B.Tech(ECE)

R20

COURSE STRUCTURE & SYLLABUS

Department of Electronics and Communication Engineering

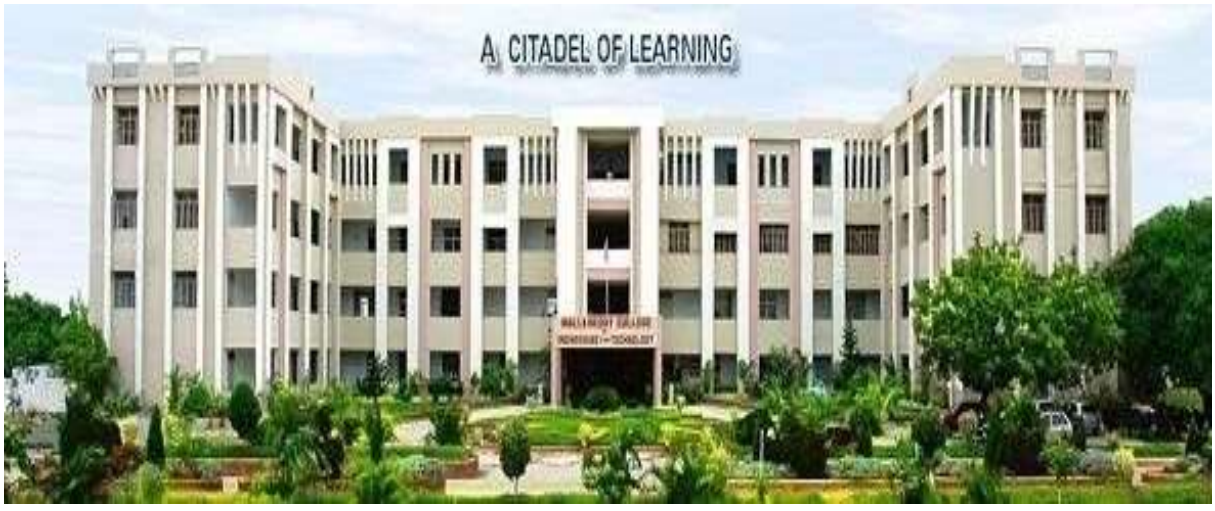
MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

Recognized under 2(f) and 12 (B) of UGC ACT 1956

(Affiliated to JNTUH, Hyderabad, Approved by AICTE-Accredited by NBA&NAAC–'A'Grade-ISO9001:2015Certified)

Maisammaguda, Dhulapally(Post Via.Kompally),Secunderabad–500100,Telangana State, India



MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING
COURSE STRUCTURE

I Year B. Tech – I Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R20A0001	English	2	-	-	2	30	70
2	R20A0021	Mathematics – I	3	1	-	4	30	70
3	R20A0011	Applied Physics	3	-	-	3	30	70
4	R20A0401	Analog & Digital Electronics	3	-	-	3	30	70
5	R20A0501	Programming for Problem solving	3	-	-	3	30	70
6	R20A0082	Applied Physics Lab	-	-	3	1.5	30	70
7	R20A0083	Engineering and IT Workshop	-	-	4	2	30	70
8	R20A0581	Programming for Problem Solving Lab	-	-	3	1.5	30	70
9	R20A0014*	Environment Science	2	-	-	0	100	-
		TOTAL	**16**	**1**	**10**	**20**	**340**	**560**

I Year B. Tech – II Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R20A0002	Professional English	2	-	-	2	30	70
2	R20A0022	Mathematics – II	3	1	-	4	30	70
3	R20A0201	Basic Electrical Engineering	3	-	-	3	30	70
4	R20A0301	Computer aided Engineering Graphics	2	-	2	3	30	70
5	R18A0502	Python Programming	3	-	-	3	30	70
6	R20A0081	English Language Communication Skills Lab	-	-	4	2	30	70
7	R20A0281	Basic Electrical Engineering Lab	-	-	3	1.5	30	70
8	R18A0582	Python Programming Lab	-	-	3	1.5	30	70
9*	R20A0003*	Human Values & Professional Ethics(audit)	2	-	-	0	100	-
		TOTAL	**15**	**1**	**12**	**20**	**340**	**560**

***Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree**

II Year B. Tech – I Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R20A0023	Mathematics-III	3	-	-	3	30	70
2	R20A0402	Electronic Devices & Circuits	3	-	-	3	30	70
3	R20A0403	Signals & Systems	3	-	-	3	30	70
4	R20A0205	Control Systems	3	-	-	3	30	70
5	R20A0404	Digital Logic Design	3	-	-	3	30	70
6	R20A0262	Network Analysis & Transmission Lines	3	-	-	3	30	70
7	R20A0481	Electronic Devices & Circuits Lab	-	-	3	1.5	30	70
8	R20A0482	Basic Simulation Lab	-	-	3	1.5	30	70
9*	R20A0008	Global Education & Professional Career(audit)	2	-	-	-	100	-
		TOTAL	**20**	**-**	**06**	**21**	**340**	**560**

***Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree**

II Year B. Tech – II Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R20A0405	Analog Circuits	3	-	-	3	30	70
2	R20A0406	Analog & Digital Communications	3	-	-	3	30	70
3	R20A0407	Electromagnetic Fields & Waves	3	-	-	3	30	70
4	R20A0408	Probability & Random Processes	3	-	-	3	30	70
5	R20A0061	Managerial Economics & Financial Analysis	3	-	-	3	30	70
6	OE I	OPEN ELECTIVE I	3	-	-	3	30	70
7	R20A0483	Analog Circuits Lab	-	-	3	1.5	30	70
8	R20A0484	Analog & Digital Communications Lab	-	-	3	1.5	30	70
9*	R20A0004	Foreign Language: French/German	2	-	-	-	100	-
		TOTAL	**20**	**0**	**6**	**21**	**420**	**480**

***Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree**

OPEN ELECTIVE I		
S.NO	SUBJECT CODE	SUBJECT
1	R20A1251	WEB DESIGNING TOOLS
2	R20A0551	INTRODUCTION TO DBMS
3	R20A0351	INTELLECTUAL PROPERTY RIGHTS
4	R20A0063	ENTERPRISE RESOURCE PLANNING
5	R20A0451	BASICS OF COMPUTER ORGANIZATION

III Year B. Tech – I Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R20A0409	Digital Signal Processing	3	-	-	3	30	70
2	R20A0410	LDIC	3	-	-	3	30	70
3	R20A0411	Computer Organization & Architecture	3	-	-	3	30	70
4 (PE1)	R20A6214 R20A0412 R20A0413	1.Fundamentals of Cyber Security 2. Cellular & Mobile Communications 3. Digital Design through Verilog	3	-	-	3	30	70
5 (PE2)	R20A0510 R20A0414 R20A0415	1. Computer Networks 2. Antennas and Wave Propagation 3. Instrumentation Engineering	3	-	-	3	30	70
6	OE II	OPEN ELECTIVE II	3	-	-	3	30	70
7	R20A0485	Digital Signal Processing Lab	-	-	3	1.5	30	70
8	R20A0486	LDIC Lab	-	-	3	1.5	30	70
9	R20A0491	Application Development I	-	-	4	2	30	70
10*	R20A0007	Indian Constitution	2	-	-	-	100	-
		TOTAL	**20**	**-**	**10**	**23**	**370**	**630**

***Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree**

OPEN ELECTIVE II		
S.NO	SUBJECT CODE	SUBJECT
1	R20A1252	MANAGEMENT INFORMATION SYSTEMS
2	R20A0552	JAVA PROGRAMMING
3	R20A1253	SOFTWARE PROJECT MANAGEMENT
4	R20A0452	INTERNET OF THINGS & ITS APPLICATIONS
5	R20A0553	OPERATING SYSTEM CONCEPTS
6	R20A0066	PUBLIC POLICY & GOVERNANCE

III Year B. Tech – II Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R20A0416	Microprocessors & Microcontrollers	3	-	-	3	30	70
2	R20A0	Artificial Intelligence & Machine Learning	3	-	-	3	30	70
3 (PE3)	R20A0417 R20A0418 R20A0419	1.Wireless Communications 2.Digital Control Systems 3.Design of Fault Tolerant Systems	3	-	-	3	30	70
4 (PE4)	R20A0420 R20A0421 R20A0422	1. Satellite Communications 2. Fiber Optical Communications 3. Speech and Audio Processing	3	-	-	3	30	70
5	OE III	OPEN ELECTIVE III	3	-	-	3	30	70
6	R20A0487	Microprocessors & Microcontrollers Lab	-	-	3	1.5	30	70
7	R20A0	AI & ML Lab	-	-	3	1.5	30	70
8	R20A0492	Application Development II	-	-	4	2	30	70
9*	R20A0006	Technical Communication & Soft Skills	2	-	-	-	100	-
		TOTAL	**17**	**-**	**10**	**20**	**340**	**560**

***Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree**

OPEN ELECTIVE III		
S.NO	SUBJECT CODE	SUBJECT
1	R20A0453	ROBOTICS & AUTOMATION
2	R20A1254	BIG DATA ARCHITECTURE
3	R20A0554	INFORMATION SECURITY
4	R20A0555	CLOUD COMPUTING FUNDAMENTALS
5	R20A0352	DESIGN THINKING
6	R20A0065	BUSINESS ANALYTICS

IV Year B. Tech – I Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R20A0423	VLSI Design	3	-	-	3	30	70
2	R20A0424	Microwave Engineering	3	-	-	3	30	70
3	R20A0425	Embedded System Design	3	-	-	3	30	70
(PE 5)	R20A0426 R20A0427 R20A0428	1. Radar Systems 2. Digital Signal Processors & Architectures 3. Multimedia Signal Coding	3	-	-	3	30	70
(PE 6)	R20A0429 R20A0523 R20A0430	1. Image & Video Processing 2. Big Data Analytics 3. RF Circuit Design	3	-	-	3	30	70
6	R20A0488	VLSI Lab	-	-	3	1.5	30	70
7	R20A0489	EM & MW Lab	-	-	3	1.5	30	70
8	R20A0493	Mini Project	-	-	6	3	30	70
		TOTAL	**15**	**-**	**12**	**21**	**240**	**560**

IV Year B. Tech – II Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R20A0337	Innovation, Start-ups, & Entrepreneurship	3	1	-	4	30	70
2	R20A0494	Major Project	-	-	20	10	30	70
		TOTAL	**3**	**1**	**20**	**14**	**60**	**140**

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B.Tech. CSE- I Sem **L/T/P/C**
3/-/-/3

(R20A0001) ENGLISH

INTRODUCTION

English is a global language which is a means to correspond globally. Keeping in account of its vital role in the global market, emphasis is given to train the students to acquire language and communication skills. The syllabus is designed to develop and attain the competency in communicative skills.

The lectures focus on the communication skills and the selected excerpts support as resources for the teachers to develop the relevant skills in the students. The lessons stimulate discussions and help in comprehending the content effectively. The focus is on skill development, nurturing ideas and practicing the skills.

COURSE OBJECTIVES:

1) To enable students to enhance their lexical, grammatical and communicative competence.
2) To equip the students to study the academic subjects with better perspective through theoretical and practical components of the designed syllabus.
3) To familiarize students with the principles of writing and to ensure error-free writing.
4) To analyze, interpretand evaluate a text and critically appreciate it.
5) To improve the writing and speaking skills, the productive skills.

Reading Skills:
Objectives

1) To develop an awareness in the students about the significance of silent reading and comprehension.
2) To augment the ability of students to guess the meanings of words from context and grasp the overall message of the text, draw inferences etc.
    a. Skimming the text

- Understanding the gist ofan argument
- Identifying the topic sentence
- Inferring lexical and contextual meaning features
- Understanding discourse
- Recognizing coherence/sequencing of sentences
- Scanning the **text**

NOTE:
The students will be trained in reading skills using the prescribed text for detailed study. They will be examined in reading and answering questions using 'unseen' passages which may be taken from authentic texts, such as magazines/newspaper articles.

