:**

Sessional Exam : The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (Either or Type) in each section. The student shall answer one question from each section.

WEB TECHNOLOGIES (WT)											
VI Semester : 1	B.Tech						Sch	eme : 2020			
Course Code	Category	Но	urs/W	eek	Credits	Maxi	imum Mar	ks			
OE313	OEC - II	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL			
		3	-	-	3	40	60	100			
Sessional Exan	n Duration : 1 ¹ /	2 Hrs				End E	xam Dura	tion: 3 Hrs			
Course Outcon	Course Outcomes : At the end of the course the student will be able to										
CO1: Design a web Page using Text Formatting Tags, Hyperlinks											
CO3: Develop	vnamic web page	mage	$\frac{5, 1a0}{10}$	aScript	permis, L	1818, CSS.					
CO4: Design a	Form using HT	ML Fo	$\frac{15}{\text{rms }\&}$	Contr	ols						
CO5: Understa	nd the basic con	cepts of	of PHP	and d	atabase co	nnection using 2	XAMPP Se	erver.			
		1		UNIT	' – I	<u> </u>					
HTML5: Over	view of HTM	L5 an	d oth	er we	b technol	ogies. HTML5	and its	essentials.			
Fundamentals of and URLs.	of HTML5,Work	king w	ith Tex	kt and	organizing	Text in HTML	, Working	with Links			
				UNIT	– II						
Images: Worki	ng with Images,	Image	Maps	, Creat	ting Tables	s, Frames					
CSS: Overview	of CSS, Back	ground	s and	Color	Gradients	in CSS, Fonts	and Text S	Styles, List			
Styles, Table La	ayouts,										
UNIT – III											
JavaScript: Ov	verview of java s	script,	Functi	ions, E	vents, Jav	a script Objects	, Working	with			
Browser Object Handling in Jav	s, Document Ol aScript.	bject, I	Docum	nent Ol	bject Mode	el, Validation, E	Errors, Exce	eption			
			I	UNIT ·	– IV						
Forms: What's	s a Form? What	Contr	ols ar	e avail	able? Crea	ting a Form an	d adding H	TML			
Controls, Subm	itting Data from	n form	s, Cust	tomiziı	ng Control	s in CSS, Form	validation	using Java			
Script, Interacti	ve Elements.										
				UNIT	- V						
Introduction to	PHP: Installin	g and	Config	guring	PHP: Buil	lding PHP with	Apache on	Windows,			
The Basics of I	PHP scripts. Th	e Buil	ding b	olocks	of PHP: V	ariables, Data	Types, Ope	erators and			
Combining HT	MI and PHP co.	lg FUI de on s	ills, A single	Dage		Server configur	ation	Tays,			
Text Books:			t singh	e i ago,	, 71711111	Server configur	ation.				
1. HTML5 Bla	ck Book, 2nd Ed	lition,	Dream	ntech P	Press, 2016	•					
2. Deitel and D Hall, 5th Ed	eitel and Nieto, lition, 2011.	—Inte	rnet ar	nd Woi	rld Wide V	Veb - How to Pr	ograml, Pro	entice			
3. Julie C. Melo	oni, PHP MySQ	L and	Apach	e, SAN	MS Teach	yourself, Pearso	n Educatio	n (2007).			
Reference Boo	ks:		1	,				· /			
1. Web Technologies, Uttam K. Roy, Oxford Higher Education., 1st edition, 10th impression, 2015.											
2. Robert Pattinson, Beginners Guide for HTML and CSS Web Design and Web Development,2018											
3. Jeffrey C and Jackson, —Web Technologies A Computer Science PerspectivePearsonEducation, 2011.											
4. Gopalan N.P	. and Akilandes	wari J.	, —W	eb Tec	hnology, I	Prentice Hall of	India, 2011				
.								81			

Web References:

1. https://www.tutorialspoint.com/Html/index.htm

2. https://www.w3.org/Style/CSS/

3. https://www.w3schools.com/php/

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

	INT	ROD	UCTIO	N TO	CYBER SE	CURITY (ICS)			
VI Semester :	B.Tech						Sche	eme : 2020	
Course Code	Category	Η	ours/We	eek	Credits	Maxim	um Mark	S	
OE314	OEC- II	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL	
		3	-	-	3	40	60	100	
Sessional Exa	m Duration 1½ Hrs	S				End Ex	am Durat	ion: 3 Hrs	
Course Outco	mes :At the end of	the co	urse the	studen	t will be abl	e to			
CO1: Discrim	inate and analyze th	e prob	lems in	cyberc	erime.				
CO2: Identify	ing different classes	s of att	acks.		hile devices	~			
CO3: Synthes	apply modern cybe	es on v	vireless a	$\frac{1}{1}$	oblie devices	5.			
CO5: Analyze	the computer foren	sic pro	blems f	or a fe	asible soluti	ons			
COS. Anaryze	the computer foren	isic pro				0115.			
					-1				
Cybercrime a Cybercrime: Indian ITA 20 Netizens.	to Cybercrime: and Information So The Legal Perspe 000, A Global Per	ecurity ctives specti	, Who , Cyber ve on C	are C crimes	cybercrime: De Cybercrimin s: An India rimes, Cybe	als? Classificatio an Perspective, C ercrime Era: Surv	gins of t ns of Cyl Cybercrim rival Man	be word, bercrimes, e and the tra for the	
UNIT – II									
Cyber offens Engineering, Vector Cloud	es: How Criminals Cyber stalking, Cy Computing.	s Plan ber ca	Them– fé and C	Introd Cyberc	luction, Hov rimes, Botn	w Criminals Plan ets: The Fuel for	the Attac Cybercrin	ks, Social ne, Attack	
			U	J NIT –	- III				
Cyber crime Devices, Trer Challenges Po Security, Atta Organizationa Mobile Comp	Mobile and Wir ads in Mobility, Crosed by Mobile De acks on Mobile/Cel al Measures for Habuting Era, Laptops	reless redit C evices, Il Phor andlin	Devices Card Fra Registr nes. Mo g Mobil	s: Intro uds in y Sett bile D le, Org	oduction, P n Mobile an ings for Mo evices: Sec ganizationa	roliferation of M ad Wireless Comp obile Devices, Au curity Implications l Security Policie	obile and outing Era thentications for Orga es and Me	Wireless , Security on Service unizations, easures in	
			U	J NIT -	- IV				
Tools and M Password Cra Steganography Networks, Phi	ethods Used in Cy acking, Keyloggers 7, DoS and DDoS shing.	bercr and Attack	ime : Int Spyware s, SQL	troduc es, Vi Injecti	tion, Proxy rus and Wo ion, Buffer	Servers and Anor orms, Trojan Hor Overflow, Attacks	nymizers, ses and B s on Wire	Phishing, ackdoors, less	
			J	UNIT -	– V				
Cyber Security Web threats Security Risk Organizations	ity: Organizationa for Organizations s and Perils for C s.	al Imp , Secu Organiz	lication rity and zations,	s: Intr d Priv Socia	roduction, C vacy Implic l Computin	Cost of Cyber crin cations. Social m ag and the associa	nes and IP nedia m ated chall	R issues, arketing: enges for	
Text Books:									
1. Cyber Secu Godbole, S	rity: Understanding Sunit Belapure, Wi	Cyber ley.	r Crimes	s, Com	puter Forens	sics and Legal Pers	spectives,	Nina	
2. Principles Learning.	of Information Sec	urity, I	Micheal	E.Wh	nitman and I	HerbertJ. Mattord	, Cengage		
								83	

Reference Books:

1. Information Security, Mark Rhodes, Ousley, MGH.

2. CyberSecurityEssentials,JamesGraham,RichardHowardandRyanOtson,CRCPress.

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

			NAN	O TE	CHNOLO	GY (NNT)		NANO TECHNOLOGY (NNT)									
VI - Seme	ster: B.Tech					× /	Sch	eme: 2020									
Course	Course	Hou	rs/W	eek	Credits	Maxim	ım Marks										
Code	Category																
						Continuous											
0.5215		L	Т	Р	С	Internal	End	TOTAL									
OE315	OEC-II					Assessment	Exam										
		3	-	-	3	40	60	100									
Sessional I	Exam Duration	: 1 ¹ / ₂	Hrs			End	Exam Dur	ration: 3 Hrs									
Course Ou	itcomes: At the	end o	of the o	course	e the studen	t will be able to											
CO1: Understand the principles behind nanotechnology and nanomaterials																	
CO2: Analyze the fabrication, characterization, and manipulation of nanomaterials,																	
CO3: Un	derstand about 1	netal	nano p	article	e based sens	ors	,										
CO4: An	alyze about nan	o wire	based	l senso	ors.												
CO5: Ur	derstand Sensor	s Bas	ed on]	Nanos	tructures of	Metal Oxides											
	UNIT – I																
Introducti	on to Nanotech	nology	v:														
Definition	of nanotechnolo	ogy; n	nain fe	atures	of nanoma	terials; types of nano	structures (0D, 1D, and									
2D struct	tures); nanocoi	nposi	tes; a	and r	nainchemica	al/physical/electrical/	optical pr	operties of									
nanomaterials. Methods for characterizing the nanomaterials: Atomic Force Microscopy (AFM),																	
Scanning Electron Microscopy (SEM). Transmission Electron Microscopy (TEM), and																	
Spectrosco	ppy.	1.		//		17	× //										
UNIT – II																	
Introducti	on to Sensors' S	cienc	e and	Techn	ology:												
Definition	of sensors; m	ain e	lemen	ts of	sensors; th	e parameters used	for charac	terizing the									
performan	ce of sensors: ac	curac	y, pre	cision	, sensitivity,	detection limit, dyna	amic range,	selectivity,									
linearity, r	esolution, respon	nse tir	ne, hy	steresi	is, and life c	ycle.	-	-									
					UNIT –	III											
Metal nan	o particle-based	Sens	ors:														
Definition	of nano particle	; featu	res of	nano	particles; an	d production of nano	particles by	y physical									
approach (laser ablation) a	nd che	emical	appro	aches (Brus	t method, seed-media	ated growth	i, etc.).									
Quantum I	Dot Sensors. Det	finitio	n of qu	lantur	n dot; fabric	ation techniques of q	uantum dot	s;									
Nanowira	hasod Sansars.																
Definition	of nanowires:	foatur	es of	nanov	vires. fabric	ation of individual	nanowire h	w ton-down									
approache	of fianownes,	appr	os of	nanov	fabrication	of papowire arrays	(fluidic cha	nnel blown									
bubble file	n contact print	ing s	prav c	oating	tablication	on Nanotubes-based	Sensore T	Definition of									
bubble min, contact printing, spray coating, etc.). Carbon Nanotubes-based Sensors. Demittion of																	
carbon nanotube, reatures of carbon nanotubes, synthesis of carbon nanotubes.																	
UNIT - V																	
Sensors B	ased on Nanosti	uctur	res of l	Metal	Oxide:												
Synthesis of metal oxide structures by dry and wet methods; types of metal oxide gas sensors (0D,																	
1D, and 2	D); defect chem	nistry	of the	meta	l oxide sen	sors; sensing mechar	nism of me	tal-oxide gas									
sensors; ar	nd porous metal-	oxide	struct	ures fo	or improved	sensing applications											
Text Boo	oks :																

1. Varghese Thomas and Balakrishna K M, Nanotechnology: An Introduction to Synthesis, Properties and Applications of Nanomaterials, Atlantic Publishers and Distributers(P) Ltd, 2012.

2. G.Mohan Kumar, Nanotechnology: Nanomaterials and Nano devices, Narosa Publications, 2016.

Reference Books :

1. T.Pradeep, Nano: The Essentials Understanding Nano Science and Nano Technology, Tata McGraw

Hill, 2013.

Richard Booker and earl Boyson, Nanotechnology: The Fun and Easy Way to Explore the Science of Matters Smallest Particle, Wiley Publications, 2011.

Web References:

1.https://nptel.ac.in/courses/118102003

2. online courses.nptel.ac.in/noc19_mm21/preview

3. online courses nptel.ac.in/noc22_ch11/preview

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

	DISASTER MANAGEMENT (DM)										
VI Semester :B.T	ech.						Sche	me: 2020			
Course Code	Category	Hou	urs/W	/eek	Credits	Maxi	imum Mark	S			
OE316	OEC-II	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total			
		3	-	-	3	40	60	100			
Sessional Exam D	ouration:1.5H	rs				End E	xam Durati	on: 3 Hrs			
Course Outcomes	Course Outcomes : At the end of the course the student will be able to										
Coll: Understand	Course Outcomes : At the end of the course the student will be able to										
CO2: Understand	the types and c	ategor	ies of	disaste	ers.	saster managen	iont.				
CO3: Understand	the impact of d	lisaster	s on s	socio-e	conomic a	nd environment					
CO4: Plan for disa	aster risk reduc	ction, n	nitiga	tion an	d manager	nent strategies.					
CO5: Understand	the relationshi	p betw	veen d	evelop	ment and o	lisasters.					
			1	UNIT -	– I						
Introduction: Con	cepts and defi	nitions	s: disa	ister, h	azard, vul	nerability, risks	, severity, f	requency			
and details, capacit	and details, capacity, impact, prevention, mitigation.										
Disastors: Disaste	re classificatio	n			• 11						
Natural Disasters:	Floods, draug	n ht. cvo	clones	s. volca	anoes, eart	hauakes, tsunar	ni. landslide	es, coastal			
erosion, soil erosio	on, forest fires	etc.,		,	unoes, eure	inqualities, usualia	, iunasiiae	is, coustai			
Manmade Disaste	rs: Industrial p	ollutic	n - A	Artificia	al flooding	in urban areas	–Nuclear ra	diation –			
Chemical spills – 7	Fransportation	accide	nts – '	Terrori	st strikes,	etc. – Mountain	and coastal	areas.			
			U	J NIT –	III						
Disaster Impacts:	Disaster im	pacts	–Env	ironme	ental, phys	sical, social, e	cological, e	conomic,			
political, etc., Heal	lth - psycho-so	cial iss	sues –	Demo	graphic as	pects-Hazard lo	ocations – G	lobal and			
national disaster tr	ends – Climate	e chang	ge and	urban	disasters.						
			U	J NIT –	· IV						
Disaster Risk Redi	uction:					an manager	a unlinf and	1			
– Risk analysis, vi	lnerability and	canac	s: Pre	essme	n, mugau nt – Farly	on, preparednes warning system	ss, renei and	recovery			
Post-Disaster Env	vironmental R	espace	<i>se</i> (i.e.	water	\therefore sanitatio	n. food safety	. waste mai	nagement.			
disease control.	security. and	comn	nunica	ations)	Role a	nd responsibili	ities of go	vernment.			
community. local	institutions. N	GOs ai	nd oth	ner stak	xeholders -	- Policies and b	egislation fo	or disaster			
risk reduction – Ac	ctivities of Nati	ional D	lisaste	er Man	agement A	uthority.	- 8				
			154510		- V						
Disasters, Environ	nment and D	evelop	ment:	Factor	s affecting	g vulnerability	such as in	npact of			
developmental projects and environmental modifications – Sustainable and environmental friendly											
recovery – Reconst	recovery – Reconstruction and development methods.										
Text Books:											
1. PradeepSahni, I	Disaster Risk R	Reducti	on in	South	Asia, PHI,	New Delhi.					
2. Ghosh G.K., Di	2. Ghosh G.K., Disaster Management, APH Publishing Corporatio										
3. Singh B.K., Ha	ndbook of Disa	ister M	lanag	ement	Technique.	s &Guidelines,	Rajat Public	ation.			

4. V. K. Sharma, *Disaster Management*, National Centre for Disaster Management, IIPE, Delhi, **Reference Books:**

1. A Status Report Publication of the Govt. of India, Ministry of Home Affairs, National Disaster Management Division, *Disaster Management in India*.

2. A. S. Arya, AnupKaranth, and Ankush Agarwal, *Hazards, Disasters and Your Community; A Primer for Parliamentarians*, GOI–UNDP Disaster Risk Management Programme.

3. Inter Agency Standing Committee (IASC) (Feb. 2007). IASC Guidelines on Mental Health and Psychosocial Support in Emergency Settings. Geneva: IASC.

Web References:

http://ndma.gov.in/ (Home page of National Disaster Management Authority)

2. http://www.ndmindia.nic.in/ (National Disaster management in India, Ministry of Home Affairs).

3. <u>www.odihpn.org</u>, *Disaster Preparedness Programme in India. A Cost Benefit Analysis*, Commissioned and Published by the Humanitarian Practice Network 'at ODI HPN.

4. www.empowerpoor.org, *Drought in India: Challenges and Initiatives; Poorest Areas in Civil Society (PACS) Programme.* [2001–2008]

Question Paper Pattern:

Sessional Exam :

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (Either or Type) in each section. The student shall answer one question from each section.

End Examination:

	PROJECT MANAGEMENT (PM)									
VI Semester :B.	Tech.						Sche	me: 2020		
Course Code	Category	Ηοι	urs/W	/eek	Credits	Maxi	mum Mark	s		
OE317	OEC - II	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total		
		2	1	-	3	40	60	100		
Sessional Exam	Duration:1.5 H	rs				End E	xam Durati	on: 3 Hrs		
Course Outcomes :At the end of the course the student will be able to CO1: Understand the methods of planning, scheduling and principles of construction management. CO2: Formulate, solve CPM and PERT networks. CO3: Understand the structure of organization and resource allocation. CO4: Understand the procedure for documentation of tenders, contracts & time-cost analysis. CO5: Understand basics of engineering economics and solving of cash flow problems. CO6: Understand the concepts of quality control and safety management. UNIT – I Introduction to Construction Management: Significance – Objectives and functions of construction management – Types – Resources – Stages – Team of construction unit. Construction Planning and Scheduling: Objectives and importance of planning and Scheduling – Mathede of planning and Scheduling: Objectives and importance of planning and Scheduling –										
Milestone charts. Network Techniq Breakdown struct Network. Critical Path Me	<i>ques in Constru</i> tures – Represent tures – Represent thod (CPM): In	<i>ction n</i> ntation	nanag and a	UNIT gemen specify – Diffe	- II t: Element ving of active erence betw	s of network – i ivities and even ween CPM and	Network tec ts – Rules f PERT – Tir	hniques – For ne		
estimates – Float	– Critical patri –	- INCLW					18.			
Program Evalua path – Network a	<i>tion and Review</i> nalysis and com	v <i>Tech</i> putatic	nique on pro	e (PER blems.	- 111 (<i>T</i>): Introd	uction, time est	imates, slac	k, critical		
<i>Cost–Time Analy</i> planning – Updat	vsis in Net Work ing – Resources	k Plan alloca	<i>ning:</i> ition.	Impor	tance of tir	ne – Project co	st analysis i	n network		
			U	J NIT -	- IV					
Tenders and Co Contracts definiti	<i>ntracts:</i> Type of on – Essentials -	of tend – Type	lers – s – D	- Princ ocume	iples of te ents – Conc	endering – Not litions of contra	ice inviting cts.	tender –		
<i>Arbitration:</i> Definition – Arbitrator – Arbitration agreement – Qualification of arbitrator – Advantages of arbitration.										
<i>Organisation:</i> Principles of organization – Types of organization – Measurement book.										
UNIT - V										
<i>Engineering Eco</i> present worth fac	nomics: Basic 1 tor – Uniform se	Princip eries pi	oles – resent	Equiv worth	alence – C factor.	ash Flow diagr	am – Single	Payment		

Safety, Inspection and Quality Control: Importance of safety – Safety Measures – Personal Protection Equipment – Need for inspection at work – Principles of inspection – Importance of quality – Elements of quality – Organisation for quality control.

Text Books:

1. B.C. Punmia& K.K. Kandelwal, *Project Planning & Control with PERT & CPM*, Laxmi Publications (P) Ltd, New Delhi.

2. J.L. Sharma, Construction Management and Accounts, SatyaPrakasan (P), NewDelhi.

3.