Writing Skills:

Objectives

1) To develop an awareness inthe students about basic formal writing skills.
2) To equip students with the components of different forms of writing, beginning with the required ones:
   - Writing sentences
   - Use of appropriate vocabulary
   - Coherence and cohesiveness
   - Formal and informal letter writing

UNIT –I

"The Road not taken"by Robert Frost

Grammar –Tenses and Punctuation(Sequences of Tenses)
Vocabulary –Word Formation - Prefixes and Suffixes
Writing –Paragraph Writing (Focusing on Tenses and Punctuations)
Reading –The art of skimming and scanning -Reading Exercise Type 1
(Match the statements to the text they refer to)

Unit – II

Act II from 'Pygmalion' by G.B.Shaw

Grammar –Direct and IndirectSpeech
Vocabulary– Synonyms, Antonyms
Writing –Essay Writing (Introduction, body and conclusion)
Reading –Comprehending the context– Reading Exercise Type 2
(Place the missing statement)

Unit – III

Satya Nadella's Email to His Employees on his First Day as CEO of Microsoft

Grammar – Voices
Vocabulary –One-Word Substitutes, Standard Abbreviations
Writing –E-mail Writing, Letter Writing (complaints, requisitions, apologies).
Reading –Reading Comprehension- Reading Exercise Type 3
(Reading between the lines)

UNIT – IV

J K Rowling's Convocation Speech at Harvard Grammar – Articles, Misplaced Modifiers
Vocabulary –Phrasal Verbs
Writing – Précis Writing
Reading –Reading Exercise Type4
(Cloze test)

UNIT –V

Abdul Kalam's Biography

Grammar – Subject-Verb Agreement, Noun-Pronoun Agreement Vocabulary – Commonly Confused Words
Writing – Memo Writing
Reading –Reading Exercise Type 5 (Identifying errors)

* Exercises apart from the textbook shall also be used for classroom tasks.

REFERENCE BOOKS

1) Practical English Usage. Michael Swan. OUP. 1995.
2) Remedial English Grammar. F.T. Wood. Macmillan.2007
3) On Writing Well. William Zinsser. Harper Resource Book. 2001
4) Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
5) Communication Skills. Sanjay Kumar and Pushpa Lata. Oxford University Press. 2011.
6) Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford UniversityPress

COURSE OUTCOMES

Students will be able to:

1) Gain competence and proficiency in 'productive' skills, i.e., writing and speaking with the recognition of the need for life-long learning of the same
2) Hone their language abilities in terms of comprehending complex technical texts with a potential to review literature
3) Present ideas clearly and logically to analyze data and provide valid conclusions in written communication
4) Enrich their grammatical accuracy and fluency to be adept at both the active and passive skills
5) Represent old conventions with a set of the new by professional verbal communicative ability

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B.Tech. ECE- I Sem **L/T/P/C**
3/1/-/4

(R20A0021) MATHEMATICS -I

COURSE OBJECTIVES:

1) The concept of a Rank of the matrix and applying the concept to know the consistency and solving the system of linear equations.
2) The concept of Eigen values, Eigen vectors and Diagonolisation.
3) The maxima and minima of functions of several variables.
4) The Applications of first order ordinary differential equations and methods to solve higher order differential equations.
5) The properties of Laplace Transform, Inverse Laplace Transform and Convolution theorem.

UNIT I:

Matrices: Introduction, Rank of a matrix - Echelon form, Normal form, Consistency of system of linear equations (Homogeneous and Non-Homogeneous)-Gauss-Siedel method, Linear dependence and independence of vectors, Eigen values and Eigen vectors and their properties (without proof), Cayley-Hamilton theorem(without proof), Diagonalisation of a matrix.

UNIT II:

Multi Variable Calculus (Differentiation): Functions of two variables, Limit, Continuity, Partial derivatives, Total differential and differentiability, Derivatives of composite and implicit functions, Jacobian-functional dependence and independence, Maxima and minima and saddle points, Method of Lagrange multipliers, Taylors theorem for two variables.

UNIT III:

First Order Ordinary Differential Equations: Exact, Equations reducible to exact form, Applications of first order differential equations - Newton's law of cooling, Law of natural growth and decay, Equations not of first degree- Equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type.

UNIT IV :

Differential Equations of Higher Order: Linear differential equations of second and higher order with constant coefficients: Non- homogeneous term of the type f(x) = e^{ax}, sinax, cosax, x^n, e^{ax} V and x^n V - Method of variation of parameters, Equations reducible to linear ODE with constant coefficients- Cauchy's Euler equation and Legendre's equation.

UNIT V:

Laplace Transforms: Definition of Laplace transform, domain of the function and Kernel for the Laplace transforms, Existence of Laplace transform, Laplace transform of standard functions, first shifting Theorem, Laplace transform of functions when they are multiplied and divided by "t", Laplace transforms of derivatives and integrals of functions, Unit step function, Periodic function.

Inverse Laplace transform by Partial fractions, Inverse Laplace transform of functions when they are multiplied and divided by "s", Inverse Laplace Transforms of derivatives and integrals of functions, Convolution theorem, Solving ordinary differential equations by Laplace transform.

TEXT BOOKS

1) Higher Engineering Mathematics by B V Ramana ., Tata McGraw Hill.
2) Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.
3) Advanced Engineering Mathematics by Kreyszig ,John Wiley & Sons

REFERENCE BOOKS

1) Advanced Engineering Mathematics by R.K Jain & S R K Iyenger, Narosa Publishers.
2) Ordinary and Partial Differential Equations by M.D. Raisinghania, S.Chand Publishers
3) Engineering Mathematics by N.P Bali and Manish Goyal.

COURSE OUTCOMES:

After learning the concepts of this paper the student will be able to

1) Analyze the solutions of the system of linear equations and find the Eigen values and Eigen vectors of a matrix, which are used to analyze the long term behavior of any system.
2) Find the extreme values of functions of two variables with / without constraints.
3) Solve first order, first degree differential equations and theirapplications.
4) Form a differential equation for typical engineering problems and hence can solve those higher order differential equations.
5) Solve differential equations with initial conditions using Laplace Transformation.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B.Tech. ECE- I Sem **L/T/P/C**
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(R20A0011) APPLIED PHYSICS

COURSE OBJECTIVES:

1) To analyze the ordinary light with a laser light and realize the transfer of light through optical fibers.
2) To identify dual nature of the matter and behavior of a particle quantum mechanically.
3) To explore band structure of the solids and classification of materials.
4) To acquire the basic knowledge of various types of semiconductor devices and find the applications in science and technology.
5) To Compare dielectric and magnetic properties of the materials and enable them to design and apply in different fields.

UNIT – I

LASERS & FIBER OPTICS

Lasers: Characteristics of lasers, Absorption, Spontaneous and Stimulated emissions, population inversion, meta stable state, types of pumping, lasing action, construction and working of Ruby Laser, Helium-Neon Laser, Semiconductor diode Laser, Applications of lasers.

Fiber Optics: Introduction to optical fiber, Construction and working principle of an Optical Fiber, Acceptance angle and Numerical aperture, Types of Optical fibers - Mode and Propagation through step and graded index fibers ,Losses in optical fiber, Optical Fiber in Communication System, Applications of optical fibers.

UNIT – II

QUANTUM MECHANICS

Wave nature of particles, de Broglie's hypothesis, matter waves, Heisenberg's uncertainty principle, Davisson and Germer's experiment, G.P Thomson experiment, Schrodinger time- independent wave equation-significance of wave function, particle in one dimensional square well potential.

UNIT – III

ELECTRONIC MATERIALS

Free electron theory(Classical & Quantum)- Assumptions, Merits and drawbacks, Fermi level, Density of states, Periodic potential, Bloch's theorem, Kronig – Penny model (qualitative) , E – K diagram, Effective mass, Origin of energy bands in solids, Classification of materials : Metals, semiconductors and insulators.

UNIT-IV

SEMICONDUCTOR PHYSICS

Intrinsic and extrinsic semiconductors, Direct and indirect band gap semiconductors, Carrier concentration in intrinsic and extrinsic semiconductors. Dependence of Fermi level on carrier concentration and temperature, carrier transport: mechanism of diffusion and drift, Formation of PN junction, V-I characteristics of PN diode, energy diagram of PN diode, Hall experiment, semiconductor materials for optoelectronic devices - LED, Solar cell.

UNIT – V:

DIELECTRICS AND MAGNETIC PROPERTIES OF MATERIALS

Dielectrics: Introduction, Types of polarizations (Electronic and Ionic) and calculation of their polarizabilities, internal fields in a solid, Clausius-Mossotti relation.

Magnetism: Introduction, origin of magnetism, Bohr magneton, classification of dia, para and ferro magnetic materials on the basis of magnetic moment, Properties of anti-ferro and ferri magnetic materials, Hysteresis curve based on domain theory, Soft and hard magnetic materials.

TEXT BOOKS:

1) Engineering Physics by Kshirsagar & Avadhanulu, S Chand publications.
2) Engineering Physics- B.K.Pandey, S.Chaturvedi, Cengage Learning.

REFERENCES:

1) Engineering Physics – R.K. Gaur and S.L. Gupta, DhanpatRai Publishers.
2) Engineering Physics, S Mani Naidu- Pearson Publishers.
3) Engineering physics 2nd edition –H.K. Malik and A.K. Singh.
4) Engineering Physics – P.K. Palaniswamy, Scitech publications.
5) Physics by Resnick and Haliday.

COURSE OUTCOMES:

After completion of studying Applied Physics the student is able to

1) Observe the properties of light and its engineering applications of laser in fiber optic communication systems.
2) Apply the basic principles of quantum mechanics and the importance of behavior of a particle.
3) Find the importance of band structure of solids and their applications in various electronic devices.
4) Evaluate concentration & estimation of charge carriers in semiconductors and working principles of PN diode.
5) Examine dielectric, magnetic properties of the materials and apply them in material technology.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B.Tech. ECE- I Sem **L/T/P/C**
3/-/-/3

(R20A0401) ANALOG & DIGITAL ELECTRONICS

COURSE OBJECTIVES:

1) To familiarize with the principal of operation, analysis and design of pn junction diode.
2) To study the construction of BJT and its characteristics in different configurations.
3) To study the construction and characteristics of JFET and MOSFET.
4) To study basic number systems codes and logical gates.
5) To introduce the methods for simplifying Boolean expressions and design of combinational circuits.

UNIT-I

P-N Junction diode: Qualitative Theory of P-N Junction, P-N Junction as a diode , diode equation, volt-ampere characteristics temperature dependence of V-I characteristic , ideal versus practical, diode equivalent circuits, Zener diode characteristics.

UNIT-II

Bipolar Junction Transistor: The Junction transistor, Transistor construction, Transistor current components, Transistor as an amplifier, Input and Output characteristics of transistor in Common Base, Common Emitter, and Common collector configurations. α and β Parameters and the relation between them, BJT Specifications.

UNIT-III

FIELD EFFECT TRANSISTOR: JFET-Construction, principle of Operation, Volt–Ampere characteristics, Pinch- off voltage. Small signal model of JFET. FET as Voltage Variable Resistor, Comparison of BJT and FET. MOSFET- Construction, Principle of Operation and symbol, MOSFET characteristics in Enhancement and Depletion modes.

UNIT IV:

Number System and Boolean Algebra: Number Systems, Base Conversion Methods, Complements of Numbers, Codes- Binary Codes, Binary Coded Decimal, Unit Distance Code, Digital Logic Gates (AND, NAND, OR, NOR, EX-OR, EX-NOR), Properties of XOR Gates, Universal Gates, Basic Theorems and Properties, Switching Functions, Canonical and Standard Form.

UNIT-V

Minimization Techniques: The Karnaugh Map Method, Three, Four and Five Variable Maps, Prime and Essential Implications, Don’t Care Map Entries, Using the Maps for Simplifying, Multilevel NAND/NOR realizations.

Combinational Circuits: Design procedure – Half adder, Full Adder, Half subtractor, Full subtractor, Multiplexer/Demultiplexer, decoder, encoder, Code converters, Magnitude Comparator.

TEXT BOOKS

1) "Electronic Devices & Circuits", Special Edition – MRCET, McGraw Hill Publications,2017.
2) Integrated Electronics Analog Digital Circuits, Jacob Millman and D. Halkias, McGrawHill.
3) Electronic Devices and Circuits, S.Salivahanan,N.Sureshkumar, McGrawHill.
4) M. Morris Mano, Digital Design, 3rd Edition, Prentice Hall of India Pvt. Ltd., 2003 /Pearson Education (Singapore) Pvt. Ltd., New Delhi,2003.
5) Switching and Finite Automata Theory- ZviKohavi& Niraj K. Jha, 3rdEdition,Cambridge.

REFERENCE BOOKS

1) Electronic Devices and Circuits,K.Lal Kishore B.SPublications
2) Electronic Devices and Circuits, G.S.N. Raju, I.K. International Publications, New Delhi,2006.
3) John F.Wakerly, Digital Design, Fourth Edition, Pearson/PHI,2006
4) John.M Yarbrough, Digital Logic Applications and Design, Thomson Learning,2002.
5) Charles H.Roth. Fundamentals of Logic Design, Thomson Learning,2003.

COURSE OUTCOMES

1) Understand the principal of operation, analysis and design of pn junction diode.
2) Understand the construction of BJT and its characteristics in different configurations.
3) Understand the construction and characteristics of JFET and MOSFET.
4) Understand basic number systems codes and logical gates.
5) Understand the methods for simplifying Boolean expressions and design of combinational circuits.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B.Tech. ECE- I Sem **L/T/P/C**
3/-/-/3

(R20A0501) PROGRAMMING FOR PROBLEM SLOVING

COURSE OBJECTIVES:

1) To understand the use of computer system in problem solving
2) To understand the various steps in Program development.
3) To learn the basic concepts in C Programming Language.
4) To learn how to write modular and readable C Programs
5) To be able to write programs (using structured programming approach) in C to solve problems.