Reference Books:

1. U.K. Shrivastava, Construction planning and Management, Galgotia (P), New Delhi.

2. S. Seetha Raman, Construction Engineering and Management, Umesh (P), New Delhi.

3. Chitkara, *Construction project management – Planning, Scheduling and Control*, Tata McGraw Hill.

4. Halpin, D.W, *Financial and Cost Concepts for Construction Management*, JohnWiley and Sons, New York.

Question Paper Pattern:

Sessional Exam: The question paper for sessional examination is for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of Three Sections with Two Questions (EITHER / OR type) in each section. The student shall answer one question from each section.

End Exam: The question paper for end examination is for 60 marks. It shall consist of Five Units, each containing Two Questions (EITHER / OR type) from each unit of the syllabus, with a weight age of 12 marks. Each of these questions may contain sub-questions. The student shall answer one question from each unit.

ADVANCED INFORMATION SYSTEMS (AIS)											
VI Semeste	er: B.Tech						Scl	heme : 2020			
Course Code	Category	H	ours/V	Veek	Credits	Maxi	mum Mark	S			
OE318	OEC-II	L	Т	Р	C Continuous Internal Assessment End Exam TO						
Sectional	nom Duration 11/	3	-	-	3	40	<u>60</u>	100			
Course Out	tcomes • At the end	Hrs l of th	ne cour	se the st	udent will k	e able to	Exam Dura	ation: 5 Hrs			
CO1: Demonstrate the Object oriented concepts.											
CO2: Interpret different types of Inheritance and Polymorphism.											
CO3: Class	CO3: Classify layer functionalities of OSI reference model and TCP Protocol suite.										
CO4: Sum	marize the concepts	s of ir	ternet	working	, security ar	nd IP addressing.					
CO5: Demo	onstrate different ty	pes o	f proto	cols and	web conte	nts used in web de	esign				
				UN	IT – I						
Introductio Object Orien Characteris Access Spec Advanced Specifier, M Polymorphis Introductio Protocol Sui	Introduction to Object Oriented Concepts: Introduction, Programming Techniques, Introduction to Object Oriented Concepts, Concept of Structured Procedural Programming, Class, Object Characteristics of Objects: Data Abstraction, Classification, Encapsulation and Message Passing. Access Specifiers in Class, UML Class Diagrams. UNIT – II Advanced Concepts in Object Oriented Technology: Relationships, Inheritance- Protected Access Specifier, Multiple and Multilevel Inheritance, Generalization and Specialization, Abstract classes, Polymorphism, Implementation of OOC through C++. UNIT – III Introduction to computer Networks: Introduction, Network Topology, OSI Reference Model, TCP Protocol Suite, Routing Devices, Types of Networks.										
Switched Ne	rking: Protocols fo etworks, Virtual Pr	ivate	Netwo	orking, I orks, and	Working o	f Internet.	s, Packets, I	Packet			
				UNI	T - V						
Introduction to Web Technology: Introduction, Hyper Text Transfer Protocol (HTTP), File Transfer Protocol (FTP), Domain Name Server (DNS), Web Applications, Types of Web Content, Multi-Tier Web Applications, Performance of Web Applications.											
Text Books:											
1. Campus 2. Campus INFOSY	Connect Foundatio Connect Foundatio /S Concepts	n Pro on Pro	gramm ogramr	ne – Obj ne – Co	ect Oriented mputer Ha	d Concepts – Syst rdware and Syster	em m Software	- Vol. – 3,			
3. Campus Server	Connect Foundati	on F	rogran	nme –	Relational	Database Manag	ement Syst	em, Client			

- 4. E.Balaguruswamy, Object Oriented programming with C++, 2017
- 5. Data Communications & Networking, Forouzan, Tata McGrawHill, Fifth edition, 2017

Web References:

- 1. https://www.tutorialspoint.com/cplusplus/
- 2. https://www.geeksforgeeks.org/computer-network-tutorials/

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

PRODUCT LIFE CYCLE MANAGEMENT (PLM)								
VI Semester	: B.Tech						Scheme : 2020	
Course Code	Category	Hours/V	Veek		Credits	Ma	ximum Marks	
OE319	OEC - II	L	Т	Р	С	Continuous Internal End Exam Assessment		TOTAL
		3	-	-	3	40	60	100
Sessional Exa	am Duration:	1 ¹ / ₂ Hrs	.1	. 1		End Exam Du	uration: 3 Hrs	
Course Outco	omes: At the en	$\frac{1}{1}$ nd of the c	ourse the	e stude	ent will be able	e to		
CO1: Unders	tand Product III	te cycle m	anageme	ent pro	cess.			
CO2: Unders	wledge on Pro	duct data	manager	pent	ient process.			
CO4: Unders	tand the impler	nentation	of PLM	and its	impact on the	organization		
CO5: Unders	tand core funct	ions of PL	M and s		chain and ERF	systems		
		10115 01 1 2		"PP-J	UNIT – I	5,5001115		
Organization	Business Mode	ls (MTS,	MTO, C	TO, E	TO Etc), Basic	cs of Enterprise Syste	ems	
(PLM, ERP,	MES), Backgr	round, Ov	verview,	Need,	Benefits, and	d Concept of Produ	ct Life Cycle, C	Components /
Elements of P	LM, Emergenc	e of PLM	, Signifi	cance	of PLM, Diffe	rences between PLM	and PDM	
					UNIT – II			
Integrated Pro	duct developm	ent proces	ss-Conce	ive-Sp	pecification, C	oncept design, Desig	n-	
Detailed desig	gn, Validation	and analys	sis (Sim	ilation), Tool design	n, Realize-Plan manu	afacturing, Manuf	facture,
Build/Assemb	ole, Test(quality	y check).						
	UNIT – III							
Workflow Processes, Design Collaboration, Processes Management, Document Management, Visualization, Bill of								
Materials (BC	OM) Manageme	ent – Lab	exercises	•				
					UNIT – IV			
Engineering C	Change Control	, Configu	ation Ma	anager	nent, Manufac	turing Process Mana	gement, Variant	Management,
Classification	Classification PLM Architecture, Various PLM tools, Data Modeling, Security management.							
UNIT – V								
CAD Integrat	ions, Informati	on authori	ng tools	(e.g.,]	MCAD, ECAI	D, Technical publish	ing), Core functio	ons (e.g., data
vaults), Data	vaults), Data Flow to Other systems such as Supply chain and ERP systems. (4 hours for lab exercises)							
Text Books	Text Books							
1. Grieves, M	ichael, Product	Lifecycle	Manage	ment,	McGraw-Hill	publishers.		
2. Antti Saaks	2. Antti Saaksvuori, Anselmi Immonen, Product Life Cycle Management – Springer publications							
Reference E	Books							
1.Kari Ulrich	and Steven D.	Eppinger,	Product	Desig	n & Developm	nent, McGraw Hill Ir	ternational	
2.Burden, Roo	dger PDM: Pro	duct Data	Manage	ment, l	Resource Publ	ications.		
Question Pap	er Pattern:		-					
Sessional E	xam:							
The questio	n paper for s	essional	examin	ation	shall be for	25 marks, coveri	ing half of the	syllabus for
first session	first sessional and remaining half for second sessional exam. The question paper shall consist of three							
sections wit	h Two Quest	tions (Eit	ther or	Type)	in each sec	tion. The student	shall answer o	ne question
				/				-

from each section.

End Examination:

			INI	DUST	RY 4.0 (I40))		
VI Semester :	B.Tech						Sc	cheme : 2020
Course Code	Category	Ho	urs/We	eek	Credits	Maxi	mum Marl	ks
OE320	OEC-II	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total
		3	-	-	3	40	60	100
Sessional Exan	n Duration :					End	Exam Dur	ation: 3 Hrs
Course Outcor	nes : At the end	l of the	course	the st	udent will be	e able to		
CO1: Understa	nd the Characte	ristics,	Senso	rs, Act	uators and C	communication me	odels for in	dustry 4.0.
CO2: Understan	nd Fourth revol	ution a	nd Indu	ustry o	perations.		T	
CO3: Understa	nd the Cyber-Pl	nysical	Syster	ns, Sei	nsors, plation	ms of Industrial I	01.	
CO4: Understa	nd the Cyber se	curity,	Indust	riai int	ernet Systen	18. Jana in Industrial 1	ГоТ	
COS: Understa	nu business mo	dels al	iu Aici		IT I	olers in moustrial.	101.	
Introduction to	IoT Sensing	and A	rtuator		nmunicatio	n		
Introduction. Tr	ransducer- Defi	nition.	Senso	r – Sta	atic and Dvn	amic characteristi	ics. Types.	Actuator –
Features, Type	es, Communic	ation	protoc	ol, S	tandards, F	eatures, Variant	s, IoT No	etworking -
introduction, Pr	oprietary non-Il	P based	l soluti	on, IP	based solution	ons.		C
				UN	IT - II			
Industry 4.0: 7	The Fourth Rev	volutio	n					
Introduction, Su	stainability As	sessme	nt of N	lanufa	cturing Indu	stry, Lean Produc	ction System	n, Smart and
Connected Busi	ness Perspectiv	ve, Sma	rt Fact	ories				
				UN	III – III			
Cyber-Physica	I Systems, Sen	sors, P	latforn	ns	C-11-1			
Cyber-Physical Management	Systems and r	Next-G	enerati	on Sei	nsors, Collai	oration Platform	and Produ Big Data an	d Advanced
Analysis	Augmenteu Rea	inty and	u viitt		anty, Artific	iai intenigence, i	ng Data an	u Auvanceu
7 mary 515.				UN	IT - IV			
Cyber security	. Industrial Inf	ternet	System	ns:				
Cyber security - Industrial Proce	- Introduction, or system	challen	ges, In	dustria	al Internet Sy	stems, Industrial	Sensing &	Actuation,
	•			UN	IT - V			
Business Mode	ls and Archite	cture,	Key E	nabler	s:			
Industrial Busi	ness Models,	Refere	nce A	rchitec	ture for Ind	dustrial Business	Models o	f IIoT, Key
Enablers of Ind	ustrial IoT in S	ensing	, Key l	Enable	ers of Industr	rial IoT in Conne	ctivity, Key	Enablers of
Industrial IoT in Connectivity.								
Text Books								
1. Vijay Madise	etti, Arshdeep B	Bahga, '	"Intern	et of T	Things: A Ha	nds-On Approach	<u>1", VPT; 1 e</u>	dition.
2. Industrial Io Nature Switz	T Challenges, erland AG, 202	Desigr 20.	Princ	iples,	Applications	s, and Security,	Ismail Butu	ın, Springer
3. Industrial Int	ternet of Thing	s Tech	nologi	es and	Research I	Directions, Anand	l Sharma, S	Sunil Kumar
Jangir, Mani	sh Kumar, Dili	p Kun	nar Cho	oubey,	Tarun Shriv	vastava,S. Balamu	irugan, CR	C, Taylor &
Francis Grou	ıp, LLC, 2020.							
Keference Boo	KS							

- 1. Industrial IoT Application Architectures and Use Cases, A. Suresh, Malarvizhi Nandagopal, Pethuru Raj, E. A. Neeba, Jenn-Wei Lin, CRC Press, Taylor & Francis Group, 2020.
- 2. "Introduction to Industry 4.0 and Industrial Internet of Things", Prof. Sudip Misra, IIT kharagpur

Web References:

- 3. https://www.electricaltechnology.org/2016/07/internet-of-things-iot-and-its-applications-inelectrical- power-industry.html
- 4. http://www.nptelvideos.in/2012/11/internet-technologies.html

Question Paper Pattern:

Internal Assessment: The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

MUL	TIMODAL 1	RAN	SPOR	TATI	ON ENG	INEERING (N	ATE)	
VII Semester : B.	Tech						Scheme	e: 2020
Course Code	Category	Ho	urs/W	'eek	Credits	Maxin	num Marks	3
OE401	OEC-III	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total
		3	-	-	3	40	60	100
Sessional Exam D	Puration : $1\frac{1}{2}$	Hrs				End Exa	m Duration	: 3 Hrs
		0.1						
Course Outcomes	At the end of	of the c	ourse	the stu	ident will t	be able to under	stand	
CO1: the compone	ents of urban a	na rura	al roac	is and	estimates t	the capacity and	l level of ser	vice
CO2: the compone	actors gradien	ons or ts and	ranwa	ay trac	K lesign of ra	ilway track		
CO3. the control is	actors, gradien	eristic	s and	decign	of runway			
CO5: the various f	features in Har	hours	and Po	orts th	eir constru	ction and coast	al protection	<u></u> ו
works		bours		J113, 11	en constru	etion and coust		1
			U	NIT –	Ι			
Highway Enginee	ring: Critical o	cross s	ection	ofurb	an and rur	al roads- Road	ecology-	
Classification of ro	ads-Concept o	of Capa	acity a	nd Lev	vel of Serv	ice-Factors affe	ecting-	
Computation of Ca	pacity and Lev	vel of S	Servic	e as pe	er Indo-HC	CM2017- Measu	ire of	
effectiveness-High	way capacity a	and per	rforma	ance cl	naracteristi	cs.		
			U	NIT -	II			
Railway Track: Requirements of an ideal permanent way – Gauges in India – Selection of								
gauge- Functions a	and requirement	ts of r	ails– S	Sleeper	rs and Ball	ast- Functions a	and requiren	nents,
Types of sleepers -	Sleeper densit	y – Ва ion S	Hast –	- Funct	torials and re	equirements, ty	pes – Sub gi	ade –
Tunctions of sub gi		1011 – 2				i its improveme	int.	
Track Alignment.	Basic requirer	nents -	– Fact	$\frac{11}{0}$	ntrolling al	ignment – Grad	lients _ Tyn	es of
gradient – Grade c	ompensation of	n curv	es.	015 001	and and an	igninent Orac	nents Typ	03 01
<i>Geometric Design of the Track:</i> Speed of the train – Speed on curves – Radius or degree of								
curvature – Super elevation or cant – Cant deficiency- negative super elevation - Types of								
transition curve – Length of transition curve – Widening of gauge on curves – Shift of the curve.								
UNIT – IV								
Airport Engineering: Selection of site for Airport – Aircraft Characteristics- Geometric Design								
of Runway- Comp	utation of Run	way le	ngth -	- Corre	ection for r	unway length –	- Orientation	۱of
Runway – Wind R	ose Diagram –	Runw	ay Li	ghting	system.			
UNIT - V								
Harbour Engineer	ring: Definitio	n of B	asic 'l	erms:	Harbour,	Port, Satellite P	ort, Docks,	Waves
and Tides – Plan	ning and Desi	ign of	Hard	ours:	Harbour I	Layout and Tel	rminal Facil	littles –
Floating Landing	Stage – Inland	d Wat	, wha	ives, J	t – Wave	action on Coa	stal Structur	res and
Coastal Protection	Works	u wa		unspor	t vrave	detion on cod	star Structur	tes and
Text Books	.,							
1. Indian Highway	Capacity Man	ual- D	eceml	per201	7, CSIR P	ublications, Nev	w Delhi.	
2. C. Saxena and S	.P. Arora [201	5], Ra	ilway	Engin	eering, Dh	anpat Raj Publi	cations	
L	-		~	0	<u></u> ,	* J		i

3. Khanna, S. K., Arora, M. G., and Jain, S. S. *Airport planning and Design*, Sixth Edition, Nem Chand and Bros, Roorkee, India, 2012.

4. C.Venkatramaiah., Transportation Engineering-Vol.2 Railways, Airports, Docks and Harbours, Bridges and Tunnels., Universities Press (India) Private Limited, Hyderabad, 2015.

Reference Books

1. Satish Chandra and M. Agrawal, *Railway Engineering*, Second Edition, Oxford University Press, 2013.

2. Rangwala, S.C. Railway Engineering, Charotar Publishing House, Anand, India, 2008.

3. Horonjeff, R., McKelvey, F. X., Sproule, W. J., and Young, S. B. *Planning and Design of Airports*, Fifth Edition, McGraw-Hill, New York, USA, 2010.

Web References:

1. https/www.coursera.org

2. www.nptel.ac.in/courses

Question Paper Pattern:

Sessional Exam: The question paper for sessional examination is for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of Three Sections with Two Questions (EITHER / OR type) in each section. The student shall answer one question from each section.

End Exam: The question paper for end examination is for 60 marks. It shall consist of Five Units, each containing Two Questions (EITHER / OR type) from each unit of the syllabus, with a weightage of 12 marks. Each of these questions may contain sub-questions. The student shall answer one question from each unit.

VII Semester :B. To Course Code	ech Category						Sahama	2020
Course Code	Category	TT					Scheme	e:2020
	Caregory	Hou	urs/W	eek	Credits	Maxin	num Marks	5
OE402	OEC-III	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total
		3	-	-	3	40	60	100
Sessional Exam Du	ration: $1\frac{1}{2}$	Hrs				End Exa	m Duration	: 3 Hrs
Course Outcomes :	At the end of	f the co	nurse	the stu	dent will b	e able to		
CO1: To take up th	e basic conce	epts of	air po	ollution	l.			
CO2: To introduce	students to b	asic co	oncept	ts of po	ollution.			
CO3: The contents	involved the	know	ledge	of caus	ses of air p	ollution.		
CO4: The contents	involved the	know	ledge	of heal	th related t	to air pollution.		
COS: To develop si	kins relevant			<u>n air po</u> NIT –	T			
Introduction to mete rose terrestrial wind mixing depths, plum	orology and profile –Effe ae rise.	transpe ects of	ort of terrain	air pol 1 and t	lution: Glo opography	bbal winds, Hea on winds, lapse	dley cells, v e rate, maxi	wind mum
			U	NIT -	II			
<i>Transport of Polluti</i> – Mathematical mod Plume behavior und	ion in Atmos lels of dispers er different n	phere: sion of neteor	Plum air po ologic UN	e beha ollutan al cono NIT – 1	vior under ts –Plume litions –Co III	different atmos behavior in val oncept of isopla	spheric conc ley and terra tes.	litions ains –
<i>Effects of Air Polla</i> Properties –Global Automobile pollutio	ution: Effect Effects –Green n sources and	ts of A enhou d contr	Air Po se eff ol – Pl	ollution fect –(hotoch	on huma Dzone dep emical smo	n beings, plant letion, heat isla og –Future engi	and anim and, dust st ines and fue	als and orms – ls.
			U	TIV	IV			
<i>Air Pollution contro</i> For particulate mat precipitators, For C combustion after bu and examples.	ol: Air Pollut ter –Settling Gaseous poll rners –Work	ion co cham utants ing pr	ntrol- lbers– -contr incipl	at sour Fabric ol by es adv	ce – Equip filters –S absorptio antages an	oment for contro Scrubbers –Cyc n-adsorption so ad disadvantage	ol of air pol clones Elect crubbers-sec es – Design	lution – rostatic condary criteria
			U	NIT –	V			
<i>Air Quality Sampli</i> analysis of SO2, CO	ing and Mo	<i>nitorin</i> ation f	ng: St for co	tack sa ntrol o	mpling – f air pollut	Instrumentatio ion and automo	n and meth bile pollution	ods of on.
Text Books:								
1. C.S. Rao, <i>Environ</i> 2. H.S. Peavy, D.R	<u>nmental Poll</u> A. Row & G	ution (. Tcho	<i>Contre</i> obano	<i>ol Engi</i> glous,	neering, N Environme	lew Age Interna ental Engineer	ational publi ing, McGra	shers. w Hill

3. Martin Crawford, Air Pollution Control Theory, TMH Publication.

Reference Books:

1. H.C Parkins, Air Pollution and Control, McGraw Hill Publication.

2. Wark, K., Warner, C.F., and Davis, W.T., Air Pollution: Its Origin and Control, Addison-Wesley Longman. 1998.

3. Gurjar, B.R., Molina, L., Ojha, C.S.P. (Eds.), Air Pollution: Health and Environmental Impacts, CRC Press.

4. Boubel, R.W., Fox, D.L., Turner, D.B., Stern, A.C., *Fundamentals of Air Pollution*, Academic Press.

Question Paper Pattern:

Sessional Exam: The question paper for sessional examination is for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of Three Sections with Two Questions (EITHER / OR type) in each section. The student shall answer one question from each section.