UNIT - I

Introduction to Computing – Computer Systems, Computing Environments, Computer Languages, Algorithms and Flowcharts, Steps for Creating and Running programs.

Introduction to C – History of C, Features of C, Structure of C Program, Character Set, C Tokens - keywords, Identifiers, Constants, Data types, Variables. Operators, Expressions, Precedence and Associativity, Expression Evaluation, Type conversion, typedef, enum

Control Structures: Selection Statements(Decision Making) – if and switch statements, Repetition Statements (Loops) - while, for, do-while statements, Unconditional Statements – break, continue, goto, Command line arguments.

UNIT-II

Pointers – Pointer variable, pointer declaration, Initialization of pointer, Accessing variables through pointers, Pointer Arithmetic, pointers to pointers, void pointers

Arrays – Definition, declaration of array, Initialization, storing values in array, Two dimensional arrays, Multi-dimensional arrays. Arrays and Pointers, Array of pointers

Strings – Declaration and Initialization, String Input / Output functions, Arrays of strings, String manipulation functions, Unformatted I/O functions, strings and pointers

UNIT – III

Designing Structured Programs using Functions - Types of Functions- user defined functions, Standard Functions, Categories of functions, Parameter Passing techniques, Scope – Local Vs Global, Storage classes, Recursive functions .Passing arrays as parameters to functions, Pointers to functions, Dynamic Memory allocation**.**

UNIT-IV

Structures and Unions - Declaration, initialization, accessing structures, operations on structures, structures containing arrays, structures containing pointers, nested structures, self referential structures, arrays of structures, structures and functions, structures and pointers, unions..

Files – Concept of a file, Streams, Text files and Binary files, Opening and Closing files, File input / output functions. Sequential Access and Random Access Functions

UNIT-V

Basic Data Structures – Linear and Non Linear Structures – Implementation of Stacks, Queues, Linked Lists and their applications.

Case Studies

Case 1: Student Record Management System

The main features of this project include basic file handling operations; you will learn how to add, list, modify and delete data to/from file. The source code is relatively short, so thoroughly go through the mini project, and try to analyze how things such as functions, pointers, files, and arrays are implemented.

Currently, listed below are the only features that make up this project, but you can add new features as you like to make this project a better one!

- Add record
- List record
- Modify record
- Delete record

Case 2: Library Management System

This project has 2 modules.

1) Section for a librarian
2) Section for a student

A librarian can add, search, edit and delete books. This section is password protected. That means you need administrative credentials to log in as a librarian.

A student can search for the book and check the status of the book if it is available.Here is list of features that you can add to the project.

1) You can create a structure for a student that uniquely identify each student. When a student borrows a book from the library, you link his ID to Book ID so that librarian can find how a particular book is borrowed .
2) You can create a feature to bulk import the books from CSV file.
3) You can add REGEX to search so that a book can be searched using ID, title, author or any of the field.
4) You can add the student login section.

TEXT BOOKS:

1) Mastering C, K.R.Venugopal, S R Prasad, Tata McGraw-Hill Education.
2) Computer Science: A Structured Programming Approach Using C, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning
3) Data Structures and Algorithms Made Easy by Narasimha Karumanchi, Career Monk publications, 2017

REFERENCE BOOKS:

1) The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI.
2) Computer Programming, E.Balagurusamy, First Edition, TMH.
3) C and Data structures – P. Padmanabham, Third Edition, B.S. Publications.
4) Programming in *C, Ashok Kamthane*. Pearson Education India.
5) Data Structures using C by Aaron M. Tenenbaum, Pearson Publications
6) Data Structures using C by Puntambekar

COURSE OUTCOMES:

1) Understand a problem and build an algorithm/flowchart to solve it
2) Interpret the structure of C program and various key features of C
3) Construct C programs using various control statements, arrays and pointers
4) Understand the concept of subprograms and recursion
5) Develop programs using structures and unions for storing dissimilar data items
6) Make use of files and file operations to store and retrieve data

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I Year B.Tech. ECE- I Sem **L/T/P/C**

-/-/3/1.5

(R20A0082) APPLIED PHYSICS LAB

COURSE OBJECTIVES:

1) Identify the specific types of elastic and electrical nature of materials in physics lab.
2) Observe concepts of magnetism in physics lab.
3) Analyze propagation of light in various optical devices practically.
4) Examine various opto electronic devices practically
5) Well-equipped with the properties of semiconductor devices in physicslab.

LIST OF EXPERIMENTS:

1) Torsional pendulum-Rigidity modulus of given wire.
2) Melde's experiment –Transverse and Longitudinal modes.
3) Stewart and Gee's method- Magnetic field along the axis of current carrying coil.
4) Spectrometer-Dispersive power of the material of a prism
5) Diffraction grating-using laser -Wave length of light.
6) Newton's Rings –Radius of curvature of Plano convex lens.
7) LED -Characteristics of LED.
8) Solar cell -Characteristics of a Solar cell.
9) Optical fiber- Evaluation of numerical aperture of optical fiber.
10) Hall effect –To study Hall effect in semiconducting samples.

REFERENCE BOOKS:

1) Practical physics by Dr. Aparna, Dr K.V Rao, V.G.S.Publications.
2) Engineering physics practical lab manual – MRCET.

COURSE OUTCOMES:

1) Students are able to measure the elastic constants of the given material of the wire and also determine the ac frequency of vibrating bar.
2) Students are able to determine the magnetic induction of a circular coil carrying current by applying the principles of terrestrial magnetism.
3) Students are able to frame relativistic ideas of light phenomenon
4) Students are able to achieve the analysis of V-I characteristics of opto electronic devices
5) Students are able to determine the carrier concentration and identify the given semiconductor material with the help of Hall Effect.

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I Year B.Tech. ECE- I Sem **L/T/P/C**
-/-/4/2

(R20A0083) ENGINEERING AND IT WORKSHOP

COURSE OBJECTIVES:

1) Understand the internal structure and layout of the computer system.
2) Learn to diagnose minor problems with the computer functioning.
3) Know the proper usage and threats of the World Wide Web.
4) Study in detail about the various features of Ms-Word, Excel, and PowerPoint.
5) Gain awareness about the tools of LibreOffice.

Task- 1: PC HARDWARE

Identification of the peripherals of a computer, components in a CPU and its functions.Block diagram of the CPU along with the configuration of each peripherals. Functions of Motherboard. Assembling and Disassembling of PC. Installing of OS.

Task- 2: TROUBLESHOOTING

Hardware Troubleshooting: Students are to be given a PC which does not boot due to proper assembly or defective peripherals and the students should be taught to identify and correct the problem.

Software Troubleshooting: Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition.

Task 3: INTERNET

Web Browsers, Access of websites, Surfing the Web, Search Engines, Customization of web browsers, proxy settings, bookmarks, search toolbars, pop-up blockers. Antivirus downloads, Protection from various threats.

Task 4: MICROSOFT WORD

Introduction to Word Processor, Editing and Formatting features, overview of toolbars, saving files, Using help and resources, rulers, fonts, styles, format painter, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and colors, Inserting Header and Footer, Using Date and Time option in Word &Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes. Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word. Using Word to create Project Certificate, Project Abstract, News Letter, Resume.

Task 5: MICROSOFT EXCEL

Excel Orientation: The importance of Excel as a Spreadsheet tool, Accessing, overview of toolbars, saving excel files, Using help and resources. Excel formulae &Functions : formulae, logical functions, text functions, statistical functions, mathematical functions, lookup

functions, conditional formatting, Charts, Hyper linking, Renaming and Inserting worksheets, Data Analysis functions.
Creating a Scheduler (Features:- Gridlines, Format Cells, Summation, auto fill, Formatting)
Calculating GPA (Features:- Cell Referencing, Formulae and functions in excel)

Task 6: MICROSOFT POWER POINT
Basic power point utilities and tools, PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Drawing toolbar-Lines and Arrows, Text boxes, Clipart, Insertion of images, slide transition, Custom animation, Hyperlinks.

Task 7: LIBRE OFFICE
Overview of LibreOffice and its features of Writer, Calc, Impress, Draw, Base, Math, Charts.
Libre office Math: Introduction , Creating & Editing Formulas, formulas as separated documents or files, formulas in office document, Creating formulas, Formula layout
Libre Office Draw : Introduction, Basic shapes, working with objects, flowcharts, organization charts.

TEXT BOOKS:
1) Introduction to Information Technology, ITL Education Solutions limited, Pearson Education
2) PC Hardware and A+ Handbook-Kate J.Chase PHI(Microsoft)
3) Excel Functions and Formulas, Bernd held, Theodor Richardson, Third Edition
4) Libre Office Documentation : https://documentation.libreoffice.org/en/english-documentation

COURSE OUTCOMES:
1) Ability to identify the major components of a computer and its peripherals. They are capable of assembling a personal computer, and can perform installation of system software like MS Windows and required device drivers.
2) Students can detect and perform minor hardware and software level troubleshooting.
3) Capacity to work on Internet & World Wide Web and make effective usage of the internet for academics.

ELECTRICAL AND ELECTRONICS ENGINEERING WORKSHOP

COURSE OBJECTIVES:

1) To get acquaintance with Residential house wiring procedure.
2) To obtain the knowledge about fluorescent lamp wiring procedure.
3) To get familiarized with staircase wiring.
4) To perform soldering and desoldering practice.

LIST OF EXPERIMENTS:

1) Residential house wiring using switches, fuse, indicator, lamp and energy meter.
2) Fluorescent lamp wiring
3) Stair case wiring
4) Soldering and Desoldering practice – components, devices and circuits using general purpose PCB.

COURSE OUTCOMES:

1) Students will able to understand domestic wiring procedures practically.
2) Students will able to do Fluorescent lamp wiring.
3) Students will able to do staircase wiring.
4) Student will able to soldering and disordering practice.

AUTOCAD WORKSHOP

1) Introduction to AutoCAD

- Design Process,
- AutoCAD Installation Process
- AutoCAD user Interface,
- Function Keys

2) Commands:

- Drawing Commands
- Editing Commands
- Drawings aids

3) D Wireframe Modeling

4) CAD Practice Exercises

- CAD -2D,
- CAD - Isometric

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I Year B.Tech. ECE- I Sem **L/T/P/C**
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(R20A0581) PROGRAMMING FOR PROBLEM SOLVING

COURSE OBJECTIVES:

1) Familiarity with the C programming environment.
2) Systematic introduction to programming constructs
3) Learning basic concepts of C through illustrative examples and small exercises
4) Understanding concept of Arrays, Strings and Structures withexamples
5) Perform basic operations on Files.

UNIT - I

Introduction to Computing – Computer Systems, Computing Environments, Computer Languages, Algorithms and Flowcharts, Steps for Creating and Running programs.
Introduction to C – History of C, Features Of C, Structure of C Program,
Character Set, C Tokens-keywords, Identifiers, Constants, Data types, Variables.

UNIT-II

C Operators, Expressions, Precedence and Associativity, Expression Evaluation, Type conversion
Statements- Selection Statements(Decision Making) – if and switch statements, Repetition statements (Loops)-while, for, do-while statements, other statements related to looping –break, continue,goto.

UNIT – III

Functions-Designing Structured Programs, Types of Functions- user defined functions, Standard Functions, Categories of functions,Parameter Passing techniques, Scope, Storage classes, Recursion- Recursive functions.
Arrays – Declaration and Initialization, Arrays with functions, Two dimensional arrays, Multi-dimensional arrays.

UNIT-V

Structures and Unions - Introduction, Declaration and Initialization, Structure within a structure, Array of Structures, Pointer to Structure, Unions.
Files – Concept of a file, Streams, Text files and Binary files, Opening and Closing files, File input / output functions.

TEXT BOOKS:

1) Computer Science: A Structured Programming Approach Using C, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.
2) Mastering C, K.R.Venugopal, S R Prasad, Tata McGraw-Hill Education.

REFERENCE BOOKS:

1) The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI.
2) Computer Programming, E.Balagurusamy, First Edition, TMH.
3) C and Data structures – P. Padmanabham, Third Edition, B.S. Publications.
4) Programming in *C, Ashok Kamthane*. Pearson Education India.
5) Let us C ,YashwanthKanethkar, 13th Edition, BPB Publications.

COURSE OUTCOMES:

At the end of the course the student will be able to

1) Understand a problem and build an algorithm/flowchart to solve it
2) Define variables and construct expressions using C language
3) Construct C programs using various conditional statements and loops
4) Develop efficient, modular programs using functions
5) Utilize arrays, structures and unions for storing and manipulating data.

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MANDATORY COURSE I
(R20A0014) ENVIRONMENT SCIENCE

COURSE OBJECTIVES:

1) Distinguish the inter relationship between living organism and environment.
2) Categorize various types of natural resources available on the earth surface.
3) Detect the causes, and control measures of various types of environmental pollution.
4) Articulate the issues related to solid waste and its management.
5) Explain and understand the importance of sustainable development.

UNIT-I:

ECOSYSTEMS: Definition, Scope, and Importance of ecosystem. Classification, natural and artificial ecosystems, structure - abiotic and biotic component, functions of an ecosystem, food chains, food webs and ecological pyramids.
Activities: Case studies, poster making.

UNIT-II:

NATURAL RESOURCES: Classification of Resources: Definition of natural resource, renewable and non -renewable resources. Renewable resources: Energy resources: growing energy needs solar energy, hydro energy, biogas, bio fuel. Non-Renewable Resources: Fossil fuels, refining of Coal, Petroleum, and natural gas. Use of alternate energy source.
Activities: Case studies, seminars.

UNIT-III:

ENVIRONMENTAL POLLUTION AND TECHNIQUES: Definition, Types of pollution: Air pollution causes, effects, control measures of air pollution and prevention techniques. Water pollution causes, effects, control measures and techniques.
Activities: Debate, seminars

UNIT-IV:

SOLID WASTE MANAGEMENT: Definition of Solid waste, characteristics of solid waste, solid waste management: collection, transportation, processing treatment, disposal methods and e-waste management,3R techniques: reduce, reuse, recycle.
Activities: Seminars, Case studies.

UNIT-V:

SUSTAINABLE DEVELOPMENT: Definition of sustainable development, concept, sustainable development goals, threats to sustainability, strategies to achieve sustainable development. Introduction to green chemistry, green building concept.
Activities: Worksheets, seminars.

TEXT BOOKS:

1) Textbook of Environmental Studies for Undergraduate Courses by ErachBharuchafor University Grants Commission
2) Environmental Studies by R. Rajagopalan, Oxford University Press.
3) Textbook of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications
4) Dr. P. D Sharma, "Ecology and Environment", Rastogi Publications, New Delhi, 12 Edition, 2015.

REFERENCE BOOKS

1) Environmental Studies by Anubha Kaushik, 4 Edition, New age international publishers
2) Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Pvt. Ltd, New Delhi
3) Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHL Learning Pvt. Ltd, New Delhi
4) Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA edition

COURSE OUTCOMES:

The basic concepts included in this course will help the student to:

1) Differentiate between various biotic and abiotic components of ecosystem.
2) Describe the various types of natural resources.
3) Examine the problems associated with waste management.
4) Evaluate the causes, and apply control measures of various types of environmental pollutions.
5) Develop technologies on the basis of ecological principles on environment which in turn helps in sustainable development.

I YEAR B.TECH
II SEMESTER SYLLABUS

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B.Tech. ECE- II Sem **L/T/P/C**
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(R20A0002) PROFESSIONAL ENGLISH

INTRODUCTION:

English is a tool for global communication and is the dominant language which is sweeping almost all the fields in the world. It has become a necessity for people to speak in English comfortably, if they want to enter the global workforce. Hence, the course is designed to help the students to meet the global standards. Each unit focuses on English skill-set to improve: Interview skills, giving presentations and professional etiquette.

COURSE OBJECTIVES:

1) To enrich students to express themselves appropriately and fluently in professional contexts.
2) To enhance their employability through regular participation in group discussions and interview skills.
3) To lay foundation with writing strategies for the futureworkplace needs.
4) To acquaint students with different components of professional presentation skills.
5) To equip students with necessary training in listening to comprehend dialects of English language.

UNIT-I

Listening - Listening for General Details.
Speaking - Description of Pictures, Places, Objects and Persons
NOTE: Listening and Speaking tasks are solely for lab purpose and not for testing in the examinations.
Extract - The summary of Asimov's *Nightfall*
Grammar - If clauses
Vocabulary - Technical
Vocabulary Writing - Paragraph
Writing

UNIT –II

Listening -Listening for Specific Details
Speaking - Oral presentations
NOTE: Listening and Speaking tasks are solely for lab purpose and not for testing in the examinations.
Extract - A literary analysis of Asimov's *Nightfall*
Grammar - Transformation of
Sentences Vocabulary - Idioms
Writing -Abstract Writing

Unit –III

Listening - Listening for
Gist Speaking - Mock
Interviews
NOTE: Listening and Speaking tasks are solely for lab purpose and not for testing in the examinations.
Extract - Character sketches of Asimov's *Nightfall's* - protagonists and antagonists - Dr. Susan Calvin, Mike Donovan, Stephen Byerley, Francis Quinn
Grammar - Transitive and Intransitive Verbs Vocabulary - StandardAbbreviations (Mini project)
Writing - Job Application – Cover letter

UNIT – IV

Listening - Listening for
Vocabulary Speaking -
Telephonic Expressions
NOTE: Listening and Speaking tasks are solely for lab purpose and not for testing in the examinations.
Extract - Theme of Asimov's *Nightfall*
Grammar - Auxiliary verbs, Degrees of Comparison
Vocabulary - Word Analogy
Writing - Job Application - Resume

UNIT – V

Listening - Critical Listening (for attitude and Opinion) Speaking - Group discussion
NOTE: Listening and speaking tasks are solely for lab purpose and not for testing in the examinations.
Extract -Asimov's *Nightfall*: A Science Fiction
Grammar - Common Errors, Prepositions
Vocabulary - Homonyms, homophones and homographs
Writing - Report Writing

* Isaac Asimov's *Nightfall* for intensive and extensive reading
* Exercises apart from the text bookshall also be referred for classroom tasks.

REFERENCE BOOKS:

1) Nightfall, Isaac Asimov; Robert Silverberg, 1990
2) Practical English Usage. Michael Swan. OUP. 1995.
3) Remedial English Grammar. F.T. Wood. Macmillan.2007
4) On Writing Well. William Zinsser. Harper Resource Book. 2001
5) Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
6) Communication Skills. Sanjay Kumar and Pushpa Lata. Oxford University Press. 2011.
7) Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press

COURSE OUTCOMES:

Students will be able to:

1) Analyze and interpret a diverse range of engineering concepts through the synthesis of information
2) Understand the impact of professional engineering solutions is societal contexts and demonstrate its knowledge
3) Achieve communicative ability in their personal and professional relations with clarity of speech and creativity in content
4) Function effectively as an individual and a team; and would be able to prepare themselves to be market ready
5) Comprehend and write effective reports and design documentation, manage projects and make effective presentations

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B.Tech. ECE- II Sem **L/T/P/C**
3/1/-/4

(R20A0022) MATHEMATICS-II

COURSE OBJECTIVES:

1) The aim of numerical methods is to provide systematic methods for solving problems in a numerical form using the given initial data,also used to find the roots of an equation and to solve differential equations.
2) The objective of interpolation is to find an unknown function which approximates the given data points and the objective of curve fitting is to find the relation between the variables x and y from given data and such relationships which exactly pass through the data (or) approximately satisfy the data under the condition of sum of least squares of errors.
3) PDE aims at forming a function with many variables and also their solution methods, Method of separation of variables technique is learnt to solve typical second order PDE.
4) Evaluation of multiple integrals.
5) In many engineering fields the physical quantities involved are vector valued functions. Hence the vector calculus aims at basic properties of vector-valued functions and their applications to line, surface and volume integrals.

UNIT – I

SOLUTIONS OF ALGEBRAIC, TRANSCENDENTAL EQUATIONS AND INTERPOLATION

Solution of algebraic and transcendental equations: Introduction, Bisection Method, Method of false position, Newton-Raphson method and their graphical interpretations.

Interpolation: Introduction, errors in polynomial interpolation, Finite differences - Forward differences, Backward differences, Central differences. Newton's formulae for interpolation, Gauss's central difference formulae, Interpolation with unevenly spaced points - Lagrange's Interpolation.

UNIT – II:

NUMERICAL METHODS

Numerical integration: Generalized quadrature - Trapezoidal rule, Simpson's $1/3^{rd}$ and Simpson's $3/8^{th}$ rules.

Numerical solution of ordinary differential equations: Solution by Taylor's series method, Euler's method, Euler's modified method, Runge-Kutta fourth order method.

Curve fitting : Fitting a straight line, second degree curve, exponential curve, power curve by method of least squares.

UNIT III:

PARTIAL DIFFERENTIAL EQUATIONS

Introduction, formation of partial differential equation by elimination of arbitrary constants and arbitrary functions, solutions of first order Lagrange's linear equation and

non-linear equations, Charpit's method, Method of separation of variables for second order equations and applications of PDE to one dimensional equation (Heat equation).

UNTI IV:

DOUBLE AND TRIPLE INTEGRALS

Double and triple integrals (Cartesian and polar), Change of order of integration in double integrals, Change of variables (Cartesian to polar).

UNIT V:

VECTOR CALCULUS

Introduction, Scalar point function and vector point function, Directional derivative, Gradient, Divergence, Curl and their related properties, Laplacian operator, Line integral - work done, Surface integrals, Volume integral. Green's theorem, Stoke's theorem and Gauss's Divergence theorems (Statement & their Verification).

TEXT BOOKS:

1) Higher Engineering Mathematics by B V Ramana ., Tata McGraw Hill.
2) Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.
3) Mathematical Methods by S.R.K Iyenger, R.K.Jain, Narosa Publishers.

REFERENCE BOOKS:

1) Elementary Numerical Analysis by Atkinson-Han, Wiley Student Edition.
2) Advanced Engineering Mathematics by Michael Greenberg –Pearson publishers.
3) Introductory Methods of Numerical Analysis by S.S. Sastry, PHI

COURSE OUTCOMES:

1) Find the roots of algebraic, non algebraic equations and predict the value at an intermediate point from a given discrete data.
2) Find the most appropriate relation of the data variables using curve fitting and this method of data analysis helps engineers to understand the system for better interpretation and decision making.
3) Solve first order linear and non-linear partial differential equations which are very important in engineering field.
4) Evaluate multiple integrals; hence this concept can be used to evaluate Volumes and Areas of an object.
5) Evaluate the line, surface, volume integrals and converting them from one to another using vector integral theorems.

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I Year B.Tech. ECE- II Sem **L/T/P/C**
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(R20A0201) BASIC ELECTRICAL ENGINEERING

COURSE OBJECTIVES:

1) To understand the basic concepts of electrical circuits & networks and their analysis which is the foundation for all the subjects in the electrical engineering discipline.
2) To emphasize on the basic elements in electrical circuits and analyze Circuits using Network Theorems.
3) To analyze Single-Phase AC Circuits.
4) To illustrate Single-Phase Transformers and DC Machines.
5) To get overview of basic electrical installations and calculations for energy consumption.

UNIT –I:

Introduction to Electrical Circuits: Concept of Circuit and Network, Types of elements, R-L-C Parameters, Independent and Dependent sources, Source transformation and Kirchhoff's Laws

UNIT –II:

Network Analysis: Network Reduction Techniques- Series and parallel connections of resistive networks, Star–to-Delta and Delta-to-Star Transformations for Resistive Networks, Mesh Analysis, and Nodal Analysis,
Network Theorems**:** Thevenin's theorem, Norton's theorem, MaximumPower Transfer theorem and Superposition theorem, Illustrative Problems.

UNIT-III:

Single Phase A.C. Circuits: Average value, R.M.S. value, form factor and peak factor for sinusoidal wave form. Steady State Analysis of series R-L-C circuits. Concept of Reactance, Impedance, Susceptance, Admittance, Concept of Power Factor, Real, Reactive and Complex power and Illustrative Problems.

UNIT –IV:

Electrical Machines (elementary treatment only):Single phase transformers: principle of operation, constructional features and emf equation. DC.Generator: principle of operation, constructional features, emf equation. DC Motor: principle of operation, Back emf, torque equation.

UNIT –V:

Electrical Installations: Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, Types of Wires and Cables, Earthing. Elementary calculations for energy consumption

TEXT BOOKS:

1) Engineering Circuit Analysis - William Hayt, Jack E. Kemmerly, S M Durbin, Mc Graw Hill Companies.
2) Electric Circuits - A. Chakrabarhty, Dhanipat Rai & Sons.
3) Electrical Machines – P.S.Bimbra, Khanna Publishers.

REFERENCE BOOKS:

1) Network analysis by M.E Van Valkenburg, PHI learning publications.
2) Network analysis - N.C Jagan and C. Lakhminarayana, BS publications.
3) Electrical Circuits by A. Sudhakar, Shyammohan and S Palli, Mc Graw Hill Companies.
4) Electrical Machines by I.J. Nagrath & D. P. Kothari, Tata Mc Graw-Hill Publishers.