End Exam: The question paper for end examination is for 60 marks. It shall consist of Five Units, each containing Two Questions (EITHER / OR type) from each unit of the syllabus, with a weightage of 12 marks. Each of these questions may contain sub-questions. The student shall answer one question from each unit.

		IN	DUST	RIAL	ROBOTICS	S (IRT)			
VII Semester: B. Te	ch						Sche	eme: 2020	
Course Code Categ	gory	Hours/Week		eek	Credits	Maximum Marks			
OE403 OEC	- III	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL	
Sector of Every Dur		3 1.1/	• 11	-	3	40	60	100 2 Hara	
Sessional Exam Du	ration :	1 1⁄2	Hrs			End Exam I	Juration :	3 Hrs	
Course Outcomes :	At the en	d of	the co	urse the	e student will	be able to			
CO1: Understand the	e basic co	mpc	onents	of indu	strial robots.				
CO2: Understand the	e types of	f End	l Effec	tors and	d Sensors in	robots.			
CO3: Understand the	e Robot n	nanip	pulator	, forwa	rd and invers	se kinematics.			
CO4: Understand the	e progran	nmin	g metł	nods for	r robots and	design considerati	ions of Rob	ot	
work cell									
CO5: Understand the	e manufa	cturi	ng and	proces	ssing applicat	tions of robot.			
			.	UN	IT – I				
rundamentals of Kobotics and Kobot technology: Automation and footics, footi definition, robot anatomy, robot configurations, work volume, precession of movement, robot actuation and feed-back component, actuators, hydraulic actuators, electrical actuators (variable reluctance type and permanent magnet type stepper motor). Position sensors (potentiometer, resolvers, and encoders), velocity sensors (tachometer), power transmission devices. UNIT – II End Effectors and Sensors: Robot end effectors, types of end effectors, mechanical grippers, other type of grippers- Vacuum cups, magnetic grippers, adhesive grippers, Hooks, Scoops and other miscellaneous devices. Sensors in robotics- tactile sensors, proximity and range sensors,									
Machine Vision, use of sensors in robotics.									
Robot Motion Analy representation, forwa three degree of freed dimension, homogene Robot Programming commands; The tex variables and other d mode commands. Robot cell design an recovery, graphical si	sis and C rd transfe om arm eous tran g: Metho tual rob ata objec d contro mulation	Cont orma in tw sform ods o ot p ets, n ol: R n of r	rol: In ation at vo dim mation of robot orogram notion obot co robot w	troduction and reversions and ho UN: programming comma ell layo vork cel	ion to manipuerse transform s, four degree tomogeneous to IT - IV amming- Lea languages, ands, end effect ut, work cell ll.	ulator kinematics, nation of two deg e freedom manip transformation ma d through- WAIT robot language ectors, sensors co control, interlock	position ree freedon ulators in th atrix. T, SIGNAL structures, ommands ar	n robot arm hre and delay constants, nd monitor ection and	
				UN	$\mathbf{IT} - \mathbf{V}$				

Robot Applications in Manufacturing: Material transfer and machine loading and unloading general considerations in material handling.

Processing Operations: Spot welding, continuous arc welding, spray coating, and other processing operations.

Text Books

- 1. Mickel. P. Groover et. al, Industrial Robotics- Technology, Programming and Applications, McGraw Hill Publishers, New Delhi.
- 2. Deb S.R., Robotics Technology and Flexible Automation, TMH Publishers, New Delhi.
- 3. Richard D. Klafter, Robotic Engineering: An Integrated Approach, Pearson Publications.

Reference Books

1. K. S. Fu, Ralph C. Gonzalez and C.S.G. Lee, Robotics, control, sensing, vision, Mc Graw Hill.

2. Rama chandran, Nagarajan, Introduction to Industrial Robotics, Pearson.

Question Paper Pattern:

Sessional Exam :

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (Either or Type) in each section. The student shall answer one question from each section.

End Examination:

	QUALITY &	& RE	LIAE	BILI	TY ENGI	NEERING (QRE	E)		
VII Semester:	B. Tech						Sche	me : 2020	
Course Code	Category	H	Iours Weel	/ K	Credits	Maximum Marks			
OE 404	OEC-III	L	Т	Р	С	Continuous Internal AssessmentEnd Exam		TOTAL	
		3	-	-	3	40	60	100	
Sessional Exam	Duration: 1.5 H	lrs			End Exar	n Duration : 3 H	rs		
Course Outcon	nes : At the end of	of the	cour	se st	udents wi	ll be able to			
CO1: Unde	erstand the over	view	of th	e To	otal Quali	ty Management	system		
CO2: Unde	erstand concepts	s of c	custor	ner	satisfactio	on and employee	involveme	nt	
CO3: Appl for c	ly the appropriat ontrolling and it	te too mpro	ols an oving	d te qua	chniques lity	of continuous pr	ocess impro	ovement	
CO4: Appl a pro	ly Quality Funct oduct or process	tion	Deplo	yme	ent and B	ench Marking pr	ocess for in	nproving	
CO5: Unde	erstand concept	of R	eliabi	lity	Engineer	ing			
				UN	IT – I				
Introductionto	T.Q.M.:Introdu	ictio	ntoQu	alit	y;Evoluti	onofandbasicapp	roachtoTota	alQuality	
Management;Lo	eadershipconcer	ots;T	heSev	venh	abitsofhi	ghlyeffectivepeo	ple;Roleof7	ΓQM	
Leaders; Implei	mentation of TQ	QM; (Quali	ty co	ouncil, qu	ality statements			
				UN	$\mathbf{I}\mathbf{T} - \mathbf{I}\mathbf{I}$				
CustomerSatis	faction:Typeso	fCus	stome	rs-					
InternalandExte	ernal;Customerp	erce	ption	ofqu	ality; Fee	edback & brief d	iscussion or	1	
Information Co	llecting Tools								
Employee Invo	lvement: Maslov	w's h	ierarc	chy o	of needs; 7	Гуреs of Teams, S	Stages of tea	ım	
development, C Involvement	Common barriers	s to t	eam p	orog	ress, Trai	ning; Benefits of	f Employee		
			1	UNI	T – III				
ContinuousPro	ocessImprovem	ent:	Intro	duct	ion,Juron	trilogy,Improver	mentstrateg	ies;P-D-	
S-A cycle & P	roblem solving	met	hod;	Basi	ic concep	ots of Kaizen and	d Six sigm	a quality	
control, Taguch	ni method, Qual	ity c	ircles						
Supplier Parti	nership: Introdu	uctic	on, Pa	ırtne	ering, Sou	rcing, Supplier	Selection,	Supplier	
Rating, Relation	nship Developm	nent							
Tools & Techni	iques of TOM :	Pare	to dia	gran	n, Cause &	k Effect diagram			
	<u> </u>				,				

UNIT – IV
Benchmarking: Introduction, Benchmarking process
Quality Function Deployment: Benefits of QFD, House of Quality

UNIT – V

Reliability Engineering: Introduction, Failures & failure modes, Causes of failures

Design for Reliability: Designing for higher Reliability, Reliability & Cost

Component Reliability: MTTF, Time dependent hazard models – Exponential Distribution **System Reliability:** Systems with components- in Series, and in Parallel; Non-Series-Parallel systems

Redundancy Techniques: Introduction, Component & Unit Redundancy, Weakest link technique

Text Books:

1. Dale H. Bester field, Total Quality Management, Pearson Education, New Delhi

2. E. Balagurusamy, Reliability Engineering, TMH Publishers, New Delhi

3. M. Mahajan, Statistical Quality Control, DhanapatRai and Sons Publishers, New Delhi

Reference Books:

1. Douglas C. Montgomery, Introduction to Quality Control, John Wiley and Sons Publishers, New

York

2. N. Logothetis, Managing for Total Quality, From Deming to Taguchi, PHI Publishers, New Delhi

3. L.S. Srinath, Reliability Engineering, East West Press, New Delhi

Question Paper Pattern:

Sessional Exam :

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (Either or Type) in each section. The student shall answer one question from each section.

End Examination:
		SM	IART (GRID	FECHNOLO	GIES (SGT)				
VII Semester :	B.Tech							Scheme : 2020		
Course Code	Category	Hou	urs/W	eek	Credits	Ma	ximum Marl	KS		
OE405	OEC-III	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total		
		3	0	0	3	40	60	100		
Sessional Exan	n Duration : 1	<u>1/2 Hrs</u>					End Exam D	uration: 3 Hrs		
Course Outco	omes : At the e	nd of th	ne cour	se the	student will	be able to				
COI: Understa	nd the basic cor	ncepts,	compo	nents	and architect	ure of smart grid.				
CO2: Understand the various measurement technologies in smart grid.										
CO3: Understand about battery technology and energy storage in smart grid.										
CO4: Understa	CO4: Understand the Interoperability and control of power grid.									
CO5: Understa	nd the cyber sec	curity is	ssues n	n smar	t gria.					
Introduction					UNII - I					
Today's Gird versus Smart Grid, Rationale for smart Grid, Computational Intelligence, Power System Enhancement, Communication and Standards, Environment and Economics, Shareholders Roles and Function, Architecture, Functions of Components.										
UNIT - II										
Sensors for Sm Multi Agent Sy Protection and C	art Grid, Monit stems (MAS) Control and SC.	oring a Techno ADA.	nd Me ology,	asurer Micro	nent Technol grid and Si	logies, PMU, Smai nart grid comparis	rt meters, Sm son, Wide An	art Appliances, rea Monitoring		
				U	UNIT – III					
Energy Storage Batteries, Flow storage systems	e: Batteries, Fuel , super capacito	Cell an ors, Sim	nd hyd ulatior	rogen 1 and c	electrolytes,	Flywheel, Super	conduction m	agnetic energy		
-				l	JNIT - IV					
Interoperability Interoperability Control of the P	y: State-of-the-Ar in the Smart C ower Grid, Star	t-Intero Grid En ndards	operabi vironn - Appr	ility - nent - oach te	Benefits an Smart Grid I o Smart Grid	d Challenges of Network Interoper Interoperability S	Interoperabil ability - Inter tandards	ity- Model for operability and		
					UNIT - V					
Smart Grid Cyber Security: Cyber Security State of the Art- Cyber Security Risks - Cyber Security Concerns Associated with AMI- Mitigation Approach to Cyber Security Risks - Cyber Security and Possible Operation for Improving - Methodology for Other Users										
Text Books										
1. James Momoh, "Smart Grid: Fundamentals of design and analysis", John Wiley & sons Inc, IEEE press 2012.										
 Janaka Ekanayake, Nick Jenkins, Kithsiri Liyanage, Jianzhong Wu, Akihiko Yokoyama, "Smart Grid: Technology and Applications", John Wiley & Sons Inc, 2012. 										
3. Lars.T.Berge Ltd, Reprint	er, K.Iniewski, 2015.	"Smart	t Grid:	Appl	ications, Co	mmunications & S	Security" Wi	ley India Pvt.		
Reference Boo	ks									

- 1. Fereidoon P. Sioshansi, "Smart Grid: Integrating Renewable, Distributed & Efficient Energy", Academic Press, 2012.
- 2. Clark W.Gellings, "The smart grid: Enabling energy efficiency and demand response", Fairmont Press Inc,2009.
- 3. Qi Huang, Shi Jing "Innovative Testing and Measurement Solutions for Smart Grid", John Wiley & Sons Inc, 2015.

Web References:

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- 1. https://onlinecourses.nptel.ac.in/noc18_ee42/preview
- 2. https://www.smartgrid.gov/the_smart_grid/smart_grid.html
- 3. https://www.coursera.org/lecture/electric-power-systems/smart-grid-the-environment-aH8g0

Question Paper Pattern:

Internal Assessment: The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

Scheme: 2020 Course Code Category Hours/Week Credits Maximum Marks Course Code Category Lours/Week Credits Maximum Marks OE 406 OEC-III L TOTAL Sessional Exam Duration: 1½ Hrs End Exam Duration: 3 Hrs Course Outcomes: At the end of the course students will be able to CO21: Accognize how foundations laid for Artificial Intelligence CO2: Analyze the search strategies to find solutions to the problems by systematically generating new states CO3: Understand the machine learning concepts and the main steps in a typical machine learning CO4: Design a digit image classifier on MNIST dataset CO4: Design a digit image classifier on MNIST dataset CO4: Design a digit image classifier on MNIST dataset CO4: Design a digit image classifier on MNIST dataset CO4: Design a digit image classifier on MNIST dataset UNIT-1 Introduction: What Is Al? The Poundations of Artificial Intelligence Introduction: What Is Al? The Poundations of Artificial Inte	AR	TIFICIAL INT	ELLI	GENC	CE & N	ACHINE	LEARNING (A	AI & ML)			
Course Code Category Hours/Week Credits Maximum Marks 0E 406 OEC-III L T P C Continuous Internal Assessment End Exam TOTAL 3 - - 3 40 60 100 Sessional Exam Duration: 1 ½ Hrs End Exam Duration: 3 Hrs End Exam Duration: 3 Hrs Course Outcomes: At the end of the course students will be able to CO2: Analyze the search strategies to find solutions to the problems by systematically generating new states C01: Recognize how foundations laid for Artificial Intelligence CO2: Analyze the search strategies to find solutions to the problems by systematically generating new states C03: Understand the machine learning concepts and the main steps in a typical machine learning CO4: Design a digit image classifier on MNIST dataset CO5: Analyze various ML training models UNIT-1 Internale Internale Internal Queen Search Strategies: BFS, DFS, Depth -limited search, IDA, Bidirectional search Informed (Heuristic) Search Strategies: Greedy best-first search, A* search, Memory-bounded heuristic search, Learning to search better. Heuristic Functions UNIT-I Machine Learning Poject : UNIT-IV Classification, Multi output classifier on Maintain your system UNIT-IV Cla	VII - Semester:	B. Tech						Sch	eme:2020		
OE 406 OEC-III L T P C Continuous Internal Assessment End Exam TOTAL 3 - - 3 40 60 100 Sessional Exam Duration: 1½ Hrs End Exam Duration: 3 Hrs End Exam Duration: 3 Hrs Course Outcomes: At the end of the course students will be able to CO1: Recognize how foundations laid for Artificial Intelligence End Exam Duration: 3 Hrs C02: Analyze the search strategies to find solutions to the problems by systematically generating new states CO3: Understand the machine learning concepts and the main steps in a typical machine learning CO4: Design a digit image classifier on MNIST dataset CO5: Analyze various ML training models UNIT-1 Introduction: What Is AI? The Foundations of Artificial Intelligence Intelligent Agents: Agents and Environments, Good Behaviour: The Concept of Rationality, The Nature of Environments, And the Structure of Agents. Uninformed Search Strategies: BFS, DFS. Depth—limited search, IDA, Bidirectional search Informed (Heuristic) Search Strategies: Greedy best-first search, A* search, Memory-bounded heuristic search. Learning to search better. Heuristic Functions. Unitf-IV UNIT-IV Machine Learning Project : Working with Real data, Launch, Monitor and Maintain your system UNIT-IV Training Models Linear Regression, Gradient Descent, Polynomial Regression, Learning Curves, Regularized Linear Regression, Gradient Descent, Polynomia	Course Code	Category	Hou	rs/We	ek	Credits	Ma	ximum Marks			
3 - 3 40 60 100 Sessional Exam Duration: 1 ½ Hrs End Exam Duration: 3 Hrs Course Outcomes: At the end of the course students will be able to CO1: Recognize how foundations laid for Artificial Intelligence CO2: Analyze the search strategies to find solutions to the problems by systematically generating new states CO3: Understand the machine learning concepts and the main steps in a typical machine learning CO4: Design a digit image classifier on MNIST dataset CO5: Analyze various ML training models UNIT-I Introduction: What Is A1? The Foundations of Artificial Intelligence Intelligent Agents: Agents and Environments, Good Behaviour: The Concept of Rationality, The Nature of Environments, And the Structure of Agents. Uniformed Search Strategies: BFS, DFS, Depth –limited search, IDA, Bidirectional search Informed (Heuristic) Search better. Heuristic Functions. UNIT-II Machine Learning Introduction, Types of Machine Learning Systems, Challenges, Testing and Validating. UNIT-IV Classification, Training a Binary Classifier, Performance measures, Multiclass classification, Error analysis, Multi label classification, Multi output classification End-to-End Machine Learning Project : Working with Real data, Launch, Monitor and Maintain your system UNIT-V	OE 406	OEC-III	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL		
Sessional Exam Duration: 1 ½ Hrs End Exam Duration: 3 Hrs Course Outcomes: At the end of the course students will be able to CO1: Recognize how foundations laid for Artificial Intelligence CO2: Analyze the search strategies to find solutions to the problems by systematically generating new states CO3: Understand the machine learning concepts and the main steps in a typical machine learning CO4: Design a digit image classifier on MNST dataset CO5: Analyze various ML training models CO5: Analyze various ML training models UNIT-I Introduction: What Is A1? The Foundations of Artificial Intelligence Intelligent Agents: Agents and Environments, Good Behaviour: The Concept of Rationality, The Nature of Environments, And the Structure of Agents. Uniformed Search Strategies: BFS, DFS, Depth –limited search, IDA, Bidirectional search Informed (Heuristic) Search Strategies: Greedy best-first search, A* search, Memory-bounded heuristic search, Learning to search better. Heuristic Functions. UNIT-II UNIT-III Machine Learning UNIT-III Machine Learning UNIT-IV Classification, Training a Binary Classifier, Performance measures, Multiclass classification, Error analysis, Multi label classification, Multi output classification End-to-End Machine Learning Project : UNIT-V Training Models Linear Regression, Gradient Descent, Polynomial Regression, Learning Curves, Regularized Linear Models, Logistic R			3	-	-	3	40	60	100		
Course Outcomes: At the end of the course students will be able to CO1: Recognize how foundations laid for Artificial Intelligence CO2: Analyze the search strategies to find solutions to the problems by systematically generating new states CO3: Understand the machine learning concepts and the main steps in a typical machine learning CO4: Design a digit image classifier on MNIST dataset CO5: Analyze various ML training models UNIT-1 Introduction: What Is AI? The Foundations of Artificial Intelligence Intelligent Agents: Agents and Environments, Good Behaviour: The Concept of Rationality, The Nature of Environments, And the Structure of Agents. UNIT-II Uninformed Search Strategies: BFS, DFS, Depth –limited search, IDA, Bidirectional search Informed (Heuristic) Search Strategies- Greedy best-first search, A* search, Memory-bounded heuristic search, Learning to search better. Heuristic Functions. UNIT-III Machine Learning Introduction, Types of Machine Learning Systems, Challenges, Testing and Validating. UNIT-IV Classification, Training a Binary Classifier, Performance measures, Multiclass classification, Error analysis, Multi label classification, Multi output classification End-to-End Machine Learning Project : Working with Real data, Launch, Monitor and Maintain your system UNIT-V Training Models Linear Regression, Gradient Descent, Polynomial Regression, Learning Curves, Regularized Linear Models, Logistic Regression TextBooks: 1.Stuart Russell and Peter Norvig, "Artificial Intelligence: A Modern Approach", Third Edition, 2010.Pearson Education. 2. Aurelian Geron, "Hands-On Machine Learning with Scikit-Learn and Tensor Flow:Concepts, Tools, and Techniques to build Intelligent Systems", OReilly Publications, First Edition, 2017 ReferenceBooks:	Sessional Exan	Duration: $1\frac{1}{2}$	Hrs				End E	xam Duration:	3 Hrs		
Course Outcomes: At the end of the course students will be able to CO1: Recognize how foundations laid for Artificial Intelligence CO2: Analyze the search strategies to find solutions to the problems by systematically generating new states CO3: Understand the machine learning concepts and the main steps in a typical machine learning CO4: Design a digit image classifier on MNIST dataset CO5: Analyze various ML training models UNIT-I Introduction: What Is A1? The Foundations of Artificial Intelligence Intelligent Agents: Agents and Environments, Good Behaviour: The Concept of Rationality, The Nature of Environments, And the Structure of Agents. UNIT-II Uninformed Search Strategies: BFS, DFS, Depth –limited search, IDA, Bidirectional search Informed (Heuristic) Search Strategies: Greedy best-first search, A* search, Memory-bounded heuristic search, Learning to search better. Heuristic Functions. UNIT-II Machine Learning Introduction, Types of Machine Learning Systems, Challenges, Testing and Validating. UNIT-IV Classification, Training a Binary Classifier, Performance measures, Multiclass classification, Error analysis, Multi label classification, Multi output classification End-to-End Machine Learning Project : UNIT-V Training Models Linear Regression, Gradient Descent, Polynomial Regression, Learning Curves, Regularized Linear Models, Logistic Regression TextBooks: 1.Stuart Russell and Peter Norvig, "Artificial Intelligence: A Modern Approach", Third Edition, 2010.Pearson Education. 2. Aurelian Geron, "Hands-On Machine Learning with Scikit-Learn and Tensor Flow:Concepts, Tools, and Techniques to build Intelligent Systems", OReilly Publications, First Edition, 2017 ReferenceBooks:					. 1 .						
CO1: Accognize now noundations and for Artificial Intelligence CO2: Analyze the search strategies to find solutions to the problems by systematically generating new states CO3: Understand the machine learning concepts and the main steps in a typical machine learning CO4: Design a digit image classifier on MNIST dataset CO5: Analyze various ML training models UNIT-I Introduction: What Is Al? The Foundations of Artificial Intelligence Intelligent Agents: Agents and Environments, Good Behaviour: The Concept of Rationality, The Nature of Environments, And the Structure of Agents. UNIT-II Uninformed Search Strategies: BFS, DFS, Depth –limited search, IDA, Bidirectional search Informed (Heuristic) Search Strategies: Greedy best-first search, A* search, Memory-bounded heuristic search, Learning to search better. Heuristic Functions. UNIT-II Machine Learning Introduction, Types of Machine Learning Systems, Challenges, Testing and Validating. UNIT-IV Classification, Training a Binary Classifier, Performance measures, Multiclass classification, Error analysis, Multi label classification, Multi output classification End-to-End Machine Learning Project : Working with Real data, Launch, Monitor and Maintain your system UNIT-V Training Models Linear Regression, Gradient Descent, Polynomial Regression, Learning Curves, Regularized Linear Models, Logistic Regression TextBooks: 1.Stuart Russell and Peter Norvig, "Artificial Intelligence: A Modern Approach", Third Edition,2010.Pearson Education. 2. Aurelian Geron, "Hands-On Machine Learning with Scikit-Learn and Tensor Flow:Concepts, Tools, and Techniques to build Intelligent Systems", OReilly Publications, First Edition, 2017 ReferenceBooks:	Course Outcom	es: At the end of	the co	burse s	tudent	s will be abl	e to				
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 Training Models Linear Regression, Gradient Descent, Polynomial Regression, Learning Curves, Regularized Linear Models, Logistic Regression TextBooks: Stuart Russell and Peter Norvig, "Artificial Intelligence: A Modern Approach", Third Edition, 2010. Pearson Education. Aurelian Geron, "Hands-On Machine Learning with Scikit-Learn and Tensor Flow: Concepts, Tools, and Techniques to build Intelligent Systems", OReilly Publications, First Edition, 2017 ReferenceBooks: 		ai data, Launen, i	101110	i una i	UNI	Γ– V					
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	ReferenceBooks	:									