COURSE OUTCOMES:

At the end of the course students, would be able to

1) Apply the basic RLC circuit elements and its concepts to networks and circuits.
2) Analyze the circuits by applying network theorems to solve them to find various electrical parameters.
3) Illustrate the single-phase AC circuits along with the concept of impedance parameters and power.
4) Understand the Constructional Details and Principle of Operation of DC Machines and Transformers
5) Understand the basic LT Switch gear and calculations for energy consumption.

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I Year B.Tech. ECE- II Sem **L/T/P/C**
2/-/2/3

(R20A0301) COMPUTER AIDED ENGINEERING GRAPHICS

COURSE OBJECTIVES:

1) To learn basic engineering graphic communication skills & concept.
2) To learn the 2D principles of orthographic projections And Multiple views of the same
3) To know the solid Projection and Its Sectional Views
4) To gain the capability of designing 3D objects with isometric principles by using computer aided sketches
5) To know the conversion of Orthographic Views to isometric Views And isometric to Orthographic views.

UNIT-I

INTRODUCTION TO COMPUTER AIDED ENGINEERING GRAPHICS

Introduction, Drawing Instruments and their uses, BIS conventions, lettering Dimensioning & free hand practicing. AutoCAD User Interface – Menu system – coordinate systems, axes, poly-lines, square, rectangle, polygons, splines, circles, ellipse,– tool bars (draw, modify, annotations, layers etc.) – status bar (ortho, grid, snap, iso etc.),

Generation of points, lines, curves, polygons, dimensioning, layers, blocks, electrical symbols.

Geometrical constructions

Curves Used In Engineering Practice

a) Conic Sections (General Method only- Eccentricity Method)
b) Cycloid, Epicycloid and Hypocycloid

UNIT-II:

2D PRJECTIONS

Orthographic Projections: – Conventions – First and Third Angle projections.Projections of Points, Projections of Lines, Projections of planes, Circuits Designs **–** Basic Circuit Symbols & Sensors

UNIT– III

Projections of Solids: Projections of regular solids prism and pyramid inclined to both planes.

Sections of solids: Section planes and sectional view of right regular solids- prism, cylinder, pyramid and cone, True shapes of the sections.

UNIT– IV

3D PROJECTIONS

Isometric Projections: Principles of Isometric Projection – Isometric Scale – Isometric Views, Commands for 3D UCS, Extrude, revolve, loft, 3D move, 3D rotate, dox, sphere, cone, wedge, cylinder, view ports.
Plane Figures, Simple and Compound Solids.

3D models of electrical components Switch, Diode, Resistor, Battery, Capacitor, Transistor, Motor.

UNIT– V

Transformation of Projections: Visualize the 2D &3D View of Engineering Objects for Conversion of Isometric Views to Orthographic Views. Conversion of orthographic views to isometric views – simple objects in AutoCAD

TEXT BOOKS:

1) Engineering Drawing – N.D. Bhatt & V.M. Panchal, 48th edition, 2005 Charotar Publishing House, Gujarat.
2) "Computer Aided Engineering Drawing" by Dr. M H Annaiah, Dr C N Chandrappa and Dr B Sudheer Premkumar Fifth edition, New Age International Publishers

REFERENCE BOOKS:

1) Computer Aided Engineering Drawing – S. Trymbaka Murthy, - I.K. International Publishing House Pvt. Ltd., New Delhi, 3rd revised edition-2006.
2) Engineering Graphics - K.R. Gopalakrishna, 32nd edition, 2005- Subash Publishers Bangalore.

COURSE OUTCOMES:

After the completion of course the student will be capable to

1) Produce geometric construction, dimensioning & Curves and detail drawings.
2) Compile Projections of points, lines ,planes then create virtual drawing by using computer
3) Sketch the Solid Projections & Sectioning of the solids
4) Develop isometric drawings of simple objects reading the orthographic projections of those objects.
5) Understand and visualize the 3-D view of engineering objects. Elaborate the conversions of 2D -3D and Vice-Versa.

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(R20A0502) PYTHON PROGRAMMING

COURSE OBJECTIVES:

1) To read and write simple Pythonprograms.
2) To develop Python programs with conditionals and loops.
3) To define Python functions and call them.
4) To use Python data structures –- lists, tuples, dictionaries.
5) To do input/output with files in Python.

UNIT I

Introduction to Python Programming Language: Introduction to Python Language and installation, overview on python interpreters, working with python, Numeric Data Types: int, float, Boolean, complex and string and its operations, Standard Data Types: List, tuples, set and Dictionaries, Data Type conversions, commenting in python.

UNIT II

Variables and Operators: Understanding Python variables, Multiple variable declarations, Python basic statements, Python basic operators: Arithmetic operators, Assignment operators, Comparison operators, Logical operators, Identity operators, Membership operators, Bitwise operators, Precedence of operators, Expressions.

UNIT III

Control flow & Loops:conditional (if), alternative (if-else), chained conditional (if- elif - else), Loops: For loop using ranges,string, Use of while loops in python, Loop manipulation using pass, continue and break

UNIT IV

Functions: Defining Your Own Functions, Calling Functions, passing parameters and arguments, Python Function arguments: Keyword Arguments, Default Arguments, Variable-length arguments, Anonymous Functions, Fruitful Functions (Function Returning Values), Scope of the Variables in a Function - Global and Local Variables. Powerful Lambda functions in python.

UNIT V

I/O and Error Handling in Python: Introduction, Access Modes, Writing Data to a File, Reading Data from a File, Additional File Methods introduction to Errors and Exceptions, Handling IO Exceptions, Run Time Errors, Handling Multiple Exceptions.

Introduction to Data Structures: What are Data structures, Types of Data structures, Introduction to Stacks and Queues.

TEXT BOOKS

1) R. Nageswara Rao, “Core Python Programming”, dreamtech
2) Allen B. Downey, ``Think Python: How to Think Like a Computer Scientist‘‘, 2nd edition,Updated for Python 3, Shroff/O‘Reilly Publishers, 2016.
3) Python Programming: A Modern Approach, Vamsi Kurama, Pearson
4) Data Structures and Algorithmic Thinking with Python by Narasimha Karumanchi

REFERENCE BOOKS:

1) Core Python Programming, W.Chun, Pearson.
2) Introduction to Python, Kenneth A. Lambert, Cengage
3) Learning Python, Mark Lutz, Orielly

COURSE OUTCOMES:

Upon completion of the course, students will be able to

1) Read, write, execute by hand simple Python programs.
2) Structure simple Python programs for solving problems.
3) Decompose a Python program into functions.
4) Represent compound data using Python lists, tuples, dictionaries.
5) Read and write data from/to files in Python Programs.

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I Year B.Tech. ECE- II Sem **L/T/P/C**

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(R20A0081) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

The Language Lab focuses on the production and practice of sounds of the English language and familiarizes the students with its use in everyday situations and contexts.

COURSE OBJECTIVES:

1) To facilitate computer-aided multi-media instruction enabling individualized and independent language learning
2) To sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm
3) To bring about a consistent accent and intelligibility in their pronunciation, ample speaking opportunities are provided.
4) To improve the fluency in spoken English and neutralize mother tongue influence
5) To train students to use language appropriately for interviews, group discussions and public speaking.

English Language Communication Skills Lab has two parts:

A. Computer Assisted Language Learning (CALL) Lab
B. Interactive Communication Skills (ICS) Lab

The following course content is prescribed for the English Language Communication Skills Lab.

UNIT –I

CALL Lab: Introduction to Phonetics –Speech Sounds –Vowels and Consonants-Transcriptions

ICS Lab: Ice-Breaking activity - JAM session

UNIT –II

CALL Lab: Pronunciation: Past Tense Markers and Plural Markers

ICS Lab: Situational Dialogues/Role Plays-–Greetings - Taking Leave – Introducing Oneself and Others - Requests and Seeking Permissions

UNIT–III

CALL Lab: Syllable and Syllabification

ICS Lab: Communication at Workplace- Situational Dialogues/Role Plays – Seeking Clarifications – Asking for and Giving Directions – Thanking and Responding – Agreeing and Disagreeing – Seeking and Giving Advice.

UNIT –IV

CALL Lab: Word Stress and Intonation

ICS Lab: Information transfer – from visual to verbal - maps, charts, tables and graphs

UNIT –V

CALL Lab: Errors in Pronunciation- Accent - the Influence of Mother Tongue (MTI)
ICS Lab: Making a Short Speech - Extempore

ELCS LAB:

1) **Computer Assisted Language Learning (CALL) Lab:**
   - **a.** The Computer aided Language Lab for 60 students with 60 systems, one master console, LAN facility and English language software for self-study by learners. **System Requirement (Hardware component):**
   - b. Computer network with LAN with minimum 60 multimedia systems with the following specifications:
     i) P IV Processor
     a)Speed –2.8 GHZ
     b) RAM –512 MB Minimum
     c) HardDisk –80 GB
     ii) Headphones of High quality
2) **Interactive Communication Skills (ICS) Lab :**
   - a. A Spacious room with movable chairs and audio-visual aids with a Public Address System, a T. V., a digital stereo –audio & video system and camcorder etc.

COURSE OUTCOMES:

After completion of the course the students will be able to:

1) Learn with precision through computer-assisted individualized and independent language learning to work independently in an engineeringset-up.
2) Improve conversational reception and articulation techniques in the course of repetitive instruction thereby gaining confidence both in institutional and professional environment.
3) Acquire accuracy in pronunciation and restoring Standard English thereby crafting better command in English language so that the students have a cutting edge over others in society.
4) Imbibe appropriate use of language in situations where one works as an individual and as a leader/team player.
5) Display professional behaviors and body language

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(R20A0281) BASIC ELECTRICAL ENGINEERING LAB

COURSE OBJECTIVES:

1) To design electrical systems.
2) To analyze a given network by applying various network theorems.
3) To expose the students to the operation of dc generator.
4) To expose the students to the operation of dc motor and transformer.
5) To examine the self excitation in dc generators.

CYCLE – I

1) Verification of KVL and KCL.
2) Verification of Thevenin's theorem.
3) Verification of Norton's theorem.
4) Verification of Super position theorem.
5) Verification of Maximum power transfer theorem.
6) Verification of Reciprocity theorem.

CYCLE -II

1) Magnetization characteristics of DC shunt generator.
2) Swinburne's test on DC shunt machine.
3) Brake test on DC shunt motor.
4) OC &SC tests on single phase transformer.
5) Load test on single phase transformer.

NOTE: Any 10 of above experiments are to be Conducted

COURSE OUTCOMES:

At the end of the course, students would be able to

1) Calculate the branch currents and mesh voltages by conducting KCL and KVL test on given circuit.
2) Prove the various circuit theorems like Superposition, Thevenin's, Norton's, Maximum power transfer and Reciprocity theorems.
3) Plot the Magnetization characteristics of DC shunt generator.
4) Plot the characteristics of DC shunt motor by conducting Brake Test.
5) Determine the Efficiency of single-phase transformer by conducting OC, SC and Load tests

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(R20A0281) PYTHON PROGRAMMING LAB

COURSE OBJECTIVES:

1) Syntax and Semantics and create Functions in Python.
2) Different data types Lists, Dictionaries in Python.
3) how to execute the programs using loops and control statements
4) Decision Making and Functions in Python
5) Files and exception Handling in Python

WEEK 1:

1) Write python program to print Hello World
2) Write a python program to get string, int, float input from user
3) Write a python program to add 2 numbers

WEEK 2:

1) Create a list and perform the following methods
a. insert() b) remove() c) append() d) len() e) pop() f) clear()

2) Write a python program to find the length of list?

3) Write a python program to find the smallest and largest number in the list?

WEEK 3:

1) Create a tuple and perform the following methods
1) Add items 2) len() 3) check for item in tuple 4)Access iems
2) Write a python program using the following methods: 1) count 2) index
3) Write a python program using "+" and "*" operations which resulting a new tuple?

WEEK 4:

1) Create a dictionary and apply the following methods
1. Print the dictionary items2) access items 3) use get() 4)change values 5) use len()
2) Write a python code to convert list of tuples into dictionaries?
3) Write python program to store data in list, tuple, set, dictionary and then try to print them.

WEEK 5:

1) Write a python program to perform arithmetic, assignment, logical and comparison operators?
2) Write a Python program to add two positive integers without using the '+' operator. (use bitwise operator)
3) Write a Python program to perform the basic four operators (+, -, *, /)

WEEK 6:

1) Write a simple python program to declare a variable in different possible ways?
2) Write a python program to show precedence of operators using the expression: z = (v+w) * x / y
3) Write a python program to check whether the values of a list exist or not (use membership operator) and also perform identity operation?

WEEK 7:

1) Write a python program to print a number is positive/negative using if-else.
2) Write a python program to find largest number among three numbers.
3) Write a python Program to read a number and display corresponding day using if_elif_else?
4) Write a python program to print list of numbers using range and for loop

WEEK 8:

1) Write a python code to print the sum of natural numbers using while loop?
2) Write a python program to print the factorial of given number?
3) Write a python program to find the sum of all numbers stored in a list using for loop?

WEEK 9:

1) Write a Python function that takes two lists and returns True if they are equal otherwise false
2) Write python program in which an function is defined and calling that function prints Hello World
3) Write python program in which an function(with single string parameter) is defined and calling that function prints the string parameters given to function.
4) Write a python program using with any one of python function argument?

WEEK 10:

1) Write a program to double a given number and add two numbers using lambda()?
2) Write a program for filter() to filter only even numbers from a given list.
3) Write a program for map() function to double all the items in the list?
4) Write a program to find sum of the numbers for the elements of the list by using reduce()?

WEEK 11:

1) Write a python program to open and write “hello world” into a file?
2) Write a python program to write the content “hi python programming” for the existing file.
3) Write a python program to read the content of a file?

WEEK 12:

1) write a program to implement stack using array.
2) write a program to implement Queue using array.

TEXT BOOKS:

1) R. Nageswara Rao, “Core Python Programming”, dreamtech
2) Allen B. Downey , “ Think Python: How to Think Like a Computer Scientist”, Second Edition, Updated for Python 3, Shroff/O’Reilly Publishers, 2016.

COURSE OUTCOMES:

After completion of the course, Students will be able to:

1. Evaluate Problem solving and programming capability
2. Describe the Numbers, Math functions, Strings, List, Tuples and Dictionaries in Python
3. Implement conditional and loop for python programs
4. Express different Decision Making statements and Functions
5. Understand and summarize different File handling operations andexceptions

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MANDATORY COURSE II
(R20A0003) HUMAN VALUES AND PROFESSIONAL ETHICS

COURSE OBJECTIVES:

This introductory course input is intended:

1) To help the students appreciate the essential complementarily between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
2) To facilitate the development of a holistic perspective among students towards life, profession and happiness, based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of value based living in a natural way.
3) To highlight plausible implications of such a holistic understanding in terms of ethical human conduct, trustful and mutually satisfying human behavior and mutually enriching interaction with Nature.

UNIT - I:

Course Introduction - Need, Basic Guidelines, Content and Process for Value Education: Understanding the need, basic guidelines, content and process for Value Education.

Self Exploration - what is it? - its content and process; 'Natural Acceptance' and Experiential Validation - as the mechanism for self exploration. Continuous Happiness and ProsperityA look at basic Human Aspirations- Right understanding, Relationship and Physical Facilities - the basic requirements for fulfillment of aspirations of every human being with their correct priority.

Understanding Happiness and Prosperity correctly - A critical appraisal of the current scenario. Method to fulfill the above human aspirations: understanding and living in harmony at various levels.

UNIT - II:

Understanding Harmony in the Human Being - Harmony in Myself! : Understanding human being as a co-existence of the sentient 'I' and the material 'Body'.

Understanding the needs of Self ('I') and 'Body' - Sukh and Suvidha. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer).

Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail. Programs to ensure Sanyam and Swasthya.

UNIT - III:

Understanding Harmony in the Family and Society - Harmony in Human - Human Relationship: Understanding harmony in the Family the basic unit of human interaction. Understanding values in human - human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship.

Understanding the meaning of Vishwas; Difference between intention and competence. Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship.
Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astiva as comprehensive Human Goals. Visualizing a universal harmonious order in society - Undivided Society (Akhand Samaj), Universal Order (Sarvabhaum Vyawastha) - from family to world family!

UNIT - IV:
Understanding Harmony in the nature and Existence - Whole existence as Coexistence: Understanding the harmony in the Nature. Interconnectedness and mutual fulfillment among the four orders of nature - recyclability and self-regulation in nature.
Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all-pervasive space. Holistic perception of harmony at all levels of existence.

UNIT - V:
Implications of the above Holistic Understanding of Harmony on Professional Ethics: Natural acceptance of human values, Definitiveness of Ethical Human Conduct, Basic 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.

TEXT BOOKS:

1) R. R. Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics.
2) Prof. K. V. Subba Raju, 2013, Success Secrets for Engineering Students, Smart Student Publications, 3rd Edition.

REFERENCE BOOKS:

1) Ivan Illich, 1974, Energy & Equity, The Trinity Press, Worcester, and HarperCollins, USA
2) E. F. Schumancher, 1973, Small is Beautiful: a study of economics as if people mattered. Blond & Briggs, Britain.
3) A Nagraj, 1998 Jeevan Vidya ek Parichay, Divya Path Sansthan, Amarkantak.
4) Sussan George, 1976, How the Other Half Dies, Penguin Press, Reprinted 1986, 1991.
5) P. L. Dhar, R. R. Gaur, 1990, Science and Humanism, Commonwealth Publishers.
6) A. N. Tripathy, 2003, Human Values, New Age International Publishers.
7) Subhas Palekar, 2000, How to practice Natural Farming, Pracheen(Vaidik) Krishi Tantra Shodh, Amravati.
8) Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits toGrowth - Club of Rome's report, Universe Books.
9) E G Seebauer & Robert L.Berry, 2000, Fundamentals of Ethics for Scientists & Engineers, Oxford University Press.
10) M Govindrajan, S Natrajan & V. S Senthil kumar, Engineering Ethics (including Humna Values), Eastern Economy Edition, Prentice Hall of India Ltd.

Relevant CDs, Movies, Documentaries & Other Literature:

1) Value Education website, http://www.uptu.ac.in
2) Story of Stuff, http://www.storyofstuff.com
3) AI Gore, An Inconvenient Truth, Paramount Classics, USA
4) Charle Chaplin, Modern Times, United Artists, USA
5) IIT Delhi, Modern Technology - the Untold Story

COURSE OUTCOMES:

1) The students will be able to obtain happiness and prosperity in their life.
2) The students will develop harmony at all levels.
3) The students can have satisfying human behavior throughout their life.

II YEAR B.TECH
I SEMESTER
SYLLABUS

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(R20A0023) MATHEMATICS - III

COURSE OBJECTIVES:

1) The expansion of a given function by Fourier series.
2) The Fourier sine and cosine transforms, properties, inverse transforms, and finite Fourier transforms.
3) Differentiation and integration of complex valued functions. Evaluation of integrals using Cauchy's integral formula.
4) Taylor's series, and Laurent's series expansions of complex functions, evaluation of integrals using residue theorem.
5) Transform a given function from z - plane to w – plane. Identify the transformations like translation, magnification-rotation, reflection-inversion, and Properties of bilinear transformations.

UNIT – I:

Fourier series: Definition of periodic function, Fourier expansion of periodic functions in a given interval of length 2. Determination of Fourier coefficients – Fourier series of even and odd functions – Half-range Fourier sine and cosine Expansions-Fourier series in an arbitrary interval.

UNIT – II:

Fourier Transforms: Fourier integral theorem - Fourier sine and cosine integrals, Fourier transforms – Fourier sine and cosine transforms – properties – inverse transforms – Finite Fourier transforms.

UNIT – III:

Analytic functions: Complex functions and its representation on Argand plane, Concepts of limit, continuity, differentiability, Analyticity, and Cauchy-Riemann conditions, Harmonic functions – Milne – Thompson method. Line integral – Evaluation along a path and by indefinite integration – Cauchy's integral theorem (singly and multiply connected regions) – Cauchy's integral formula – Generalized integral formula.

UNIT – IV:

Singularities and Residues: Radius of convergence – Expansion in Taylor's series, Laurent's series. Singular point – Isolated singular point – pole of order m – essential singularity. Residue – Evaluation of residue by formula and by Laurent series – Residue theorem. Evaluation of integrals of the type

(a) Improper real integrals $\int_{-\infty} f(x)dx$ (b) $\int_c \quad f(cos\Theta, sin\Theta)d\Theta$

UNIT – V:

Conformal mapping: Transformation of z-plane to w-plane by a function, Conformal transformation. Standard transformations- Translation; Magnification and rotation; Inversion and reflection, Transformations like e^z , log z, z^2, and Bilinear transformation. Properties of Bilinear transformation, determination of bilinear transformation when mappings of 3 points are given (cross ratio).

TEXT BOOKS:

1) Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.
2) Higher Engineering Mathematics by Ramana B.V, Tata McGraw Hill.
3) Complex Variables : Theory and Applications by H.S Kasana.

REFERENCES:

1) Complex Variables by Murray Spiegel,Seymour Lipschutz, et al. by Schaum's outlines series.
2) Advanced Engineering Mathematics by Kreyszig, John Wiley & Sons.
3) Advanced Engineering Mathematics by Michael Greenberg –Pearson publishers.

COURSE OUTCOMES:

After learning the concepts of this paper the student will be able to

1) Find the expansion of a given function by Fourier series in the given interval and hence this concept can be used in the analysis of signals.
2) Find Fourier sine, cosine transforms and inverse transformations; hence this concept can be used in designing electrical circuits, signal processing and image processing etc.
3) Analyze the complex functions with reference to their analyticity and integration using Cauchy's integral theorem.
4) Find the Taylor's and Laurent series expansion of complex functions and solution of improper integrals can be obtained by Cauchy's-Residue theorem.
5) Understand the conformal transformations of complex functions can be dealt with ease and which can be used in different physical situations.

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(R20A0402) ELECTRONIC DEVICES AND CIRCUITS

COURSE OBJECTIVES:

1) To learn how pn diode is used as a rectifier and various types of filter design
2) To know different types of transistor biasing techniques
3) To learn BJT Hybrid model and how to design transistor amplifier
4) To learn about feedback amplifiers and different types of oscillators.
5) To learn about FET amplifiers and special purpose diodes.

UNIT I

Rectifiers: P-N Junction diode as a rectifier, half wave rectifier, Full wave rectifier, Bridge rectifier, their ripple factor, efficiency and % regulation.
Filters: Capacitor filter, Inductor Filter.

UNIT II

Biasing and Stabilization: Operating point, the D.C Load line, Fixed bias, Collector to base bias, Self-bias techniques for stabilization, Stabilization factors, (s, s^{I}), Bias Compensation using diode and transistor , (Compensation against variation in V_{BE}, I_{CO}),Thermal runaway and Thermal stability

UNIT III

BJT Hybrid Model and Transistor Amplifier- Transistor hybrid model, Analysis of single stage transistor amplifier using h-parameters: voltage gain, current gain, Input impedance and Output impedance. Comparison of transistor configurations in terms of Ai, Ri, Av, and Ro

UNIT IV

FEEDBACK AMPLIFIERS:

Concept of Feedback and types, Effects of negative feedback on amplifiers characteristics, voltage series, current series, current shunt, and voltage shunt feedback amplifiers.
OSCILLATORS: Classification of oscillators, Barkhausen criterion, RC phase shift oscillator, Wein-bridge oscillator, LC oscillators- Hartley and Colpitts oscillator.

UNIT V:

FET Amplifiers: FET Biasing, Common source Amplifier, Common Drain Amplifier.
Special purpose Devices: Principal of operation and characteristics of Tunnel Diode, Varactor Diode, photo Diodeand UJT.

TEXT BOOKS

1) “Electronic Devices & Circuits”, Special Edition – MRCET, McGraw Hill Publications,2017.
2) Integrated Electronics Analog Digital Circuits, Jacob Millman and D. Halkias, McGrawHill.
3) Electronic Devices and Circuits, S.Salivahanan,N.Sureshkumar, McGrawHill.

REFERENCE BOOKS

1) Electronic Devices and Circuits,K.Lal Kishore B.SPublications
2) Electronic Devices and Circuits, G.S.N. Raju, I.K. International Publications, New Delhi, 2006.

COURSE OUTCOMES:

After the course completion the students will be able

1) To design pn diode based rectifiers with filters
2) To design different types of transistor biasing circuits
3) To design transistor amplifier using hybrid model.
4) To design and analyze feedback amplifiers and different types of oscillators.
5) To analyze and understand FET amplifiers and special purpose diodes.

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II Year B.Tech. ECE- I Sem **L/T/P/C**
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(R20A0403) SIGNALS AND SYSTEMS

COURSE OBJECTIVES:

The main objectives of the course are:

1) Knowledge of time-domain representation and analysis concepts of basic elementary signals
2) Knowledge of Fourier Series for Continuous Time Signals
3) Knowledge of frequency-domain representation and analysis concepts F.T., L.T. & Z.T and Concepts of the sampling process.
4) Mathematical and computational skills needed to understand the principal of Linear System and Filter Characteristics of a System.
5) Mathematical and computational skills needed to understand the concepts of auto correlation and cross correlation and power Density Spectrum.