1.Elaine Richie Kevin Knight[2008],[3rdEdition],Artificial Intelligence,TMH

2. Oliver Theobald, "Machine Learning for Absolute Beginners", Second Edition, 2017

3. Miroslav Kubat, "An Introduction to Machine Learning", Springer, 2017

WebReferences:

1.https://onlinecourses.nptel.ac.in/noc18_cs51

2.https://www.geeksforgeeks.org/F-intelligence-an-introduction/

3. https://www.coursera.org/learn/python-machine-learning offered by University of Michigan

4. https://github.com/ageron/handson-ml.

Question Paper Pattern:

Sessional Exam

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Exam

DISTRIBUTED EMBEDDED SYSTEMS (DES)											
VII - Semester : B. Tech Scheme: 2020											
Course	Category	Hours/	Week		Credits	Max	imum Marks				
Code											
						Continuous					
OE 407	OEC-III	L	Т	P	С	Internal	End Exam	TOTAL			
					2	Assessment	(0)	100			
Combon al I		3	-	-	3	40		100			
Sessional I		the end $\frac{1}{2}$	HIS of the out		the student	Eng	Exam Duratio	n: 3 Hrs			
Course O	retard the rea	ltime on	vironm	ourse	d applicati						
CO2: Understand System architecture and design of Distributed Embedded Systems											
CO2. Unde	CO2: Understand System architecture and design of Distributed Embedded Systems										
CO4: Analy	vze the netwo	vrk conne	ction of	Allu S	ibuted syst	eme					
CO5: Analy	yze the worki	ng of mu	ltiple er	mbeda	ded device	s in a distributed ne	twork				
COS. Anal	yze the worki			mocu		s in a distributed ne	twork				
Real Time I	Environment	Real-tin	ne com	niter	system rea	uirements classific	cation of real tir	ne systems			
functional r	equirements.	temporal	require	ment	s, global ti	ne. examples of rea	al time systems.	ne systems,			
runctional requirements, temporal requirements, global time, examples of real time systems.											
UNIT-II											
Distributed System Design: Need of distributed systems, System Architecture, compatibility, scalability											
and dependability.											
System Scheduling: Inter component communication, task management, and dual role of time; inter											
task interact	tions, Schedu	ling prot	olem - st	tatic &	& dynamic	scheduling – syster	n design – valid	lation –			
time-trigger	red architectu	re.									
D ¹ · · 1 · · 1		<u> </u>			UNIT-IV			CAN			
Distributed	Networks: Ty	pes of no	etworks	, com	iparisons, I	SO-OSI model, TC	P/IP connection	is. CAN			
concepts, E	thernet										
Casa Studia	Diveto oth	ontrollo.	damba	4444	UNII-V	CCM based ambed	dad anomationa	and avant			
trigger base	d embedded a	phicatic		lueu	operations,	USIVI Dased enibed	ided operations,	and event			
Text Books		ippiicatic	JII5.								
1 Hermann	Konetz Real	L_Time s	vstems	– Des	ion Princir	les for distributed I	Embedded Appl	ications			
2nd Edition	Springer 20	11.	ystems	Des		ies for distributed i		ileations,			
2. GlafP.Fe	iffer. Andrew	Avre an	d Christ	tian K	evold. Em	bedded Networking	with CAN and	CAN			
open, Copp	erhill Media	Corporati	100, 200	8.	<i>y</i> ,			0121			
Reference	Books:	- 1	,								
1. Bernd Kleinjohann, Architecture and Design of Distributed Embedded Systems, Springer US,2013											
2. Wayne Wolf, "Computers as Components", Second edition, Morgan Kaufmann, 2008.											
Web Refer	ences:		-								
1.https://v	www.coursera	.org/spec	cializati	ons/re	eal-time-en	nbedded-systems					
2. https://	onlinecourses	.nptel.ac	.in/noc2	20 ee	98/preview						
		+									
Ouestion P	aper Pattern	:									
Sessional F	Sessional Exam: The question paper for sessional examination shall be for 25 marks covering half of										
		P.	r 101	~ = 551			, 0010				

the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

	NATURAL LANGUAGE PROCESSING (NLP)									
VI Semeste	r: B. Tech						S	cheme : 2020		
Course Code	Category	Н	ours/W	/eek	Credits	Max	Maximum Marks			
OE 408	OEC-III	L	Т	Р	С	Continuous Internal AssessmentEnd ExamTOTAL				
		1	-	2	2	40	60	100		
Sessional E	xam Duration:	$\frac{1}{2}$ Hrs	0.0011	a tha at	idont will b	En e abla to	d Exam Du	ration: 3 Hrs		
CO1: Unde	rstand the import	ance of	Text V	Se the su Wranglir	og Cleansir	ng and POS taggin	σ			
CO2: Deve	lop a NLP applic	ation us	sing the	e NLTK	library.	ig und i ob tuggin	5.			
CO3: Imple	ement Text classi	fication	algori	thms usi	ng scikit-le	arn and NLTK.				
CO4: Unde	rstand the basics	of Toke	enizing	g text usi	ng WordNe	et.				
CO5: Unde	rstand the import	tance of	Text f	feature e	xtraction pr	cocess.				
UNIT – I										
Introduction to Natural Language Processing : Why learn NLP, Diving into NLTK, Text Wrangling and Cleansing, Sentence splitter, Tokenization, Stemming, Lemmatization, Stop word removal, Rare word removal, Spell correction, POS tagging, Named Entity Recognition (NER).										
UNIT – II										
NLP Applie Information	cations: Building retrieval, Speech	g your f n recogn	irst NI	LP applie Text clas	cation, Othesification,	er NLP application	ns – Machir ction.	ne translation,		
				UN	IT – III					
Text Classi Stochastic g algorithm, T	fication : Machin gradient descent, Text clustering –	ne Lear Logist K-Meaı	ning, 7 ic regr 1s.	Text cla ression,	ssification, Support Ve	Sampling – Naïv ector Machines, T	ve Bayes, D The Randon	ecision trees, 1 forest		
				UN	IT – IV					
Tokenizing sentences in Filtering sto lemmas and collocations	Text and Wor nto words, Toke op words in a tol d synonyms in	rdNet 1 nizing s kenized the Wo	Basics: sentenc senter ordNet,	: Introdu ces using nce, Loo , Calcul	uction, Tol g regular e king up Sy ating Word	kenizing text into xpressions, Train nsets for a word Net Synset simi	o sentences, ing a senter in WordNet larity, Disc	, Tokenizing nee tokenizer, t, Looking up overing word		
				UN	$\mathbf{IT} - \mathbf{V}$					
Feature Extraction : Bag of words feature extraction, Training a Naïve Bayes classifier, Training a Decision tree classifier, Training a maximum entropy classifier, Training scikit-learn classifiers, Measuring precision and recall of a classifier, Training a classifier with NLTK-Trainer.										
Text Books	:									
5. Natural Hardeni	Language Proces ya by Packt 2016	ssing: P 5.	ython	and NL	TK, Deept	i Chopra, Jacob F	Perkins, and	Nitin		
6. Practica Systems	l Natural Langu s, Bodhisattwa	iage Pr Majumo	ocessii der, A	ng: A C nuj Gup	Comprehens ota, Sowm	sive Guide to Bu ya Vajjala, Harsl	uilding Rea hit Surana	l-World NLP published by		

O'Reily Media, Inc, 2020.

Reference Books:

- 4. Daniel Jurafsky & James H. Martin, Speech and Language Processing, An Introduction to Natural Language Processing, Computational Linguistics and Speech Recognition, 2nd Edition, Pearson Education, 2009.
- 5. Tanvier Siddiqui, U.S. Tiwary, Natural Language Processing and Information Retrieval, Oxford Higher Education, 2008.
- 6. Daniel M. Bikel & Imed Zitouni, Multilingual Natural Language Processing Applications: From Theory to Practice, Pearson Publication, 2012.
- 7. Christopher D. Manning, and Hinrich Schutze, Foundations of Statistical Natural Language Processing, MIT Press, 1999.

Web References:

- 1. <u>https://www.coursera.org/specializations/natural-language-processing</u>
- 2. https://www.udemy.com/course/speech-recognition-a-z-with-hands-onlearnkarts/
- 3. https://nptel.ac.in/courses/106105158

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

DESIGN THINKING(DT)											
VII Semest	er: B. Tech					Scheme : 2020					
Course Code	Category	Ho	ours/W	/eek	Credits	Max	Maximum Marks				
OE 409	OEC-III	L	Т	Р	С	Continuous Internal AssessmentEnd ExamTOTAL					
Sectional	ware Duration 1	3	0	0	3	40	60	100			
Course Out	$\frac{1}{1}$	72 nrs nd of th		se the st	udent will b	pe able to	u exam Du	ration: 5 mis			
CO1: Reco	CO1: Recognize the importance of Design Thinking										
CO2: Identify the steps in Design Thinking process											
CO3: Identify the difference between creativity and innovation											
CO4 : Evaluate the value of creativity											
CO5: Formulate specific problem statements of real time issues											
UNIT – I											
Introduction to Design Thinking : Introduction to elements and principles of Design, basics of designdot, line, shape, form as fundamental design components. Principles of design. Introduction to design thinking, history of Design Thinking, New materials in Industry											
UNIT – II											
Design Thi implementin thinking - po	nking Process: In ng the process in erson, costumer,	Design driving	thinking inverties of the think in the think in the	ng proce ntions, d brain sto	ss (empathi lesign think rming, proc	ize, analyze, idea ing in social inno luct development	& prototype ovations. To	e), pols of design			
		· · ·	-	UN	IT – III						
Innovation innovation value of crea	: Art of innovations. Art organizations.	ion, Di Creativ	fferend ity to	ce betwe Innovati	een innovat on. Teams	tion and creativit for innovation, M	y, role of c leasuring th	creativity and le impact and			
				UN	IT – IV						
Product De Product plan	e sign: Problem fo	ormatio ecificat	n, intra tions. I	oduction nnovatio	to product on towards p	design, Product broduct design Cas	strategies, P se studies.	roduct value,			
				UN	$\mathbf{IT} - \mathbf{V}$						
Design Thinking in Business Processes: Design Thinking applied in Business & Strategic Innovation, Design Thinking principles that redefine business – Business challenges: Growth, Predictability, Change, Maintaining Relevance, Extreme competition, Standardization. Design thinking to meet corporate needs. Design thinking for Startups. Defining and testing Business Models and Business Cases. Developing & testing prototypes.											
Text Books:											
1.Change by	y design, Tim Bro	own, Ha	arper E	Bollins (2	2009)		<u>a</u>				
2 Design T	hinking for Strat	egic Ini	novatio	on, Idris	Mootee, 20	13, John Wiley &	Sons				
Reference I	Books:										
1. Design	Thinking in the C		om by]	David Le	ee, Ulysses	press					
2. Rod Judl	kins, The Art of C	reative	Think	ang, Roc	1 Judkins, H	lodder & Stought	on				

3. Universal principles of design- William lidwell, kritinaholden, Jill butter.

4. The era of open innovation – chesbrough. H

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/OR Type) in each section. The student shall answer one question from each section.

End Examination:

	CLOUD, MICRO SERVICES & APPLICATION																
VII Semester	: B. Tech					-	Sch	eme:2020									
Course Code	Category	Hou	rs/We	ek	Credits	Ma	ximum Marks	1									
OE 410	OEC-III	L	Т	Р	С	Continuous Internal Assessment	EndExam	TOTAL									
		3	0	-	3	40	60	100									
Sessional I	Exam Duration:	11/2 H	rs			EndEx	xamDuration:3	Hrs									
Course Outcomes: At the end of the course students will be able to																	
CO1: Demonstrate the main concepts of cloud, its characteristics, advantages, key technologies and																	
its various delivery and deployment models.																	
CO2: Develop and design an application using various tools in cloud environment.																	
CO3: Acquire the basic and important design concepts an disuse of web application development techniques in cloud																	
CO4: Struc	ture simple pythe	on prog	gram fo	or dev	eloping an a	pplication in cl	oud.										
CO5: Analyze the issue of cloud such as security, energy efficiency and interoperability, and provide																	
an insight into future prospects of computing in the cloud monitoring.																	
Cloud Fund	amontals Cloud	Sor	rico (UI Tompo	NIT-I	d Samuica D	anloymont M	adala Claud									
Cioua Fulia		Serv	vice (Lompe	inems-Cloud		· · · ·										
components-G	fuiding principle	with	respe	ct to	utilization,	Security, Price	ing- Applicatio	on of Cloud									
Computing. C	ase Study: Desig	n and	Implei	mentat	ion of Publi	c and Private C	Cloud Environm	ents – Open									
Stack and AW	ΥS.																
				UN	IIT–II												
ApplicationA	rchitectures-Mo	nolith	1C&D1	stribut	ed,Microser	viceFundament	talandDesignAp	proach-									
CloudNativeA	pplications-12Fa	actors/	App-Aj	pplicat	ionIntegrati	onProcessandA	PIficationProce	ess-									
APIFundamen	tal-Microservice	and A	PI Ma	anagei	ment- Sprin	g Boot Fundai	mental and Des	sign of									
Microservice -	- API Tools - Dev	velope	r Porta	ıl-App	lications of I	Micro service a	nd API fication										
				UN	IT–III												
Devops funda	mentals - Devo	ps Ro	ole and	d Res	ponsibility-7	Fools and App	olications- Cont	tainerization									
Process and Ap	oplication-Evolut	tion of	f APP	Deplo	yment- Doc	cker Fundamen	tals - Docker A	Architecture-									
Docker Comma	ands. Case study	Orche	stratio	n, Kuł	ernetes, Do	cker Container.											
UNIT-IV																	
Cloud Security-Cloud Security Shared Responsibility Architecture-Security By Design Principles-																	
Identity And A	Access Managem	ent-C	loud S	ecurity	y Layers Ill	ustration-Cloud	l Network, Hos	st And Data									
Security Conce	epts-Security Ope	eratior	ns and	Majo	r Cloud Ser	vice Provider '	Tools-Security	Compliance									
and Regulation	s-Cloud Monitor	ing-Be	enefits	ofClo	ud Monitori	ing-Overview o	f Cloud Monito	ring Tools.									
				UN	IT–V			UNIT- V									

Developing and Deploying an Application in the Cloud- Building a python project based on Design-Development-Testing-Deployment of an application in the cloud using a development framework and deployment platform.

Case Study: Python Use case and Python Framework.

TextBooks :

- 1. Thomas Erl, Zaigham Mahmood, and Ricardo Puttini, "Cloud ComputingConcepts, Technology & Architecture", PrenticeHall, 2013.
- 2. GuoNingLiu, Qiang GuoTong, Harm Sluiman, AlexAmies, "Developing and Hosting Applications on the Cloud", IBMPress, 2012.
- 3. KaiHwang,GeofferyC.FoxandJackJ.Dongarra, "Distributed and Cloud Computing: Clusters, Grids, Clouds and the Future of Internet", First Edition, Morgan Kaufman Publisher,anImprintofElsevier,2012.
- 4. Rajkumar Buyya ,James Broberg Andrzej M.Goscinski , "Cloud Computing: Principles and Paradigms",Wiley,2011

Reference Books

- 1. Michael J. Kavis "Architecting the Cloud: Design Decisions for Cloud Computing Service Models (SaaS, PaaS, and IaaS)", 1stEdition, Wiley, 2014.
- 2. AzureVirtual Machineshttps://docs.microsoft.com/enus/azure/virtualmachines/
- 3. GoogleApp Enginehttps://cloud.google.com/appengine#allfeatures
- 4. GoogleKubernetesEnginehttps://cloud.google.com/kubernetesengine#allfeatures
- 5. DockerTutorial:https://dockercurriculum.com

Question Paper Pattern

Sessional Exam

The question paper for sessional examination is for 30marks, covering half of the syllabus for first Sessional and remaining half or second sessional exam. Question No 1which carries 6marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying8marks each

End Exam

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one uni and may contain sub-questions. i.e there will be two questions from each unit and the student should answer any one question.