UNIT I:

INTRODUCTION TO SIGNALS: Elementary Signals- Continuous Time (CT) signals, Discrete Time (DT) signals, Classification of Signals, Basic Operations on signals.

FOURIER SERIES: Representation of Fourier series, Continuous time periodic signals, Dirichlet's conditions, Trigonometric Fourier Series, Exponential Fourier Series, Properties of Fourier series, Complex Fourier spectrum.

UNIT II:

FOURIER TRANSFORMS: Deriving Fourier transform from Fourier series, Fourier transform of arbitrary signal, Fourier transform of standard signals, Properties of Fourier transforms.

SAMPLING: Sampling theorem **–** Graphical and analytical proof for Band Limited Signals, impulse sampling, Natural and Flat top Sampling, Reconstruction of signal from its samples, effect of under sampling – Aliasing.

UNIT III:

SIGNAL TRANSMISSION THROUGH LINEAR SYSTEMS: Introduction to Systems, Classification of Systems, Linear Time Invariant (LTI) systems, impulse response, Transfer function of a LTI system. Filter characteristics of linear systems. Distortion less transmission through a system, Signal bandwidth, System bandwidth, Ideal LPF, HPF and BPF characteristics.

UNIT IV:

CONVOLUTION AND CORRELATION OF SIGNALS: Concept of convolution in time domain, Cross correlation and auto correlation of functions, properties of correlation function, Energy density spectrum, Parseval's theorem, Power density spectrum, Relation between convolution and correlation.

UNIT V:

LAPLACE TRANSFORMS: Review of Laplace transforms, Inverse Laplace transform, Concept of region of convergence (ROC) for Laplace transforms, Properties of L.T's relation between L.T's, and F.T. of a signal.

Z–TRANSFORMS: Concept of Z- Transform of a discrete sequence. Distinction between Laplace, Fourier and Z transforms, Region of convergence in Z-Transform, Inverse Z- Transform, Properties of Z-transforms.

TEXT BOOKS:

1) "Signals & Systems", Special Edition – MRCET, McGraw Hill Publications, 2017
2) Signals, Systems & Communications – B.P. Lathi, BS Publications, 2003.
3) Signals and Systems – A.V. Oppenheim, A.S. Willsky and S.H. Nawab, PHI, 2nd Edn.
4) Signals and Systems – A. Anand Kumar, PHI Publications, 3rd edition.

REFERENCE BOOKS:

1) Signals & Systems – Simon Haykin and Van Veen,Wiley, 2nd Edition.
2) Network Analysis – M.E. Van Valkenburg, PHI Publications, 3rd Edn.,2000.
3) Fundamentals of Signals and Systems Michel J. Robert, MGH International Edition,2008.
4) Signals, Systems and Transforms – C. L. Philips, J. M. Parr and Eve A. Riskin, Pearson education.3rd Edition, 2004.

COURSE OUTCOMES:

After completion of the course, the student will be able to:

1) Understand the basic elementary signals
2) Determine the Fourier Series for Continuous Time Signals
3) Analyze the signals using F.T, L.T & Z.T and study the properties of F.T., L.T. & Z.T.
4) Understand the principal of Linear System and Filter Characteristics of a System.
5) Understand the concepts of auto correlation and cross correlation and power Density Spectrum.

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(R20A0205) CONTROL SYSTEMS

COURSE OBJECTIVES:

1) To learn the basic principles of control system, transfer function representation using block diagram and signal flow graph.
2) To analyze the time response and the effect of different controllers.
3) To study and analyze the different methods of stability in time domain.
4) To understand the frequency domain specifications and different methods of stability in frequency domain.
5) To learn the basic concepts of state space analysis and solutions to time invariant state equations.

UNIT - I:

Introduction: Concept of control system, Classification of control systems - Open loop and closed loop control systems, Differences, Examples of control systems- Effects of feedback, Feedback Characteristics.

Transfer Function Representation: Block diagram algebra, Determining the Transfer function from Block Diagrams, Signal flow graphs(SFG) - Reduction using Mason's gain formula- Transfer function of SFG's.

UNIT - II:

Time Response Analysis: Standard test signals, Time response of first order systems, Characteristic Equation of Feedback control systems, Transient response of second order systems - Time domain specifications, Steady state response, Steady state errors and error constants.PID controllers: Effects of proportional derivative, proportional integral systems on steady state error.

UNIT - III:

Stability Analysis in S-Domain: The concept of stability – Routh-Hurwitz's stability criterion – qualitative stability and conditional stability – Limitations of Routh-Hurwitz's stability.

Root Locus Technique: Concept of root locus - Construction of root locus.

UNIT - IV:

Frequency Response Analysis: Introduction, Frequency domain specifications, Bode plot diagrams- Determination of Phase margin and Gain margin, Stability analysis from Bode plots, Polar plots.

UNIT - V:

State Space Analysis of Continuous Systems: Concepts of state, state variables and state model, Derivation of state models from block diagrams, Diagonalization, Solving the time invariant state equations, State Transition Matrix and it's properties, Concepts of Controllability and observability.

TEXT BOOKS:

1) Control Systems Engineering - I. J. Nagrath and M. Gopal, New Age International (P) Limited, Publishers.
2) Control Systems - A. Ananad Kumar, PHI.
3) Control Systems Engineering by A. Nagoor Kani, RBA Publications.

REFERRENCE BOOKS:

1) Control Systems Theory and Applications by S. K. Bhattacharya, Pearson.
2) Control Systems Engineering by Palani, TMH.
3) Control Systems by N. K. Sinha, New Age International (P) Limited Publishers.
4) Control Systems by S.Hasan Saeed, KATSON BOOKS.
5) Solutions and Problems of Control Systems by A.K. Jairath, CBS Publishers.

COURSE OUTCOMES

At the end of this course, students would be able to:

1) Explain the basic principles of control system, transfer function representation using block diagram and signal flow graph.
2) Analyze the time response and effect of different controllers.
3) Study the different methods of stability in time domain.
4) Analyze the frequency domain specifications and stability methods in frequency domain.
5) Explain the basic concepts of state space analysis and solutions to time invariant state equations.

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II Year B.Tech. ECE- I Sem **L/T/P/C**
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(R20A0404) DIGITAL LOGIC DESIGN

COURSE OBJECTIVES:

1) To design storage elements and learn applications of storage elements.
2) To design sequential logic circuits.
3) To know the basic language features of Verilog HDL and the role of HDL in digital logic design.
4) To know the role of HDL in digital logic design.
5) Learning to design using Verilog at different levels of abstraction.

UNIT –I

Sequential Machines Fundamentals: Introduction, Basic Architectural Distinctions between Combinational and Sequential circuits, classification of sequential circuits, The binary cell, The S-R-Latch Flip-Flop The D-Latch Flip- Flop, The “Clocked T” Flip-Flop, The “ Clocked J-K” Flip-Flop, Design of a Clocked Flip-Flop, Conversion from one type of Flip-Flop to another.

UNIT –II

Sequential Circuit Design and Analysis: Introduction, classification of sequential circuits, State Diagram, State table, Analysis of Synchronous Sequential Circuits, State Reduction and assignment, Design procedure of synchronous sequential circuits.
Registers and Counters: Registers, Shift Registers, classification of counters, Design of Ripple counters and Synchronous counters, other counters.

UNIT –III

INTRODUCTION TO VERILOG HDL: Verilog as HDL, Levels of Design Description, Concurrency, Simulation and Synthesis, Programming Language Interface, Module.
Language Constructs and Conventions: Introduction, Keywords, Identifiers, White Space, Characters, Comments, Numbers, Strings, Logic Values, Data Types, Operators.

UNIT-IV

GATE LEVEL MODELING: Introduction, AND Gate Primitive, Module Structure, Other Gate Primitives, Illustrative Examples, Tristate Gates, Array of Instances of Primitives, Design of Flip-Flops with Gate Primitives, Delay.
MODELING AT DATAFLOW LEVEL: Introduction, Continuous Assignment Structure, Delays and Continuous Assignments, Assignment to Vector, Operators.

UNIT-V

BEHAVIORAL MODELING: Introduction, Operations and Assignments, 'Initial' Construct, Assignments with Delays, 'Wait 'Construct, Design at Behavioral Level, Blocking and Non-Blocking Assignments, The 'Case' Statement, 'If' an 'if-Else' Constructs, for loop, 'While Loop', Parallel Blocks.

TEXT BOOKS:

1) Digital Design- Morris Mano, PHI, 3rd Edition.
2) Switching Theory and Logic Design-A. Anand Kumar, PHI, 2nd Edition.
3) Fundamentals of Logic Design –Charles H. Roth, 5th Ed., Cengage Learning.
4) Logic Design Theory –N. N. Biswas PHI.

REFERENCE BOOKS:

1) Introduction to Switching Theory and Logic Design – Fredriac J. Hill, Gerald R. Peterson, 3rd Ed, John Wiley & Sons Inc.
2) Digital Fundamentals – A Systems Approach – Thomas L. Floyd, Pearson, 2013.
3) Digital Logic Applications and Design- John M. Yarbrough, Thomson Publications, 2006.
4) Digital Logic and State Machine Design – Comer, 3rd, Oxford, 2013.
5) Digital Circuits and Logic Design –Samuel C. Lee , PHI.

COURSE OUTCOMES:

Upon completion of the course, student should possess the following skills:

1) Be able to design storage elements and learn applications of storage elements.
2) Be able to design sequential logic circuits.
3) Be able to design simple circuits using different levels of programming.
4) Be able to analyze digital circuits using simulation and synthesis.
5) Be able to write programs for complex circuits.

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II Year B.Tech. ECE- I Sem **L/T/P/C**
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(R20A0262) NETWORK ANALYSIS AND TRANSMISSION LINES

COURSE OBJECTIVES:

1) To know the behavior of R,L,C elements in steady state and transients state
2) To understand the two port network parameters
3) To draw the Locus diagram of series and parallel RL,RC circuits and understand the concept of Resonance
4) To analyze the transmission line constants
5) To study the propagation, reflection and transmission of plane waves in bounded and Unbounded media

COURSE OBJECTIVES:

1. To understand the basic concepts of RLC circuits.
2. To know the behavior of the R,L,C in Steady state and Transient states
3. To understand the two port network parameters
4. To draw the Locus diagram of series and parallel RL,RC circuits and understand theconcept of Resonance
5. To study the propagation, reflection and transmission of plane waves in bounded andUnbounded media

UNIT – I:

D.C.Transient Analysis (First and Second Order Circuits):

Introduction to transient response and steady state response, Transient response of series – RL, RC, RLC Circuits for D.C.excitation, Initial Conditions, Solution using Differential Equationsapproach and Laplace Transform method, Illustrative problems

UNIT – II:

Two Port Networks:

Impedance Parameters, Admittance Parameters, Hybrid Parameters, Transmission (ABCD) Parameters, Conversion of one parameter to another parameter, Conditions for Reciprocity and Symmetry, Interconnection of two port networks in Series, Parallel and Cascaded configurations, Illustrative problems.

UNIT-III:

Locus diagrams: Locus diagrams of Series and Parallel RL, RC, RLC circuits with variation of various parameters

Resonance: Resonance-Series and Parallel circuits, Concept of Bandwidth and Quality factor.

UNIT – IV:

Transmission Lines – I: Types, Parameters, Transmission Line Equations, Primary & Secondary Constants, Expressions for Characteristics Impedance, Propagation Constant, Phase and Group Velocities, Infinite Line Concepts, Losslessness/Low Loss Characterization, Distortion – Condition for Distortionlessness and Minimum Attenuation, Illustrative Problems.

UNIT V:

Transmission Lines – II: SC and OC Lines, Input Impedance Relations, Reflection Coefficient, VSWR, λ/4, λ 2, λ /8 Lines – Impedance Transformations, Significance of Zmin and Zmax, Smith Chart – Configuration and Applications, Single Stub Matching, Illustrative Problems.

TEXT BOOKS:

1) Electrical Circuits – A. Chakrabarhty, Dhanipat Rai & Sons.
2) Network Analysis – N.C Jagan and C. Lakhminarayana, BS publications.
3) A Text book of Electrical Technology by B.L Theraja and A.K Theraja, S.Chand publications
4) Basic Concepts of Electrical Engineering – PS Subramanyam, BSPublications.
5) Transmission Lines and Networks – Umesh Sinha, Satya prakashan, 2001, (Tech. India Publications), New Delhi.

REFERENCE BOOKS:

1) Engineering Circuits Analysis – William Hayt and Jack E. Kemmerly, Mc Graw Hill Company, 7th Edition.
2) Basic Electrical Engineering – S.N. Singh PUI.
3) Electrical Circuits – David A. Bell, Oxford Printing Press.
4) Principles of Electrical Engineering by V.K Mehta, Rohit Mehta, S.Chandpublications.
5) Electrical Circuit Analysis – K.S. Suresh Kumar, Pearson Education.