VII Semester : B.Tech Scheme : 2020 Course Code Category Hours/Week Credits Maximum Marks 0E411 OEC-III L T P C Continuous Internal Assessment End Exam TOTAL 3 0 0 3 40 60 100 Sessional Exam Duration 1½ Hrs End Exam Duration: 3 Hrs End Exam Duration: 3 Hrs Course Outcomes : At the end of the course the student will be able to CO1: Understand the basic concepts of Blockchain technology. CO2: Interpret the security and risks involved in Blockchain applications. CO2: Interpret the security and risks involved in Blockchain Implementation CO4: Understand the process of Ethereum Blockchain Implementation CO4: Understand the process of Hyper ledger Blockchain Implementation CO4: Understand the process of Hyper ledger Blockchain Evolution of Blockchain : Evolution of Computer Applications, Digital Signatures, Hashing, and public key cryptosystems, private vs. public Blockchain, Centralized Applications, Decentralized Applications, Stages in Blockchain Evolution, Consontia, Forks, Public Blockchain Concepts: Introduction, Changing of Blocks, Hashing, Merkle-Tree, Consensus, Mining and Finalizing Blocks, Currency aka tokens, security on blockchain, data storage on blockchain, wallets, coding on blockchain solutions, introduction, Obstacles for Use of Blockchain nodes, risk associated with blockchain solutions, Introduction, Obstacles for Use of Blockchain Merke-Tree, Consensus, Mining and		BLOCK CHAIN TECHNOLOGIES (BCT)									
Course Code Category Code Hours/Week Credits Maximum Marks 0E411 OEC-III L T P C Continuous Internal Assessment End Exam TOTAL 3 0 0 3 40 60 100 Sessional Exam Duration 1½ Hrs End Exam Duration: 3 Hrs End Exam Duration: 3 Hrs CO1: Understand the basic concepts of Blockchain applications. CO2: CO2: CO3: Interpret the security and risks involved in Blockchain applications. CO3: CO3: Interpret the security and risks involved in Blockchain applications. CO3: CO4: Understand the process of Ethereum Blockchain Implementation CO5: Understand the process of Ethereum Blockchain. Evolution of Blockchain : Evolution of Conputer Applications, Challenges Articulated, Blockchain, Blockchain Characteristics, Opportunities Using Blockchain, History of Blockchain, Evolution of Blockchain Evolution of Conputer Applications, Digital Signatures, Hashing, and public key cryptosystems, private vs. public Blockchain, Consortia, Forks, Public Blockchain Environments, Type of Players in Blockchain Ecosystem, Players in Market. UNIT – II Interduction, Changing of Blocks, Hashing, Merkle-Tree, Consensus, Mining and Finalizing Block, Currency aka tokens, security on blockchain, data storage on blockchain, wallets, coding	VII Semest	er: B.Tech						S	cheme : 2020		
OE411 OEC-III L T P C Continuous Internal Assessment End Exam TOTAL 3 0 0 3 40 60 100 Sessional Exam Duration 1½ Hrs End Exam Duration: 3 Hrs End Exam Duration: 3 Hrs Course Outcomes: 1A the end of the course the student will be able to End Exam Duration: 3 Hrs CO2: Interpret the security and risks involved in Blockchain applications. CO2: Interpret the security and risks involved in Blockchain applications. CO3: Interpret the types of Blockchain applications and Blockchain solutions. CO4: Understand the process of Ethereum Blockchain Implementation CO5: Understand the process of Blockchain. Fordations. CO4: Understand the process of Blockchain, Blockchain, Blockchain Characteristics, Opportunities UNIT - I Introduction, Scenarios, Challenges Articulated, Blockchain, Blockchain Evolution of Computer Applications, Digital Signatures, Hashing, and public key cryptosystems, private vs. public Blockchain. Consensus, Mining and Finalizing Blockchain Environments, Type of Blocks, Hashing, Merkle-Tree, Consensus, Mining and Finalizing Blocks, Currency aka tokens, security on blockchain, data storage on blockchain, wallets, coding on blockchain solutions: Introduction, Obstacles for Use of Blockchain Blockchain Relevance Evaluation Framework, Blockchain Solutions Reference Architecture, Types of Blockchain Applications. Cryptographic Tokens, Spripei	Course Code	Category	Н	ours/W	eek	Credits	Max	imum Mar	ks		
3 0 0 3 40 60 100 Sessional Exam Duration 1½ Hrs End Exam Duration: 3 Hrs Course Outcomes: A the end of the course the student will be able to CO1: Understand the basic concepts of Blockchain technology. CO2: Interpret the security and risks involved in Blockchain applications. CO3: Interpret the types of Blockchain applications and Blockchain solutions. CO4: Understand the process of Ethereum Blockchain Implementation CO5: Understand the process of Hyper ledger Blockchain Implementation CO5: Understand the process of Hyper ledger Blockchain, Blockchain Characteristics, Opportunities UNIT – I Introduction, Scenarios, Challenges Articulated, Blockchain, Blockchain Characteristics, Opportunities Using Blockchain, History of Blockchain. Evolution of Blockchain Evolution of Computer Applications, Digital Signatures, Hashing, and public key cryptosystems, private vs. public Blockchain, Forks, Public Blockchain Environments, Type of Players in Blockchain Ecosystem, Players in Market. UNIT – II Blockchain Concepts: Introduction, Changing of Blocks, Hashing, Merkle-Tree, Consensus, Mining and Finalizing Blocks, Currency aka tokens, security on blockchain, data storage on blockchain, wallets, coding on blockchain: smart contracts, peer-to-peer network, types of Blockchain nodes, risk associated with blockchain solutions, life cycle of blockchain transaction. VIII – III Architecting Blockchain solutions: Introduction, Obstacles for Use of Blockchain Blockchain Relevance Eval	OE411	OEC-III	L	Т	Р	С	Continuous Internal AssessmentEnd ExamTOTAL				
Sessional Exam Duration 19: Hrs End Exam Duration: 3 Hrs Course Outcomes : At the end of the course the student will be able to CO1: Understand the basic concepts of Blockchain technology. CO2: Interpret the security and risks involved in Blockchain applications. CO3: Understand the process of Ethereum Blockchain Implementation CO4: Understand the process of Ethereum Blockchain Implementation CO5: Understand the process of Hyper ledger Blockchain Implementation CO5: Understand the process of Hyper ledger Blockchain, Blockchain Characteristics, Opportunities UNIT – I Introduction, Scenarios, Challenges Articulated, Blockchain, Blockchain Characteristics, Opportunities Using Blockchain, History of Blockchain. Evolution of Blockchain Evolution of Computer Applications, Digital Signatures, Hashing, and public key cryptosystems, private vs. public Blockchain. Centralized Applications, Decentralized Applications, Stages in Blockchain Evolution, Consortia, Forks, Public Blockchain Environments, Type of Players in Blockchain data storage on blockchain, wallets, coding on blockchain: smart contracts, peer-to-peer network, types of blockchain nodes, risk associated with blockchain solutions, life cycle of blockchain transaction. UNIT – III Architecting Blockchain solutions: Introduction, Obstacles for Use of Blockchain Platforms, Approach for Designing Blockchain Applications UNIT – III Architecture Considerations, Architecture of Enterprise Use Cases, Types of Blockchain Applications LUNIT – III Architecting			3	0	0	3	40	60	100		
COI: Understand the basic concepts of Blockchain technology. CO2: Interpret the security and risks involved in Blockchain applications. CO3: Interpret the types of Blockchain applications and Blockchain solutions. CO4: Understand the process of Ethereum Blockchain Implementation CO5: Understand the process of Hyper ledger Blockchain Implementation CO5: Understand the process of Hyper ledger Blockchain, Blockchain Characteristics, Opportunities UNIT – I Introduction, Scenarios, Challenges Articulated, Blockchain, Blockchain Characteristics, Opportunities Using Blockchain, History of Blockchain, Evolution of Blockchain : Evolution of Computer Applications, Digital Signatures, Hashing, and public key cryptosystems, private vs. public Blockchain. Centralized Applications, Decentralized Applications, Stages in Blockchain Evolution, Consortia, Forks, Public Blockchain Environments, Type of Players in Blocks. Hashing, Merkle-Tree, Consensus, Mining and Finalizing Blocks, Currency aka tokens, security on blockchain, data storage on blockchain, wallets, coding on blockchain: smart contracts, peer-to-peer network, types of blockchain nodes, risk associated with blockchain solutions. Introduction, Obstacles for Use of Blockchain, Blockchain Relevance Evaluation Framework, Blockchain Solutions Reference Architecture, Types of Blockchain Applications. Cryptographic Tokens, Typical Solution Architecture for Enterprise Use Cases, Types of Blockchain Solutions, Architecture Considerations, Architecture with Blockchain Platforms, Approach for Designing Blockchain Applications UNIT – IV Ethereum Blockchain Implementation: Introduction, Tuna Fish Tracking Use Case, Ethereum Ecosystem, Ethereum Development, Ethereum Tool Stack, Ethereum Virtual Machine, Smart Contract Programming, Integrated Development Environment, Truffle Framework, Ganache, Unit Testing, Ethereum Accounts, MyEtherWallet	Sessional E	xam Duration 1	$\frac{1/2}{2}$ Hrs				En	d Exam Du	ration: 3 Hrs		
Colspan="2">Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan	Course Ou	rstand the basic of	end of the	1000000000000000000000000000000000000	se the st	udent will t	be able to				
CO3: Interpret the types of Blockchain applications and Blockchain solutions. CO4: Understand the process of Ethereum Blockchain Implementation CO5: Understand the process of Hyper ledger Blockchain Implementation Using Blockchain, History of Blockchain. Evolution of Blockchain : Evolution of Computer Applications, Digital Signatures, Hashing, and public key cryptosystems, private vs. public Blockchain, Forks, Public Blockchain Environments, Type of Players in Blockchain Ecosystem, Players in Market. Blockchain Concepts: Introduction, Changing of Blocks, Hashing, Merkle-Tree, Consensus, Mining and Finalizing Blocks, Currency aka tokens, security on blockchain, data storage on blockchain, wallets, coding on blockchain : smart contracts, peer-to-peer network, types of blockchain nodes, risk associated with blockchain solutions: Introduction, Obstacles for Use of Blockchain, Blockchain Relevance Eularea UNIT - III Architecting Blockchain solutions: Introduction, Obstacles for Use of Blockchain, Blockchain Relevance Evaluation Framework, Blockchain Solutions Reference Architecture, Types of Blockcha	CO2: Inter	pret the security a	and risk	$\frac{1}{5}$ invol	ved in F	Blockchain a	y. applications				
CO4: Understand the process of Ethereum Blockchain Implementation CO5: Understand the process of Hyper ledger Blockchain Implementation UNIT – I Introduction, Scenarios, Challenges Articulated, Blockchain, Blockchain Characteristics, Opportunities Using Blockchain, History of Blockchain. Evolution of Blockchain : Evolution of Computer Applications, Digital Signatures, Hashing, and public key cryptosystems, private vs. public Blockchain. Centralized Applications, Decentralized Applications, Stages in Blockchain Evolution, Consortia, Forks, Public Blockchain Environments, Type of Players in Blockchain Ecosystem, Players in Market. UNIT – II Blockchain Concepts: Introduction, Changing of Blocks, Hashing, Merkle-Tree, Consensus, Mining and Finalizing Blocks, Currency aka tokens, security on blockchain, data storage on blockchain, wallets, coding on blockchain: smart contracts, peer-to-peer network, types of blockchain nodes, risk associated with blockchain solutions, life cycle of blockchain transaction. UNIT – III Architecting Blockchain solutions: Introduction, Obstacles for Use of Blockchain, Blockchain Relevance Evaluation Framework, Blockchain Solutions Reference Architecture, Types of Blockchain Applications. Cryptographic Tokens, Typical Solution Architecture for Enterprise Use Cases, Types of Blockchain Solutions, Architecture Considerations, Architecture with Blockchain Platforms, Approach for Designing Blockchain Applications UNIT – IV Ethereum Blockchain Implementation: Introduction, Tuna Fish Tracking Use Case, Ethereum Ecosystem, Ethereum Development, Ethereum Tool Stack, Ethereum Virtual Machine, Smart Contract Programming, Integrated Development Environment, Truffle Framework, Ganache, Unit Testing, Ethereum Accounts, MyEtherWallet	CO3: Inter	pret the types of l	Blockcl	nain ap	plication	ns and Bloc	kchain solutions.				
CO5: Understand the process of Hyper ledger Blockchain Implementation UNIT – I Introduction, Scenarios, Challenges Articulated, Blockchain, Blockchain Characteristics, Opportunities Using Blockchain, History of Blockchain. Evolution of Blockchain : Evolution of Computer Applications, Digital Signatures, Hashing, and public key cryptosystems, private vs. public Blockchain. Centralized Applications, Decentralized Applications, Stages in Blockchain Evolution, Consortia, Forks, Public Blockchain Environments, Type of Players in Blockchain Ecosystem, Players in Market. UNIT – II Blockchain Concepts: Introduction, Changing of Blocks, Hashing, Merkle-Tree, Consensus, Mining and Finalizing Blocks, Currency aka tokens, security on blockchain, data storage on blockchain, wallets, coding on blockchain: smart contracts, peer-to-peer network, types of blockchain nodes, risk associated with blockchain solutions: lift cycle of blockchain transaction. UNIT – III Architecting Blockchain solutions: Introduction, Obstacles for Use of Blockchain, Blockchain Relevance Evaluation Framework, Blockchain Solutions Reference Architecture, Types of Blockchain Applications, Architecture Considerations, Architecture with Blockchain Platforms, Approach for Designing Blockchain Applications UNIT – IV Ethereum Blockchain Implementation: Introduction, Tuna Fish Tracking Use Case, Ethereum Ecosystem, Ethereum Development, Ethereum Tool Stack, Ethereum Virtual Machine, Smart Contract Programming, Integrated Development Environment, Truffle Framework, Ganache, Unit Testing, Ethereum Accounts, MyEtherWallet	CO4: Understand the process of Ethereum Blockchain Implementation										
UNIT – I Introduction, Scenarios, Challenges Articulated, Blockchain, Blockchain Characteristics, Opportunities Using Blockchain, History of Blockchain. Evolution of Blockchain : Evolution of Computer Applications, Digital Signatures, Hashing, and public key cryptosystems, private vs. public Blockchain. Centralized Applications, Decentralized Applications, Stages in Blockchain Evolution, Consortia, Forks, Public Blockchain Environments, Type of Players in Blockchain Ecosystem, Players in Market. UNIT – II Blockchain Concepts: Introduction, Changing of Blocks, Hashing, Merkle-Tree, Consensus, Mining and Finalizing Blocks, Currency aka tokens, security on blockchain, data storage on blockchain, wallets, coding on blockchain: smart contracts, peer-to-peer network, types of blockchain nodes, risk associated with blockchain solutions, life cycle of blockchain transaction. UNIT – III Architecting Blockchain solutions: Introduction, Obstacles for Use of Blockchain, Blockchain Relevance Evaluation Framework, Blockchain Solutions Reference Architecture, Types of Blockchain Applications, Cryptographic Tokens, Typical Solution Architecture for Enterprise Use Cases, Types of Blockchain Solutions, Architecture Considerations, Architecture with Blockchain Platforms, Approach for Designing Blockchain Implementation: Introduction, Tuna Fish Tracking Use Case, Ethereum Ecosystem, Ethereum Development, Ethereum Tool Stack, Ethereum Virtual Machine, Smart Contract Programming, Integrated Development Environment, Truffle Framework, Ganache, Unit Testing, Ethereum Accounts, MyEtherWallet	CO5: Understand the process of Hyper ledger Blockchain Implementation										
UNIT – I Introduction, Scenarios, Challenges Articulated, Blockchain, Blockchain Characteristics, Opportunities Using Blockchain, History of Blockchain. Evolution of Blockchain : Evolution of Computer Applications, Digital Signatures, Hashing, and public key cryptosystems, private vs. public Blockchain. Centralized Applications, Decentralized Applications, Stages in Blockchain Evolution, Consortia, Forks, Public Blockchain Environments, Type of Players in Blockchain Ecosystem, Players in Market. UNIT – II Blockchain Concepts: Introduction, Changing of Blocks, Hashing, Merkle-Tree, Consensus, Mining and Finalizing Blocks, Currency aka tokens, security on blockchain, data storage on blockchain, wallets, coding on blockchain solutions, life cycle of blockchain transaction. UNIT – III Architecting Blockchain solutions: Introduction, Obstacles for Use of Blockchain, Blockchain Relevance Evaluation Framework, Blockchain Solutions Reference Architecture, Types of Blockchain Applications, Cryptographic Tokens, Typical Solution Architecture for Enterprise Use Cases, Types of Blockchain Solutions, Architecture Considerations, Architecture with Blockchain Platforms, Approach for Designing Blockchain Implementation: Introduction, Tuna Fish Tracking Use Case, Ethereum Ecosystem, Ethereum Development, Ethereum Tool Stack, Ethereum Virtual Machine, Smart Contract Programming, Integrated Development Environment, Truffle Framework, Ganache, Unit Testing, Ethereum Accounts, MyEtherWallet											
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UNIT – III Architecting Blockchain solutions: Introduction, Obstacles for Use of Blockchain, Blockchain Relevance Evaluation Framework, Blockchain Solutions Reference Architecture, Types of Blockchain Applications. Cryptographic Tokens, Typical Solution Architecture for Enterprise Use Cases, Types of Blockchain Solutions, Architecture Considerations, Architecture with Blockchain Platforms, Approach for Designing Blockchain Applications UNIT – IV Ethereum Blockchain Implementation: Introduction, Tuna Fish Tracking Use Case, Ethereum Ecosystem, Ethereum Development, Ethereum Tool Stack, Ethereum Virtual Machine, Smart Contract Programming, Integrated Development Environment, Truffle Framework, Ganache, Unit Testing, Ethereum Accounts, MyEtherWallet	Using Bloc Application Centralized Public Bloc Blockchain Finalizing H coding on b with blockc	ckchain, History s, Digital Signatu Applications, De kchain Environm Concepts: Introd Blocks, Currency lockchain: smart hain solutions, lif	v of B ares, Ha eccentral ents, T uction, v aka to contra fe cycle	Changokens, cts, peo	ain. Ex and pub pplicatio Players i UN security er-to-pee ckchain	volution of olic key cry ons, Stages in Blockcha IT – II Blocks, Hash on blockc er network, transaction	f Blockchain : ptosystems, priva in Blockchain Evo in Ecosystem, Pla hing, Merkle-Tree hain, data storage types of blockcha	Evolution of te vs. public olution, Con yers in Mar e, Consensus e on blockch ain nodes, ri	of Computer c Blockchain. isortia, Forks, ket. s, Mining and hain, wallets, isk associated		
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UNIT – IV Ethereum Blockchain Implementation: Introduction, Tuna Fish Tracking Use Case, Ethereum Ecosystem, Ethereum Development, Ethereum Tool Stack, Ethereum Virtual Machine, Smart Contract Programming, Integrated Development Environment, Truffle Framework, Ganache, Unit Testing, Ethereum Accounts, MyEtherWallet	Architecting Evaluation Application Blockchain for Designir	g Blockchain solu Framework, E s. Cryptographic Solutions, Archi ng Blockchain Ap	itions: 1 Blockch Token tecture	Introdu ain S s, Typi Consi ons	ction, O olutions ical Solu derations	bstacles for Referenc ition Archit s, Architect	Use of Blockchai e Architecture, tecture for Enterp ture with Blockch	in, Blockcha Types of rise Use Ca ain Platforr	in Relevance Blockchain ses, Types of ns, Approach		
Ethereum Blockchain Implementation: Introduction, Tuna Fish Tracking Use Case, Ethereum Ecosystem, Ethereum Development, Ethereum Tool Stack, Ethereum Virtual Machine, Smart Contract Programming, Integrated Development Environment, Truffle Framework, Ganache, Unit Testing, Ethereum Accounts, MyEtherWallet					UN	IT – IV					
	Ethereum Blockchain Implementation: Introduction, Tuna Fish Tracking Use Case, Ethereum Ecosystem, Ethereum Development, Ethereum Tool Stack, Ethereum Virtual Machine, Smart Contract Programming, Integrated Development Environment, Truffle Framework, Ganache, Unit Testing, Ethereum Accounts, MyEtherWallet										
$\mathbf{UNIT} - \mathbf{V}$					UN	$\mathbf{IT} - \mathbf{V}$					
Hyperledger Blockchain Implementation, Introduction, Use Case - Car Ownership Tracking,	Hyperledger	Hyperledger Blockchain Implementation, Introduction, Use Case - Car Ownership Tracking,									

Hyperledger Fabric, Hyperledger Fabric Transaction Flow, FabCar Use Case Implementation, Invoking Chaincode Functions Using Client Application.

Text Books:

7. Ambadas, Arshad Sarfarz Ariff, Sham "Blockchain for Enterprise Application Developers", Wiley 2. Andreas M. Antonpoulos, "Mastering Bitcoin: Programming the Open Blockchain", O'Reilly

Reference Books:

- 4. Blockchain: A Practical Guide to Developing Business, Law, and Technology Solutions, Joseph Bambara, Paul R. Allen, Mc Graw Hill
- Mastering Bitcoin: Programming the Open Blockchain, 2nd ed., Antonopoulos, O'Reilly, 2017. ISBN: 978
- 6. Blockchain: Blueprint for a New Economy, Melanie Swan, O'Reilly

Web Resources

1. NPTEL online course : https://nptel.ac.in/courses/106/104/106104220/#

2.Udemy: https://www.udemy.com/course/build-your-blockchain-az/

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

AGILE METHODOLOGIES (AM)											
VII Semest	er : B. Tech						S	Scheme : 2020			
Course Code	Category	Но	ours/W	eek	Credits	Max	Maximum Marks				
OE 412	OEC-III	L	T	P	C	Continuous Internal AssessmentEnd ExamTOTAL					
Sessional E	xam Duration 1 ¹	/ Hrs	U	U	3	40 En	d Exam Du	ration: 3 Hrs			
Course Out	Course Outcomes : At the end of the course the student will be able to										
CO1: Understand the importance of interacting with business stakeholders in determining the											
requirements for a software system											
CO2: Analy	yze iterative softv	vare de	velopm	nent proc	cesses: how	to plan them, how	v to execute	them.			
CO3: Identi	ify the impact of	social a	spects	on softw	vare develop	pment success.					
CO4: Unde	rstand Software p	process	improv	vement a	as an ongoir	ng task for develop	pment teams	5.			
CO5: Analy	CO5: Analyze the Agile Metrics and Quality Assurance Activities										
UNIT – I											
AGILE IVI Traditional I Agile Proje Testing – A AGILE PR Software Do and Practice	AGILE METHODOLOGY: Theories for Agile Management – Agile Software Development – Traditional Model vs. Agile Model - Classification of Agile Methods – Agile Manifesto and Principles – Agile Project Management – Agile Team Interactions – Ethics in Agile Teams - Agility in Design, Testing – Agile Documentations – Agile Drivers, Capabilities and Values UNIT – II AGILE PROCESSES: Lean Production - SCRUM, Crystal, Feature Driven Development- Adaptive Software Development - Extreme Programming: Method Overview – Lifecycle – Work Products, Roles										
				UN	IT – III						
AGILITY Making - Acquisition, Managing S Sharing – R	AND KNOWL Earl_S Schools , Refinement, D Software Knowled ole of Story-Card	EDGE of Kl istribut dge – C ls – Sto	MAN M – I ion, D Challen ry-Car	AGEM Institutio eploymo ges of N d Matur	ENT: Agilonal Know ent , Leven Aigrating to ity Model (A	le Information Sy ledge Evolution raging – KM in o Agile Methodolo SMM).	ystems – A Cycle – Software I ogies – Agil	gile Decision Development, Engineering – le Knowledge			
				UN.	11 – 1V						
AGILITY AND REQUIREMENTS ENGINEERING: Impact of Agile Processes in RE–Current Agile Practices – Variance – Overview of RE Using Agile – Managing Unstable Requirements – Requirements Elicitation – Agile Requirements Abstraction Model – Requirements Management in Agile Environment, Agile Requirements Prioritization – Agile Requirements Modeling and Generation – Concurrency in Agile Requirements Generation											
UNIT – V											
AGILITY AND QUALITY ASSURANCE: Agile Product Development – Agile Metrics – Feature Driven Development (FDD) – Financial and Production Metrics in FDD – Agile Approach to Quality Assurance - Test Driven Development – Agile Approach in Global Software Development.											
Text Books	:										
1. David J.	Anderson and Eli	i Schrag	genheir	n, —Ag	ile Manage	ment for Software	e Engineerin	g: Applying			
				-				-			

the Theory of Constraints for Business Results, Prentice Hall, 2003.

2. Hazza and Dubinsky, —Agile Software Engineering, Series: Undergraduate Topics in Computer Sciencel, Springer, 2009.

Reference Books:

- 1. Craig Larman, —Agile and Iterative Development: A Manager_s Guidel, Addison-Wesley, 2004.
- 2. Kevin C. Desouza, —Agile Information Systems: Conceptualization, Construction, and Management^{||}, Butterworth-Heinemann, 2007.

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

	AUGMENTED REALITY & VIRTUAL REALITY (ARVR)									
VII Semest	er : B. Tech						S	cheme : 2020		
Course Code	Category	He	ours/W	eek	Credits	Max	imum Marks			
OE 413	OEC-III	L	T	P	C	Continuous Internal AssessmentEnd ExamTOTAL				
Sessional F	vam Duration 11) / Hrs	U	U	3	40 En	00 d Evem Du	100 ration: 3 Hrs		
Course Out	$\frac{1}{1}$	$\frac{1115}{1115}$	e cours	e the stu	l Ident will b	e able to	u Exam Du			
CO1: Explo	ore the history of	spatial of	comput	ting and	design inte	ractions				
CO2: Understand the foundational principles describing how hardware, computer vision algorithms										
function .		r	F		8			,		
CO3: Learn Virtual reality animation and 3D Art optimization.										
CO4: Demonstrate Virtual reality										
CO5: Introduce to the design of visualization tools										
UNIT – I										
Designing and Art Across Digital Realities: Introduction, Modalities, Types of common HCI modalities, New Modalities, The current state of modalities for spatial computing Devices, current controllers for immersive computing systems, Voice, Hands and Hardware inputs over the next generation. Designing for our senses, not our devices: Envisioning a future, sensory technology, The Role of women in AI, Sensory Design Five sensory Principles Adobes' AR										
	UNIT - II									
Virtual Real 3D Art Opt Versus Maki	lity of Art: A more imization: Introdu ng them from scrat	e natural ction, E cch.	l way of Draw Ca	making alls, Usir	3D art, VR i ng VR Tool	for animation s for creating 3D A	Art, Acquirin	g 3D Models		
	-			UN	III – III					
Computer v Platform, Ma Virtual Rea engines, und	ision that makes a apping, platforms, o lity and Augmen erstanding 3D Graj	augmen other De ted Rea ohics, Po	ited rea evelopm ality – ortabilit	nlity Poss nent cons cross- p y lessons UN	sible works: iderations, T blatform the from video IT – IV	History of AR, Ho The AR Cloud eory: Why cross p game design, simpl	w and why t latform, The ifying the co	o select an AR e role of game ntroller input.		
Virtual Real	lity Toolkit: What	is VRT	TK, His	tory, Stea	am VR Unit	y Toolkit, VRTK v	4, future of V	/RTK, success		
of VRTK	-			•		-				
Three Virtu Locomotion paradigms, In	al Reality and A in VR, Locomotion nventory of VR, Au	n in AR	ted Re , Effect ed Reali	ality De ive use c ity Rayca	velopment of Audio, Au sts	Best Practices: H Idio in VR, Audio i	andling Loco n AR, Comn	omotion, non interaction		
UNIT – V										
Data and M understandin spatial comp vs 3D data animation, fa info graphics data visualiz visualization	Data and Machine learning visualization Design and Development in spatial computing: Introduction, understanding data visualization, principles for data and machine learning visualization design and development in spatial computing, why data and machine learning visualization works in spatial computing, 2D data visualization vs 3D data visualization in spatial computing, interactivity in data visualizations and in spatial computing, animation, failures in data visualization, good data visualization design optimize 3D spaces, data representations, info graphics, and interactions, defining distinctions in data visualization and big data for machine, how to create data visualization: data visualization creation pipeline, webXR, data visualization challenges in XR, data visualization industry use case examples of data visualization, 3D reconstruction and direct manipulation of real									

world data, data visualization is for everyone, hands on tutorials, how to create data visualization, resources. **Character AI and Behaviors:** Introduction, behaviors, current practice: Reactive AI, more intelligence in the system, Deliberative AI, machine learning.

Text Books:

1. Erin Pangilinan, Steve lukas, and Vasanth Mohan, "Creating Augmented & Virtual Realities", 1st edition, O'REILLY, 2019.

Reference Books:

1. Steve Aukstakalnis, "Practical Augmented Reality", Pearson Education, 2017

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

		CC	MPO	SITE N	MATERIAL	S (CM)				
VII Semeste	er: B. Tech					-	Sche	eme: 2020		
Course Code	Category	Ho	ours/W	eek	Credits	Maxin	num Mark	S		
OE 414	OEC – IV	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL		
		3	0		3	40	60	100		
Sessional E	Exam Duration	: 1 ¹ / ₂	Hrs			End Exam l	Duration :	3 Hrs		
Course Out	comos • At the	and of	the co	ursa th	a student wil	l ba abla to				
CO1. Line	for the surgest state									
	Ty the properties	5 01 110	er and	matrix	materials us	ed in commercial	composites	8,		
and its manufacturing techniques.										
CO2: Understand manufacturing methods and their elastic properties of lamina.										
CO3: Analyze the Hooke's law for different type of materials.										
CO4: Understand the elastic behavior of the unidirectional composite										
CO5: Analy	CO5: Analyze a laminated plate in bending, including finding laminate properties from									
lamın	1a.			TIN	JIT_I					
Basic Concepts and Characteristics: Geometric and Physical definitions, natural and man-made										
composites. Aerospace and structural applications, types and classification of composites.										
Reinforcem	ents: Fibers- G	lass, S	Silica, I	Kevlar.	, carbon, bor	on, silicon carbid	le, and bor	on carbide		
fibers. Partic	culate composite	es, Pol	ymer c	ompos	ites, Thermo	plastics, Thermos	ets, Metal r	natrix and		
ceramic com	posites		•							
				UN	IT – II					
Manufactu	ring methods: A	Autocl	ave, taj	pe proc	luction, mou	lding methods, fil	ament wind	ding, hand		
layup, pultru	usion, RTM .									
Micromech	anics: Unidire	ctiona	l com	posites	, constituer	it materials and	properties,	elastic		
properties o	of a lamina, pro	opertie	s of ty	ypical (composite n	haterials, laminate	characteri	stics and		
configuratio	lis. Characteriza		rcomp							
Coordinate	transformation	ns• Ha	oke's	law for	· different ty	nes of materials	Hooke's lay	v for two		
dimensional	unidirectional	lamin	a, Trar	sforma	ation of stres	ss and strain, Nu	merical ex	amples of		
stress strain	transformation.		,			,		1		
				UN	IT – IV					
Elastic beha	aviour of Unid	irectio	onal Co	omposi	ites: Elastic	constants of lami	na, relation	iship		
between engineering constants and reduced stiffness and compliances, analysis of laminated										
composites, constitutive relations.										
Analysis of	laminated co	nnosi	to nlat	oc. Int	roduction the	nin nlate theory	specially o	rthotropic		
plate, cross	and angle ply la	minate	ed plate	es. prob	plems using t	hin plate theory,	specially 0	rillouopic		
1 / 2 2 3 4	<u> </u>		1	1 1						
Text Books										
1. R.M.Jone	s, Mechanics of	Comp	osite N	Aateria	ls Mc Graw	Hill Company, Ne	ew York.			

Isaac and M.Daniel, Engineering Mechanics of Composite Materials, Oxford University Press.
 Madhujit Mukhopadadhyay, Mechanics of composite materials and structures, Universities Press

Reference Books

1. L. R. Calcote, Analysis of Laminated Composite Structures , Van Nostrand Rainfold

2. B. D. Agarwal and L. J. Broutman, Analysis and performance of fibre Composites, Wiley Interscience, New York

Question Paper Pattern:

Sessional Exam :

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (Either or Type) in each section. The student shall answer one question from each section.

End Examination:

	IMAGE PROCESSING (IP)									
VII Semester :	B. Tech						Sc	heme : 2020		
Course Code	Category	Ho	urs/We	eek	Credits	Maxi	mum Mar	KS		
OE 415	OEC-IV	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total		
		3	0	0	3	40	60	100		
Sessional Exam	n Duration : 1	¹ / ₂ Hrs				End	Exam Dur	ation: 3 Hrs		
Course Outcomes : At the end of the course the student will be able to										
CO1: Understand the concepts of F system and various operations that can perform on										
digital in	lages.		<u> </u>	<u> </u>						
CO2: Understand the image enhancement in spatial and frequency domain.										
CO3: Understand various image restoration techniques.										
CO4: Understand various image compression and segmentation techniques.										
CO5: Understa	nd the various r	nathem	natical (ransto	orms, color i	mage concepts an	d processin	g.		
UNIT – I										
Basic Concepts Definition, Applications of Digital Image Processing, Fundamental Steps, Components										
And Quantization Spatial and Gray Level Resolution Image Interpolation Some Basic Relationships										
Between Pixels Linear And Non Linear Operations										
UNIT - II										
UNII - II Imaga Enhancoment										
Spatial Doma Logical And A	in: Basic Gray	y Leve ations.	l Tran Image	nsform Subti	ations, Historation, Imag	ogram Processing e Averaging, Ba	g, Enhance sic of Spat	ment Using ial Filtering.		
Smoothing And	Sharpening Sp	atial F	ilters, (Combi	ning Spatial	Enhancement Me	thods.	6,		
Frequency Do	main: Introduc	ction to	• Fouri	er Tra	ansforms, Ba	sics of Filtering	in Frequer	ncy Domain,		
Fundamental S	Steps in Filter	ing in	Frequ	uency	Domain, S	Smoothing Frequ	ency Dom	ain Filters,		
Sharpening Fre	quency Domain	Filters	s, Hom	omorp	hic Filtering	•				
				UN	III – III					
Image Restora Presence of Not Domain Filterin Filtering, Least	tion Model of I ise Only-Spatial ng, Linear Positi Mean Square F	mage I l Filteri ion Inv Filters, (Degrada ng, Ad ariant I Constra	ation/I aptive Deriva ained 1	Restoration M Filters, Peri tions, Algebr Least Square	Iodel, Noise Mod odic Noise Reduc raic Approach to I s Restoration.	lels, Restora tion by Fre Restoration	ation In quency , Inverse		
				UN	IT - IV					
Image Compression File format (bmp, tiff, pcx, gif, jpeg.), Compression fundamentals, Image Compression Models, Error Free Compression: VLC, Arithmetic Coding, LZW coding, Bit plane Coding, Lossless Predictive Coding, Lossy Compression: Lossy Predictive Coding, Block Transform coding										
Image Segmentation Fundamentals, Detection of Discontinuities: Point, Line, Edge detection, Edge										
Linking and Bo	undary Detection	on: Loc	al Proc	essing	g, Global Pro	cessing via Houg	h Transforn	1.		
				UN	IT - V					
Image Transforms Introduction One and Two Dimensional Discrete Fourier Transform (DFT), Properties of DFT, Properties of Discrete cosine and sine transforms, Properties of Slant, KL transforms.										

Color Image Processing Color fundamentals, Color models: RGB, CMY and CMYK, HSI, Converting colors, RGB to HIS, HIS to RGB manipulating HIS component images, Pseudo color Image Processing, Full Color Image Processing.

Text Books

- 1. Rafael Gonzalez & Richard Woods, —Digital Image Processing^{II}, 3rd Edition. Pearson publications, 2012
- 2. Anil K. Jain, —Fundamental of Digital Image Processing, PHI publication, 2013.
- 3. S. Jayaraman, S. Esakkirajan & T. Veera Kumar, —Digital Image Processing^{II}, Mc. Graw Hill, 2011.

Reference Books

- 1. Pratt, —Digital Image Processing, 2nd Edition, Wiley Publication, 1991.
- 2. S. Sridhar, —Digital Image Processing, Oxford University Press, 2011.

Web References:

- 1. https://nptel.ac.in/courses/117105079/
- 2. https://nptel.ac.in/courses/117104069/
- 3. https://nptel.ac.in/courses/106105032/

Question Paper Pattern:

Internal Assessment: The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

MOBILE COMPUTING(MC)										
VII Semest	er : B. Tech				Scheme : 2020					
Course Code	Category	Н	ours/W	eek	Credits	Max	Iaximum Marks			
OE 416	OEC-IV	L	Т	Р	C	Continuous Internal AssessmentEnd ExamTOTAL				
Sessional F	vam Duration 11	/ J /2 Hrs	-	-	3	40 En	00 d Exam Du	100 ration: 3 Hrs		
Course Out	tcomes : At the er	$\frac{1113}{100}$	e cours	se the stu	l Ident will b	e able to				
CO1: To learn about the mobile infrastructure, radio resource management. overview of generation										
1G to 5G				,		8	U			
CO2: To ill	ustrate the location	on man	agemei	nt involv	red in GSM	, Mobile IP.				
CO3: To ill	ustrate the transm	nission,	transa	ction tec	hnology in	volved in mobile.				
CO4: To ex	plore the wireles	s netwo	ork in n	nobile.						
COS: 10 di	scover the cognit	ive rad	lo netw	orks in i	mobile					
				UN	TT - 1					
Introductio	n Overview of	f wirel	ess and	d mobil	e infrastrug	cture, Preliminary	concepts	on cellular		
architecture	architecture, Design objectives and performance issues, Radio resource management and interface,									
assignment strategies. Overview of generations: - 1G to 5G										
UNIT – II										
Location A Mobility me Activity bas based group update, Rej Movement, Location me performance vertical).	And Handoff M odels characteriz sed), Mobility m o mobility mode porting Cells, L Distance, Profil anagement and M e evaluation metr	fanage ing ind odels c l, Com location le Base Mobile ics, Ha	ment lividua haracte munity n Area d), Te IP, Ov ndoff s	Introduc 1 node 1 erizing ti 2 based as) and rminal 1 verview trategies	tion to lo novement he moveme group mot Dynamic Paging (Sin of handoff s, Different	cation manageme (Random walk, F ent of groups of n bility model), Stat location managem nultaneous paging process, Factors types of handoffs	nt (HLR a luid flow, 1 nodes (Refe tic (Always ment scher g, Sequenti affecting ha (soft, hard,	and VLR), Markovian, rence point s vs. Never nes (Time, ial paging), andoffs and horizontal,		
,				UN	IT – III					
Wireless Transmission Fundamentals Introduction to narrow and wideband systems, Spread spectrum, Frequency hopping, Introduction to MIMO, MIMO Channel Capacity and diversity gain, Introduction to OFDM, MIMO-OFDM system, Multiple access control (FDMA, TDMA, CDMA, SDMA), Wireless local area network, Wireless personal area network (Bluetooth and zigbee).										
Wireless N	etwork Mobile	Ad-ho	oc net	works -	Character	istics and applic	ations: Co	verage and		
connectivity problems, Routing in MANETs, Wireless sensor networks - Concepts, basic architecture, design objectives and applications; Sensing and communication range, Coverage and connectivity, Sensor placement, Data relaying and aggregation, Energy consumption, Clustering of sensors, Energy efficient Routing (LEACH).										
				UN	$\mathbf{T} \mathbf{T} - \mathbf{V}$					
Cognitive	Radio Networks	s Fixe	ed and	dynami	ic spectrun	n access, Direct a	and indirect	spectrum		

sensing, Spectrum sharing, Interoperability and coexistence issues, Applications of cognitive radio networks, Introduction to D2D communications-High level requirements for 5G architecture, Introduction to the radio resource management, power control and mode selection problems, Millimeter wave communication in 5G.

Text Books:

7. Jochen Schiller, "Mobile Communications", Second Edition, Pearson, 2004.

8. Andrea Goldsmith, "Wireless Communications", Cambridge University Press, 2005

Reference Books:

1. Theodore Rappaport, "Wireless Communications: Principles and Practice", Pearson Education, 2014.

2. Ezio Biglieri, MIMO, "Wireless Communications", Cambridge University Press, 2009.

3. Ivan Stojmenovic, "Handbook of Wireless Networking and Mobile Computin", Wiley, 2002.

4. James Cowling, "Dynamic Location Management in Heterogeneous Cellular Networks", 2004.

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

VII Semester	r : B. Tech								
Course							S	Scheme : 2020	
Code	Category	Hours/Week			Credits	Max	imum Marks		
OE 417	OEC-IV	L	Т	Р	C	Continuous Internal Assessment	End Exam	TOTAL	
Sessional Ex	am Duration 1 ¹ /	2 6 Hrs	-	2	3	40 En	00 d Exam Du	100 ration: 3 Hrs	
Course Outo	comes : At the en	$\frac{2}{1113}$	e cours	e the stu	ıdent will b	e able to			
CO1:Unders	tand basic eleme	ents of	Enterp	rise Syst	ems				
CO2:Develo	p skills in under	standin	g archi	tecture					
CO3:Unders	tand the applicat	tion pat	terns						
CO5: Analyz	tand the integrat	10n and	i patter	ns					
COS. Allaryz	ze the deployment	III							
				UN	I - TI				
Introduction enterprise sys systems, Fina Components management,	Introduction to Modern Enterprise Systems : Introduction to enterprise systems. Elements of enterprise systems – Business Information system, Decision support systems, Knowledge management systems, Financial and human resource systems. Kinds of Enterprise systems- B2C and B2B models. Components of Enterprise systems: Channels (Mobile, web, desktop, partner integration), Data management, workflow, Controlling and Auditing, Accounting etc.								
				UN	IT – II				
Key charact Collaboration Enterprise S oriented, mic	teristics Enterp n, Data transform System architect ero service, and c	rise sy nation. t ures : l cloud an	stems: Batch p rchitect	Distrib processin tures.	utivity, Ma ng, Monolit	nnaged redundanc	y, Exceptio ecommerce	n processing, , service	
				UN	IT – III				
Introduction to Enterprise Application architectures: Layer Architecture, Event driven Architecture, Service oriented Architecture, Micro service architecture, Plug-in architecture. Application architecture Patterns: Layering, Organizing domain logic, Mapping to database, Web Presentation, Concurrency.									
				UN	IT – IV				
 Enterprise Application Integration: Introduction to Enterprise Integration, different integration styles. Elements of messaging-based Integration. Enterprise Integration patterns: Modern service integration techniques. Introduction to WSDL, SOAP. Introduction RESTFul webservices integration. Differences between SOAP and REST. 									
	$\mathbf{UNIT} - \mathbf{V}$								
Deployment Security, ava Introduction architecture r	Deployment of Enterprise applications: Key requirements in deployment - Stability, capacity, Security, availability, Network, Availability, and Transparency (Basic Introduction only). Introduction to Enterprise Architecture : Importance of Enterprise Architecture. Enterprise architecture models. Zachman Framework, TOGAF Framework.								

Text Books:

- 1. Ralph Stair, George Reynold, "Principle of Information Systems", 10 ed.
- 2. Martin Fowler et al, "Pattern of Enterprise Application Architecture", Addison-Wesley, 2012
- 3. Gregor Hohpe, Bobby Woolf, Enterprise Integration Patterns: Designing, Building, and Deploying Messaging Solutions,

Reference Books:

- 1. Mark Richards, Software Architecture patterns, 2015, O'Reilly.
- 2. Sam Newman, "Building Microservices", 2015,O'Reilly.

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

MODERN WEB APPLICATIONS (MWA)											
VI Semeste	r:B.Tech						S	Scheme : 2020			
Course Code	Category	Н	ours/Week		Credits	ts Maximum Marks					
OE 418	OEC-IV	L	Т	Р	С	Continuous Internal Assessment	ContinuousEndInternalExamAssessmentTOTAL				
Constant I D											
Sessional Exam Duration: 1/2 Hrs End Exam Duration: 3 Hrs Course Outcomes: At the end of the course the student will be able to											
CO1: Unde	CO1: Understand the various steps to design static websites										
CO2: Deve	lop a Web Page	using th	ne HTN	<u>а</u> L5.							
CO3: Apply	CSS effectively	to crea	te inte	ractive v	vebsites.						
CO4: Imple	ement client-side	scripti	ng usin	ig JavaS	cript to desi	gn dynamic webs	ites.				
CO5: Deve	elop end to end ap	plicati	on - we	eb fronte	and and bac	kend development					
				UN	I - TI						
Introduction websites: St and Web Pr Tier Model,	Introduction to Internet & World Wide Web: Concept of website, its need and purpose, Types of websites: Static and dynamic website, Web Browsers, – Web Servers, Uniform Resource Locator, Tools and Web Programming Languages. Web Standards, Tiered Architecture: Client Server Model, Three Tier Model, Service Oriented Architectures, REST services, Introduction to HTML, XML, JSON										
				UN	IT – II						
Hyper Text formatting t and Externa	t Mark Up Lar ags, Adding ima l Linking, Frame	iguage ges, Li s, Form	: - Lar sts, Er 1s	nguages nbedding	used for v g multimed	vebsite developme ia in Web pages,	ent, HTML Inserting ta	5: basic tags, ables, Internal			
				UN	IT – III						
Cascading sheet, Intern	Style Sheets (CS al style sheet, Inl	SS3): E line styl	asics o le shee	of Casca t, CSS S	ding Style yntax, colo	sheets, Advantage r, background, Fo	es of CSS, I nt, images	External Style			
				UN	IT – IV						
Java Script variables, ta Iterative stat	Java Script: Features of JavaScript, extension of JavaScript, Syntax of JavaScript: data types, operators, variables, tag, Document Object Model (DOM) with JavaScript, Selection Statement using if and Switch, Iterative statement: for, for/in, while, do while, break and continue										
UNIT – V											
Front End Framework : Introduction to jQuery - Syntax, Selectors, Events, Traversing, AJAX ; Introduction to Bootstrap – Basics, Grids, Themes ; Angular JS – Expressions, Modules, Data Binding, Scopes, Directives & Events, Controllers, Filters, Services, Validation											
Back End Technologies: Introduction to RESTful services, Resources, Messages (Request, Response), Addressing, Methods – (GET, POST, PUT, DELETE)											
Text Books	Text Books:										

- 4. Deitel and Deitel and Nieto, —Internet and World Wide Web How to Programl, Prentice Hall, 5th Edition, 2011.
- 5. HTML5 Black Book,2nd Edition, Dreamtech Press,2016.
- 6. HTML & CSS: Design and Build Websites, Jon Duckett, John Wiley & Sons
- 7. RESTful Web Services: Leonard Richardson, Sam Ruby, May 2007

Reference Books:

- 2 Web Technologies, Uttam K. Roy, Oxford Higher Education., 1st edition, 10th impression, 2015.
- 3 Robert Pattinson, Beginners Guide for HTML and CSS Web Design and Web Development,2018
- 4 Jeffrey C and Jackson, —Web Technologies A Computer Science PerspectivePearsonEducation, 2011.
- 4. Gopalan N.P. and Akilandeswari J., -Web Technology, Prentice Hall of India, 2011.

Web References:

- 1. https://www.tutorialspoint.com/Html/index.htm
- 2. https://www.w3.org/Style/CSS/
- 3.Bootstrap CSS Framework: <u>https://getbootstrap.com</u>
- 4. https://docs.angularjs.org/api/ng/function/angular.element

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

		CC)GNIT	IVE R	ADIO (CR	()				
VII - Semester: B. T	Tech				Scheme:2020					
Course Code	Category	Hou	rs/Weel	K	Credits	Max	ximum Marks			
OE 419	OEC-IV	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOT AL		
C	• 1 1/ TT	3	-	-	3	40 End E	<u>60</u>	100 2 Harr		
SessionalExamDurat	10n:1 ½ Hrs.					End E	xam Duration:	3 Hrs.		
Course Out comes: At the end of the course the student will be able to										
CO1: Understand the	Coll: Understand the architecture of SDR and management of unlicensed spectrum									
C02: Analyze the Aw	vare and Adam	of SD1	ognitive	radios	5.	leenseu speetrum				
CO3: Analyze the sp	ectrum aware	ness ai	nd inter	ference	e avoidance					
CO4: Understand tec	chnical challer	nges in	CR and	l vario	us spectrun	n sensing method	ds.			
CO5: Analyze the Ol	FDM based C	ognitiv	ve radio	and M	IIMO-OFD	M channel estim	nation			
				UNII	-I					
Software defined Radio: Basic SDR – Software and Hardware Architecture of an SDR – Spectrum Management – Managing unlicensed spectrum–Noise Aggregation-Component development–Wave form development– Cognitive wave form development										
				UNIT	-II					
Cognitive Radio Tecl Radio capabilities and	nnology: Intro Properties–A	oductic vailab	on–Radi le Techi	oflexit	oilityandcap es–IEEE 80	oability–Aware– 2 Cognitive Rac	Adaptive–Com lio related activi	parison of ities.		
Snectrum Awareness	•			UNII	-111					
Introduction, The Interf Creating Spectrum As analysis, Distributed se	erenceavoidan wareness-Specensing and op-	ncepro ctrum eratior	blem,Co usage 1 1, Chanr	ognitiv eportin nel awa	veRadioRolo ng, Spectru areness and	e,Spectralfootpri m sensing, Pote multiple signals	intminimization ential Interferer in space	, nce		
Cognitive Radio tech	nical challens	ges an	d spect	rum se	ensing:					
Design Challenges as Detecting spread spee	ssociated with	CR -H	Hardwar -Sensing	e requi	irements-H	idden primary us quency-Security	ser problem-			
				UNIT	-V					
Spectrum sensing Spectrum sensing over stationary based sensing sensing methods.	erview – Cla ng –Energy d	etector	tion -	Matche sensin	ed filter – g –Radio Io	waveform base lentifier– Coope	ed sensing – c erative sensing-	yclo- other		
Text Books:										
1.BruceA.Fetti,-C 2.H.Arslan-Cogni	Cognitive Radi tiveRadio,SDF	otechn RandAd	ology", daptiveV	1 st Edit Vireles	tion,Elsevie s <i>Systems</i> ,S _]	r. pringer,2007.				
References:										

1.K.C.Chen, R.Prasad, —Cognitive Radio Networks, Wiley, 2009.

2.J. H. Reed, —Software Radiol, Pearson, 2004.

3. Paul Burns, —Software defined radio for 3Gl, Artech House, 2003.

WebReferences:

1.https://nptel.ac.in/courses/108107107/3

2.<u>https://www.youtube.com/watch?v=hzxgDyXbpt4</u>

3.https://www.youtube.com/watch?v=z-E5jIoUFbA

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ORType)ineachsection. The student shall answerone question from each section. **End Examination:**

AUTOMATION & CONTROL (AMC)											
VII Semester :	B. Tech				Scheme : 2020						
Course Code	Category	Hou	ırs/We	ek	Credits	Μ	aximum Mark	S			
OE 420	OEC- IV	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL			
		3	0	0	3	40 60 100					
Sessional Ex	am Duration :	1 ½ H	[rs			End E	Exam Duration	: 3 Hrs			
Course Outo CO1: Under CO2: Under CO3: Under CO3: Under CO4: Under CO5: Under Automation in and strategies of Levels of auton without storage Pneumatic Sys structure and si air reservoir, co direction contro Symbols of pro- indirect control Introduction t hydraulic powe calculations, ho pressure contro Control Techn Manufacturing Forms. Comput Blocks of Auto	comes : At the en- stand the elemen stand the constru- stand the workin stand various con- stand various con- stand the automa of automation, Ba nations, Automate of automated flow of pre- stems: Introducti gnal flow of pne- onstructional deta of actuators, con- ter pack, hydraulic ses size calculation of automatic system industries, Cont- ter Based Industri mation System: I	ad of t ts of a iction g of h ntrol t ated ted g Indu asic elected flo w line con to umatic ails an valves travers travers travers travers c fluid ons, hy ntrol v inuous cial Co LAN,	he count and work ydrauli echniq sting a stries: ements w line: s with pneum c system d work f single Advart s, filter ydrauli valves, n: Indu s Verse ontrol: 1 Analog	rse the tion p prking ic syst ues in nd ins Un a Intro a of an s and t storag UN atic sy ms; pr cing of contro e diagn e and i UN atages rs, typ c actu open- UN ustrial es Disc Introd g & D	student wil rinciples of pneuma ems automation pection met NT - I duction- Au automated a ransfer mec e buffers. T - II vstems: adva eumatic por f filter, lubri of valves, pn am, design multiple act T - III and limitati es of hydrau ators and ac center and oc IT - IV Control Sys crete Contro uction & Au igital I/O M	ll be able to tic systems hods in industr tomation in pro system, Advan chanisms, Anal antages and lim wer pack: air g cator, pressure eumatic counte of manually o uators. ons, physical p alic pumps, pur cessories, accu closed-center h stems, Process l, Computer Pr tomatic Process codules, SCAD	y oduction system ced automation ysis of transfer nitations, applic eneration and d regulator, actu er. perated circuits rinciples of oil mp performance unulator, hydra ydraulic system Industries Vers cocess Control <i>a</i> ss Control, Buil A System & RT	n, Principles functions, lines ations, istribution, ators, :: direct and hydraulics, e ulic valves, ns. es Discrete- ind its ding TU.			
UNIT - V Automated Inspection and Testing: Inspection and testing, Statistical Quality Control, Automated Inspection Principles and Methods, Sensor Technologies for Automated Inspection, Coordinate Measuring machines, Other Contact Inspection Methods, Machine Vision, Other optical Inspection Methods. Text Books : 1 Mikell D. Crosswar "Automation Production Systems and Computer Integrated											
Manufa	1. Mikell-PGroover "Automation-Production-Systems-and-Computer-Integrated- Manufacturing"-Ed-4-2015, Pearson publishers										

2. Majumdar S.R., "Pneumatic Systems Principles and Maintenance", Tata McGraw Hill, New Delhi.
3. Peter Croser and Frank Ebel, "Pneumatics Basic Level TP 101" Festo Didactic GMBH & Co,
Germany.
4. Hasebrink J.P. and Kobler R., "Fundamentals of Pneumatic Control Engineering", Festo
5. Krishna Kant "Computer Based Industrial Control" -PHI
6. Groover M. P., "Industrial Robotics, Technology, Programming and Application", McGraw Hill Book and Co., 2012.
Reference Books :
 Merkle D., Schrader B. and Thomes M., "Hydraulics Basic Level TP 501" Festo Didactic GMBH & Co, Germany.
2. Peter Rohner, "Industrial Hydraulic Control" John Wiley and Sons, Brisbane
3. Tiess Chiu Chang & Richard A. Wysk "An Introduction to Automated Process Planning Systems"
4. Amber G.H & P.S. Amber "Anatomy of Automation" PrenticeHall
 Srinivas Medida, "Pocket Guide on Industrial Automation", First Edition, IDC Technologies, 2008
Web References:
1. https://www.electrical4u.com/industrial-automation/
2. https://conceptsystemsinc.com/what-is-industrial-automation-types-of-industrial-automation
3. https://www.thomasnet.com/articles/automation-electronics/general-automation-systems
Question Paper Pattern:
Internal Assessment: The question paper for sessional examination shall be for 25 marks, covering
half of the syllabus for first sessional and remaining half for second sessional exam. The question paper
shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student
shall answer one question from each section.
Fud Evam: The question paper for End evamination shall be for 60 marks. The Question paper shall

	Н	IUMAN	RES	OURCE	MANAGI	EMENT (HRM)			
VII Semester : B. Tech					Scheme : 2020				
Course Code	Course CodeCategoryHours/Week					s Maximum Marks			
OE 421	OEC-IV	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL	
		3	-	-	3	40	60	100	
Sessional E	Exam Duration 1	1⁄2 Hrs				En	d Exam Du	ration: 3 Hrs	
Course Ou	tcomes :At the e	nd of th	e cours	se the stu	udent will b	e able to			
CO1: Under	rstand human res	source m	anage	ment con	ncept and cl	nallenges			
CO2:Under	stand human reso	ource sy	stem d	esign					
CO3: Unde	rstand Functiona	l Areas	of HRI	N					
CO4: Understand human resource planning									
CO5: Under	rstand human res	source m	anage	ment in	Service Sec	tor			
				UN	NIT – I				

HUMAN RESOURCE MANAGEMENT: Concept And Challenges: Human Resources Management – Meaning, Definitions, Characteristics, Objectives, Importance, Functions and Process, Challenges, Recent Trends -Human Resources Manager – Duties and Responsibilities. The Components Of HR Systems: HR Philosophy; HR policies, practices and processes

UNIT – II

HUMAN RESOURCE SYSTEM DESIGN: HR Profession- Human Resource(HR) Professional Qualities and Skills ;HR Department-Meaning, Definitions, Characteristics, Objectives, Importance, Functions and Process of Human Resources Development-Differences between personnel Management and Human Resources Development; Line Management Responsibility in HRM; Performance Evaluation and Management: Selected Evaluation Techniques; Human Resource Accounting And Audit: Definition Of Human Resource Accounting (HRA), Need, Significance, Objectives For Hr, Measurements In HRA, Meaning of Human Resource Audit ,Need Of Human Resource Audit Conducting Human Resource Audit, Human Resource Audit Process; Information Management In HRA.

UNIT – III

Functional Areas of HRM: Recruitment and Staffing: Strategic recruitment decisions, Types of recruitment-Internal recruitment, External recruitment, Selection process, Staffing global assignments; Compensation and Reward System: Compensation - Meaning, Definitions, Objectives and Importance-Wages and Salary Perquisites, Fringe Benefits, Bonus and Incentives – Meanings only, incentives in sun rise sector and sun set sector.

Employee Relations - Define employee relations, four methods for managing employee relations; HR compliance: Meaning and Importance;

Human Resource Information Systems: Importance of HR Information Systems Features of HR Information Systems, Designing And Implementing an HRIS;

Payroll Management: What is Payroll Management, Importance of Payroll Management, Payroll Management, Payroll Processing Stages, Methods of Payroll Management.

UNIT – IV

Human Resource Planning: Strategic and Human Resource Planning, The HR Planning Process; Training And Development: Introduction: Training-Objectives, Training Process of training, Training needs assessment, Training evaluation, Development-Development process, Development needs analysis, Succession planning.

UNIT – V

Strategic Management of Human Resources: SHRM, relationship between HR strategy and overall corporate strategy, HR as a Factor of Competitive Advantage, Managing Diversity in the Workplace. **Human Resource Management in Service Sector:** Managing Human Element in Service Sector: Human Element in Service Sector – Introduction, Role and Significance; The Services Triangle ; Front Line Employees /Boundary Spanners – Meaning, Issues Faced by Front Line Employees: Person/Role Conflicts, Organization/Client Conflict, Inter client Conflict; Emotional Labour – Meaning, Strategies for Managing Emotional Labor; Flexible Working Practices – Implications for HR.

Text Books:

1. Prof. Gary Dessler, Human Resources Management, Pearson, 16th Edition, 2020.

- 2. Prof.JohnM.Ivancevich, "Human Resource Management", Tata McGraw Hill Publication, 12th Edition, 2003.
- 3. Prof.Aswathappa, "Human Resource Management and Personnel Management", 3 rd Edition, Tata McGraw Hill, 2002.

Reference Books:

9. Dr.C.B.Gupta, "Human Resource Management ", Sultan Chand & Sons, New Delhi, 1st Edition, 2018.

10. Prof.S.S.Khanka, "Human Resource Management", Chand & Company, New Delhi, 2019

11. Dr.S.Seetharaman et al., "Human Resource Management", SciTech Publications Pvt Ltd. Chennai,2012.

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

DESIGN PATTERNS (DP)										
VII Semest	er: B. Tech				Scheme: 2020					
Course Code	Category	Hours/Week			Credits	Maximum Marks				
OE 422	OEC-IV	L	Т	Р	С	Continuous Internal AssessmentEnd ExamTOTAL				
Coorter al T	Den die ee	3	0	0	3	40	60	100		
Sessional E	xam Duration:	$\frac{11/2}{\text{nd of th}}$		End Exa	m Duration: 3 H	rs				
CO1: Unde	erstand the usage	$\frac{100010}{000000000000000000000000000000$	on natt	$\frac{se me st}{erns for}$	solving obi	ect-oriented design	n problems			
CO2: Desc	ribe the creationa	l natter	ns abst	tract fact	orv. factory	v method, builder.	prototype, a	nd singleton.		
CO3: Unde	erstand structural	pattern	s: adar	oter, brid	ge, compos	site, decorator, faca	ade, fly weig	ght, proxy.		
CO4: Expla	ain behavioral par	tterns c	hain of	f respons	sibility, con	nmand, interpreter,	, iterator, me	ediator,		
mem	ento, observer, s	tate, str	ategy,	template	e method, a	nd visitor.				
CO5: Expla	ain the patterns u	sed in s	olving	design j	problems of	f Lexi Document E	Editor			
				UI	NIT – I					
Design Pat Design Patt How Design	tern Introduction erns, Organizing n Patterns Solve 1	on: Wl the Ca Design	nat Is talog, Proble	a Design How to ms?	n Pattern, I Select a De	Describing Design esign Pattern, How	Patterns, the to Use a D	he Catalog of esign Pattern,		
110 11 2 0018			110010	UN	II – II					
Creational Pattern, Sin	Creational Patterns: Abstract Factory Pattern, Builder Pattern, Factory Method Pattern, Prototype Pattern Singleton Pattern									
				UN	III – III					
Structural Pattern, Fly	Patterns: Adap weight Pattern, F	ter Pate Proxy Pate	tern, E attern.	Bridge P	attern, Cor	nposite Pattern, D	Decorator Pa	ttern, Facade		
		•		UN	IT – IV					
Behavioral Pattern, Me method Patt	Behavioral patterns: Chain of responsibility Pattern, Command Pattern, Interpreter Pattern, Iterator Pattern, Mediator Pattern, Memento Pattern, Observer Pattern, State Pattern, Strategy Pattern, Template method Pattern, Visitor Pattern.									
				UN	NIT – V					
A Case Study: Designing a Document Editor, Design Problems, and Document Structure, Formatting, Embellishing the User Interface, Supporting Multiple Look-and-Feel Standards, Supporting Multiple Window Systems, User Operations Spelling Checking and Hyphenation.										
Text Books:										
1. Erich Gamma [2008], Design Patterns elements of reusable object oriented software, Pearson Education.										
2. Frank Buschmann, RegineMeunier, Hans Rohnert, Peter Sommerlad, Michael Stal, PatternOriented Software Architecture: A System of Pattern, John Wiley & Sons; 1996.										
Reference	Books:									
1. Mark Gra	and, Pattern's in .	JAVA	Vol-I, '	Wiley D	reamTech					

- 2. Mark Grand, Pattern's in JAVA Vol-II, Wiley DreamTech
- 3. Mark Grand [2006], JAVA Enterprise Design Patterns Vol-III, Wiley DreamTech
- 4. Eric Freeman-Oreilly-spd, Head First Design Patterns.
- 5. Alan Shalloway, Design Patterns Explained, Pearson Education.

Web References:

1. https://sourcemaking.com/design_patterns

2. https://www.oodesign.com/

Question Paper Pattern:

Sessional Examination:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:
PRESTRESSING SYSTEMS (PS)										
VII Semester :B. 7	Scheme : 2020									
Course Code	Category	Ho	urs/W	'eek	Credits Maximum Marks					
OE 423	OEC-IV	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total		
		3	-	-	3	40	60	100		
Sessional Exam D	uration: 1½ H	Irs		End Exam Duration: 3 Hrs						
Course Outcomes : At the end of the course the student will be able to										
CO1: Understand	the various me	and syn thods	of pro	tensio	-stressing.					
CO2: Understand	the various me	thods	of pos	t tensi	oning					
CO4 : Determine t	the losses in pr	e-tensi	ioned	and no	oning st-tensione	ed members				
CO5: Analyse the	prestressed m	ember	s with	straig	ht. concent	tric and eccentr	ic tendons.			
	preseressed in		U	NIT –	I		ie tenaons.			
Introduction: Hist	orical develop	ment -	- Gene	eral pri	nciples of	prestressing – I	Pretensionin	g and		
post tensioning – A	Advantages an	d limi	tations	s of pr	estressing -	- Need for higl	h strength st	eel and		
high grade concrete	e for prestresse	ed elen	nents -	- Prest	ressing ty	pes.	_			
			U	NIT -	II					
<i>Methods and Systems of Pretensioning:</i> Pre tensioning methods – Tensioning devices -Long line system (Hoyer system) - Individual Mould System - Strut system (ShorerChalos System) –										
Comparison of the	various system	ns - Pr	recast	elemei	nts – Poles	, Masts, Pylons	and railway	/		
sleepers their advar	ntages and disa	advant	ages,	applic	ations and	manufacturing	techniques			
Mothods and Sust	ame of Postia	nsiani	<u>иа</u> . Т	onsion	ing device	for post tensiv	oning Met	hods of		
post tensioning - M System, Prescon	MagnelBlatons System, Baur	system – Le	, Frey conhai	vssinet dt Sy	system, C stem – C	offord Udall sy omparison of	ystem, Lee Pretensionin	McCall ng and		
Posttensioning syst	tems									
			UN	TIV – T	IV					
<i>Losses of Prestress:</i> Losses of prestress in pre tensioned and post tensioned members due to instantaneous losses – elastic deformation, friction and anchorage slip; time-dependent losses – shrinkage, creep and relaxation of stress.										
UNIT - V										
<i>Analysis of Sections for Flexure:</i> Elastic analysis of concrete beams prestressed with straight, concentric, eccentric, bent and parabolic tendons – Kern lines – Cable profile.										
1. IN. Krisnna Kaju, <i>Prestressed Concrete</i> , Sixth Edition, Tata McGraw–Hill publishing Company Limited.										
 Praveen Nagarajan, <i>Prestressed Concrete</i>, Pearson Education Inc., New Delhi. G.S. Pandit, S.P. Gupta, Prestressed Concrete, CBS Publishers and Distributors Pvt. Ltd., 										
Vijayawada.										
Neuropean Computer A fundamental menuse d. Deputies Hall										
Reference Codes:										
Reference Codes.										

1. IS 1343-2012, Code of Practice for Prestressed Concrete, BIS, New Delhi.

2. IS 456-2000, *Code of Practice for plain and reinforced concrete*, BIS, New Delhi. **Question Paper Pattern:**

Sessional Exam: The question paper for sessional examination is for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of Three Sections with Two Questions (EITHER / OR type) in each section. The student shall answer one question from each section.

End Exam: The question paper for end examination is for 60 marks. It shall consist of Five Units, each containing Two Questions (EITHER / OR type) from each unit of the syllabus, with a weightage of 12 marks. Each of these questions may contain sub-questions. The student shall answer one question from each unit.

ADDITIVE MANUFACTURING TECHNOLOGY (ADMT)									
VII Semester: B. Tech Scheme : 2020									
Course Code	Category	Hours/Week			Credits	Maximum Marks			
OE 424	OEC – IV	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL	
		3	-	-	3	40	60	100	
Sessional E	Exam Duration	: 1 ¹ / ₂	Hrs			End Exam l	Duration :	3 Hrs	
Course Outcomes : At the end of the course the student will be able to									
CO1: Under	rstand prototypi	ng, and	d the p	hases o	f Rapid proto	otyping.			
CO2: Under	rstand the rapid	protot	yping p	process	chain.				
CO3: Under	rstand the functi	oning	of Liqu	uid bas	ed rapid prot	otyping systems.			
CO4: Under	rstand the functi	oning	of Pow	der ba	sed rapid pro	totyping systems.			
CO5: Under	rstand the Direc	t meth	ods of	Toolin	g and Indirec	t methods of Too	ling.		
				UN	I – TI				
Introduction: Historical Development, Definition of prototype, types of prototypes, Role of prototypes, Three phases of development leading to Rapid prototyping, Fundamentals of rapid prototyping, Applications and advantages of rapid prototyping									
	11		0	UN	$\mathbf{I} - \mathbf{I}$	0			
 Rapid prototyping process chain: 3D modelling, data conversion and transmission, checking and preparing, Building and post processing. Liquid based rapid prototyping systems- Stereo Lithography Apparatus (SLA), applications, advantages and disadvantages of Stereo lithography. STL file format, Types of Errors. Fusion Deposition Modelling: Principle, process, applications, advantages and disadvantages of EDM. Multi let Modelling Systems 									
	U	•		UN	IT – III				
Solid based rapid prototyping systems: Laminated Object Manufacturing (LOM), three phases o LOM, Applications of LOM, advantages and disadvantages of LOM. Solid Ground Curing(SGC): Steps in solid ground curing, Applications of solid ground curing, advantages and disadvantages of Solid ground curing, build time calculation.									
UNIT – IV									
 Powder-based Rapid prototyping systems: Selective Laser Sintering (SLS), Materials for SLS, Principle, Process, Applications, advantages and disadvantages of SLS. Three Dimensional Printing (3DP): Principle, Process, Applications, advantages and disadvantages of 3DP Laser Engineered Net Shaping (LENS) : Principle, Process steps, Applications, Advantages and disadvantages of LENS 									
UNIT – V									
Direct methods of rapid tooling : AIM tooling, SLS rapid steel, Direct Laser Metal Sintering (DMLS), Laminate tooling Indirect methods of rapid Tooling : RTV silicon rubber moulds, Vacuum casting, Reaction									
injection Moulding(RIM), Wax Injection moulding, Spray metal tooling, 3D kelt tool									

Text Books

- 1. Chua C.K., Leong.K.F, and Lim C, C.S., Rapid Prototyping Principles and Applications, World Scientific Publishing Co. Pte. Ltd
- 2. D.T.Pham and S.S.Dimov, Rapid manufacturing The technologies and applications of rapid Prototyping and rapid tooling. Springer Publications

Reference Books

1. Terry Wholers, Wholers report, Wholers Associates

2. I. Gibson D. W. Rosen and B. Stucker., Additive manufacturing technologies, Springer Publication

Question Paper Pattern:

Sessional Exam :

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (Either or Type) in each section. The student shall answer one question from each section.

End Examination:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub-questions. And the student should answer any one question from each unit. Each Question carries 12 marks.

		DF	RONI	E TE	CHNOLO	OGY (DT)				
VII Semester: B. Tech					Scheme: 2020					
Course Code	Category	ry Hours / Week			Credits	Maxim	Maximum Marks			
OE 425	OEC - IV	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL		
		3	-	-	3	40	60	100		
Sessional Exam l	Duration: 1	¹ /2 Hrs	5			End Ex	am Durati	on: 3 Hrs		
Course Outcom	es: At the e	nd of	the c	ourse	e students	will be able to				
CO1: Understand the historical development of unmanned aerial vehicles										
CO2: Understa	and different	dron	e part	s and	their cont	ribution for successfu	ll flight op	eration		
CO3: Identify	the battery t	o be u	sed fo	or UA	AV applica	tion.				
CO4: Understa	and working	of mo	otor th	nat ca	in be used	in UAV.				
CO5: Classify different microcontrollers and flight controllers										
				τ	JNIT – I					
Introduction to drones and their applications : - Definition of drones, history of drones, Structural classification of drones: - fixed wing structure, lighter than air systems, rotary wings aircraft and applications of drones.										
UNIT – II										
Components of drones :-classifications of drone structures and their suitability, applications and uses of drone frame materials, classifications and applicability of propeller motors, drone materials, design parameters for propellers, composition and structuring of Electronic speed controller, flight control board, characteristics of FCB and their structure.										
Battery and its Discharging of Ba criteria of Battery	managemer attery. Back for Drone a	nt: Int up, R pplica	roduc ating tion.	ction s, Sh	of Battery elf Life, M	, Description of Li-I Jaintenance and safet	Po Battery by of Batter	, Charging / y. Selection		
				U	$\mathbf{NIT} - \mathbf{IV}$					

Sensors : Wi fi devices, RADAR and range finder, GPS receiver, Gyro sensor, Speed and Distance sensor, Image sensor, TOF sensor, Chemical sensor. Cameras in drones and selection criteria of camera for different range. Barometers, Accelerometer, Magnetometer, remote control for drone.

Motors : Difference between AC and DC motors and stepper motor, Brushed and Brushless motors, brief idea of motor capabilities for a drone build. Selection criterion of motor for drone application. Working and application of BLDC motor.

UNIT – V

Connections and Interfaces of Devices in Drone: Brief introduction of RS232, RS422, RS485,

UART ports. Different types of connectors and their specifications. Microcontroller interfacing techniques.

Introduction to Drone Programming Introduction to programming language used in drone : C and Python. Installation of cards.Auto Pilot software i.e. Ardupilot, Openpilot

Text Books:

1. Terry Kilby and Belinda Kilby, "Make:Getting Started with Drones ",Maker Media, Inc, 2016

2. VasilisTzivaras, "Building a Quadcopter with Arduino", Packt Publishing, 2016

3. Donald Norris, "Build Your Own Quadcopter -Power Up Your Designs with the Parallax Elev-8", McGraw-Hill Education, 2014

Reference Books:

1. Baichtal, "Building Your Own Drones: A Beginners' Guide to Drones, UAVs, and ROVs", Que Publishing,2016.

2. Austin, Unmanned Aircraft Systems: UAVS Design, Development and Deployment. Wiley, 2010.

3. Sebbane, Smart Autonomous Aircraft: Flight Control and Planning for UAV. CRC Press, 2015

4. Zavrsnik, Drones and Unmanned Aerial Systems: Legal and Social Implications for Security and Surveillance. Springer, 2015.

Web References :

1. https://www.dronezon.com/learn-about-drones-quadcopters/

2.http://ardupilot.org/copter/docs/advanced-multicopter-design.html

Question Paper Pattern:

Sessional Exam :

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (Either or Type) in each section. The student shall answer one question from each section.

End Examination:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub-questions. And the student should answer any one question from each unit. Each Question carries 12 marks.

INFRASTRUCTURE FOR SMART CITY DEVELOPMENT (ISCD)									
VII Semester :B. '	Scheme : 2020								
Course Code	Category	Ho	urs/W	eek	ek Credits Maximum Marks			5	
OE 426	OEC-IV	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total	
		3	-	-	3	40	60	100	
Sessional Exam Duration: 1.5Hrs End Exam Duration: 3 Hrs									
· ·									
Course Outcomes : At the end of the course the student will be able to									
CO1: Understand the fundamental concepts of smart and sustainable cities.									
CO2: Understand the GIS applications in Smart City Planning.									
CO3: Understand the component of smart cities and dwell into their technological advancement									
CO4: Understand the involvement of stake holders in the design and implementation of responsive smart cities.									
CO5: Explain the importance of different linkages and their defined roles including government, urban planners, universities, city developers and communities.									
UNIT – I									

Smart City Planning – An Overview: Understanding – Dimensions – Global experience, Global standards and performance bench marks, Practice codes. India 100 smart cities policy and mission, Smart city planning and development, Financing smart cities development, Governance of smart cities.

UNIT - II

Green Building Concepts & Sustainable Development: Green projects in smart cities, sustainability – Green building – Rating system – Energy efficient building – Energy saving systems.

GIS Applications in Smart City Planning: Coordinate system and geo-coding, vector data structure and algorithms, raster data structure and algorithms, data bases for GIS – Concepts, error modeling and data uncertainty, decision making through GIS, constructing spatial data infrastructure and spatial information system. National Urban Information system. Why remote sensing, aerial & satellite remote sensing – Principles of aerial remote sensing – Aerial photo-interpretation – Photogrammetry – Stereovision – Measurement of heights/depths by relief displacement and parallax displacement. Principles of satellite remote sensing, spatial, spectral and temporal resolutions.

UNIT – III

Smart Urban Transportation Systems: Elements of Infrastructure (Physical, Social, Utilities and services) - Basic definitions – Concepts - Significance and importance; Data required for provision and planning of urban networks and services; Resource analysis, Provision of infrastructure; Role of transport, types of transport systems, evolution of transport modes, transport problems and mobility issues; Urban form and Transport patterns, land use – Transport cycle, concept of accessibility. Hierarchy, capacity and geometric design elements of roads and intersections. Basic principles of Transport infrastructure design. Urban transport

planning process – Transport, environment and safety issues. Principles and approaches of Traffic Management, Transport System Management.

UNIT – IV

*Water Supply and Drainage:*Water – sources of water, treatment and storage, transportation and distribution, quality, networks, distribution losses, water harvesting, recycling and reuse, norms and standards of provision, institutional arrangements, planning provisions and management issues. Sanitation – points of generation, collection, treatment, disposal, norms and standards, grey water disposal, DEWATS, institutional arrangements, planning provisions and management issues. Municipal and other wastes –generation, typology, quantity, collection, storage, transportation, treatment, disposal, recycling and reuse, wealth from waste, norms and standards, institutional arrangements, planning provisions and management issues. Power – Sources of power procurement, distribution networks, demand assessment, norms and standards, planning provisions and management issues.

UNIT - V

Project Management for Smart Cities: Philosophy and concepts of Project management phases – Stages of project & their approval status – Planning – Scheduling – PERT model - Project cost analysis – Resource allocation & Levelling – Project monitoring and control – Risk management – Case studies.

E-Governance and IOT: The concept of management – Concept of e-management &e-business - e-Government Principles – Form e-Government to e-governance - e-governance and developing countries – Designing and Implementing e-Government Strategy; E-governance: Issues in implementation. IOT- fundamentals, protocols, design and development, data analytics and supporting services, case studies.

Text Books:

1. Gupta Tripati, Smart cities transforming India, Pentagon Press.

2. Marta Peris-Ortize, Dag r Bennett, Diana Perez, Bustamante Yabav, *Sustainable Smart Cities*, Springer

3. Mani. N, Smart Cities and Urban Development in India, New Century Publications.

Web References:

1. https://smartnet.niua.org

2. <u>https://smartcities</u>council.com

3. https:// mygov.in/group/smart- cities.

Question Paper Pattern:

Sessional Exam: The question paper for sessional examination is for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of Three Sections with Two Questions (EITHER / OR type) in each section. The student shall answer one question from each section.

End Exam: The question paper for end examination is for 60 marks. It shall consist of Five Units, each containing Two Questions (EITHER / OR type) from each unit of the syllabus, with a weightage of 12 marks. Each of these questions may contain sub-questions. The student shall answer one question from each unit.