COURSE OUTCOMES:

At the end of the course students, would be able to

1) Analyze the Steady state and transient behavior of RLC Circuits
2) Know the characteristics of two port network parameters.
3) Determine the frequency response of RLC circuit using Locus diagram and apply the concept of Resonance in various circuits
4) Gain the knowledge on Transmission Line Constants
5) Analyze the transmission line parameters and configurations.

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II Year B.Tech. ECE- I Sem **L/T/P/C**
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(R20A0481) ELECTRONIC DEVICES AND CIRCUITS LAB

COURSE OBJECTIVES:

1) To identify, test R,L & C Components, Potentiometers, BJTs, JFETs, MOSFETs, LEDs, LCDs and UJT
2) To study the operation of multimeters, Function Generators, RPS and CROs
3) To study the characteristics of pn diodes, Zener diodes, HWR and FWR
4) To study the characteristics of BJT in different types of configurations
5) To study about feedback amplifiers and oscillators

PART A: Only For Viva- Voice Examination Electronic Work Shop Practice (In Three Lab Session)

1) Identification, Specifications, Testing of R, L, C Components (Color Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards, PCB's
2) Identification, Specifications and Testing of Active Devices, Diodes, BJT's, Low power JFET's, MOSFET's, Power Transistors, LED's, LCD's, UJT.
3) Study and operation of
   a) Multi meters (Analog and Digital)
   b) Function Generator
   c) Regulated Power Supplies
   d) CRO.

PART B: (For Laboratory Examination – Minimum of 10 experiments)

1) P-N junction diode forward and reverse bias characteristics
2) Zener diode characteristics and Zener as voltage regulator
3) Half –Wave Rectifier without and with capacitorfilter
4) Full – Wave Rectifier without andwithcapacitorfilter
5) Input and output characteristics of a BJT in CE configuration
6) Measurement of h – parameters in CE configuration
7) Frequency response of CE amplifier
8) Feedback amplifiers: Voltage series and current shunt
9) RC phase shift oscillator using transistors
10) Hartley & Colpitts oscillator using transistors
11) Frequency response of common source JFET amplifier
12) UJT Characteristics

COURSE OUTCOMES

1) Identify, test R,L & C Components, Potentiometers, BJTs, JFETs, MOSFETs, LEDs, LCDs and UJT
2) Understand the operation of multimeters, Function Generators, RPS and CROs
3) Analyze the characteristics of pn diodes, Zener diodes, HWR and FWR
4) Analyze the characteristics of BJT in different types of configurations
5) Analyze about feedback amplifiers and oscillators

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II Year B.Tech. ECE- I Sem **L/T/P/C**
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(R20A0482) BASIC SIMULATION LAB

COURSE OBJECTIVES:

1) To learn basic Operations on Matrices.
2) To simulate generation of basic waveforms and general operations on signals.
3) To Understand the Concept of auto correlation, cross correlation and Convolution of given Signal/ sequence and simulate it accordingly.
4) To learn various transforms like Fourier and Z-transform of various signals.
5) To learn probability density function (PDF) and power spectral density (PSD) of Random variable

NOTE:

1) All the experiments are to be simulated using MATLAB or equivalent software
2) Minimum of 15 experiments are to be completed

List of experiments:

1) Basic operations on matrices.
2) Generation on various signals and Sequences (periodic and aperiodic), such as unit impulse, unit step, square, saw tooth, triangular, sinusoidal, ramp, sinc.
3) Operations on signals and sequences such as addition, multiplication, scaling, shifting, folding, computation of energy and average power.
4) Finding the even and odd parts of signal/sequence and real and imaginary part of signal.
5) Convolution between signals and sequences.
6) Auto correlation and cross correlation between signals and sequences.
7) Verification of linearity properties of a given continuous /discrete system.
8) Verification of time invariance properties of a given continuous discrete system.
9) Computation of unit sample, unit step and sinusoidal response of the given LTI system and verifying its physical Realizability and stability properties.
10) Gibbs phenomenon.
11) Finding the Fourier transform of a given signal and plotting its magnitude and phase spectrum.
12) Locating the zeros and poles and plotting the pole zero maps in s-plane and z-plane for the given transfer function.
13) Generation of Gaussian Noise (real and complex), computation of its mean, M.S. Value and its skew, kurtosis, and PSD, probability distribution function.
14) Sampling theorem verification.
15) Removal of noise by auto correlation/cross correlation.
16) Verification of Weiner-Khinchine relations.
17) Checking a random process for stationary in wide sense.

COURSE OUTCOMES

After going through this course the student will be able to

1) Do the various operations on matrices.
2) Perform various operations on the signals including Time shifting, Scaling, Reversal, Amplitude Scaling.
3) Determine the correlation & Convolution between Signals and sequences.
4) Understand the various transforms of signals and sequences.
5) Understand PDF and PSD of random variable and also Generation of Gaussian noise.

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MANDATORY COURSE III
(R20A0008) GLOBAL EDUCATION AND PROFESSIONAL CAREER

Introduction

In every era of human life, studying abroad has allowed one to experience another part of oneself in a different setting. Additionally, if all that hurry is geared towards success in one's career, international education will most definitely be worth one's time. It is not only an expedition of self-discovery but also an investment in one's resume.

The world, today, is redefining knowledge and great leadership to encompass critical values that are key to meeting modern career challenges. To meet the current requirements, a study delineating Global Education is of utmost importance towards prospective growth.

COURSE OBJECTIVES:

1) To assist students to understand the broad scope of engineering.
2) To equip the students to study the academic subjects with better perspective of the expectations of the international standards
3) To familiarize students with the financial requirements and ways to receive monetary aid
4) To enable students' understanding of the various admission tests
5) To acquaint them with their own skill set and train the students towards skills development

UNIT-I

Importance and relevance of Engineering in today's and futuristic contexts.The jobs that will thrive in the market in the coming decades. For eg., Robot Manufacturer & service Management, Big Data & AI Scientists, Artificial Bodies Manufacturer, Gene Designers, etc

UNIT-II

Countries and their entry requirements, Non-immigrant student visas, Work Permit visas.

UNIT-III

Admission tests to colleges and universities world-over PSAT, SAT, TOEFL, AP, IELTS…

UNIT-IV

Financial capacity requirements Scholarships, Full scholarships, merit scholarships, on- campus jobs.

UNIT-V

Skills Mapping Match one's skills with jobs, Skills development

COURSE OUTCOMES

After completion of the course, the students will be able to:

1) Comprehend the usage of engineering in various fields and disciplines.
2) Identify the right college and country to pursue higher education.
3) Prepare themselves for the skill-oriented academics and prospective growth.
4) Plan for their future education with the precise financial management.
5) Discover and discuss their skill set and the jobs that map their skills.

II YEAR B.TECH

II SEMESTER SYLLABUS

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech. ECE- II Sem **L/T/P/C**
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(R20A0405) ANALOG CIRCUITS

COURSE OBJECTIVES:

1) Study transistor amplifier circuits and their frequency response characteristics.
2) Study about the designing of multistage amplifiers
3) Study large signal amplifiers.
4) Study and design of various types of multi vibrators.
5) Study of time base generators.

UNIT I

BJT Amplifiers-Frequency Response: Frequency response of an amplifier, Analysis at low and High Frequencies, Hybrid-pi (π) common emitter transistor model, validity of hybrid- π model, variation of hybrid – π parameters, Millers theorem and its dual, the CE short circuit current gain, current gain with resistive load, gain-bandwidth product.

UNIT II

Multistage Amplifiers: Distortion in amplifiers, Analysis of cascaded BJT amplifier, Darlington pair, Coupling schemes-RC coupled amplifier, Transformer coupled amplifier, Direct coupled Amplifier.

UNIT III

LARGE SIGNAL AMPLIFIERS: Classification, Distortion in amplifiers, class A large signal amplifiers, efficiency of class A amplifier, class B power amplifier, efficiency of class B amplifier, class B push pull amplifier, Complementary symmetry class B push pull amplifiers, class AB push pull amplifier.

UNIT IV

MULTIVIBRATORS: Transistor as a switch, switching times of a transistor. Analysis of Bistable, Monostable and Astable Multivibrators, Schmitt trigger using transistors.

UNIT –V

TIME BASE GENARATORS: General features of a Time Base Signal, Methods of Generating Time Base Wave forms, Basic Principles of Transistor Miller and Bootstrap Time Base Generator, Current Time Base Generator.

TEXT BOOKS:

1) Pulse, Digital and Switching Waveforms - J. Millman and H. Taub, McGraw-Hill,1991.
2) Integrated Electronics-Jacob Millman and Christos C. Halkias,1991 Ed -2008,TMH.

REFERENCE BOOKS:

1) Pulse and Digital Circuits – A. Anand Kumar, PHI, 2005.
2) Pulse, Digital Circuits and Computer Fundamentals - R.Venkataraman.
3) Microelectric Circuits-Sedra and Smith-5 Ed., 2009, Oxford University press.
4) Electronic Circuit Analysis-K.LalKishore, 2004, BSP.

COURSE OUTCOMES:

1) Understand transistor amplifier circuits and their frequency response characteristics.
2) Understand about the designing of multistage amplifiers
3) Understand and design large signal amplifiers.
4) Understand and design of various types of multi vibrators.
5) Understand and design of time base generators.

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II Year B.Tech. ECE- II Sem **L/T/P/C**
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(R20A0406) ANALOG & DIGITAL COMMUNICATIONS

COURSE OBJECTIVES:

1) To analyze and design various continuous wave Amplitude modulation and demodulation techniques.
2) To understand the concept of Angle modulation and demodulation, and the effect of noise on it.
3) To attain the knowledge about the functioning of different AM, FM Transmitters and Receivers.
4) To analyze and design the various Pulse Modulation Techniques (Analog and Digital Pulse modulation)
5) To understand the concepts of Digital Modulation Technique, Baseband transmission and Optimum Receiver.

UNIT – I

Amplitude Modulation: Need for modulation, Amplitude Modulation - Time and frequency domain description, single tone modulation, power relations in AM waves, Generation of AM waves -Switching modulator, Detection of AM Waves - Envelope detector, DSBSC modulation - time and frequency domain description, Generation of DSBSC Waves - Balanced Modulators, Coherent detection of DSB-SC Modulated waves, COSTAS Loop, SSB modulation - time and frequency domain description, frequency discrimination and Phase discrimination methods for generating SSB, Demodulation of SSB Waves, Vestigial side band modulation.

UNIT - II

Angle Modulation: Basic concepts of Phase Modulation, Frequency Modulation: Single tone Frequency modulation, Narrow band FM, Wide band FM, Spectrum Analysis of Sinusoidal FM Wave using Bessel functions, Constant Average Power, Transmission bandwidth of FM Wave - Generation of FM Signal- Armstrong Method, Direct method- Reactance Modulator, Detection of FM Signal: Balanced slope detector, Phase locked loop, Comparison of FM and AM., Concept of Pre-emphasis and de-emphasis.

UNIT - III

Transmitters: Classification of Transmitters, AM Transmitters, FM Transmitters

Receivers: Radio Receiver - Receiver Types - Tuned radio frequency receiver, Superhetrodyne receiver, RF section and Characteristics - Frequency changing and tracking, Intermediate frequency, Image frequency, AGC, Amplitude limiting, FM Receiver, Comparison of AM and FM Receivers.

UNIT - IV

Pulse Modulation: Types of Pulse modulation- PAM, PWM and PPM. Comparison of FDM and TDM.

Pulse Code Modulation: PCM Generation and Reconstruction, Quantization Noise, Non- Uniform Quantization and Companding, DPCM, DM and Adaptive DM, Noise in PCM and DM.

UNIT - V

Digital Modulation Techniques: ASK- Modulator, Coherent ASK Detector, FSK- Modulator and Non-Coherent FSK Detector, FSK detection using PLL BPSK- Modulator, Coherent BPSK Detection, Principles of QPSK, Differential PSK and QAM.

Baseband Transmission and Optimal Reception of Digital Signal: A Baseband Signal Receiver, Probability of Error, Optimum Receiver, ISI, Eye Diagrams.

TEXTBOOKS:

1) Analog and Digital Communications – Simon Haykin, John Wiley, 2005.
2) Electronics Communication Systems-Fundamentals through Advanced-Wayne Tomasi, 5th Edition, 2009, PHI.
3) Communication Systems-Simon Haykin, 2nd Edition.

REFERENCE BOOKS:

1) Principles of Communication Systems - Herbert Taub, Donald L Schilling, Goutam Saha, 3rd Edition, McGraw-Hill, 2008.
2) Analog and Digital Communication – K. Sam Shanmugam, Willey, 2005.

COURSE OUTCOMES:

Upon completing this course, the student will be able to

1) Analyze and Design various continuous wave Amplitude modulation and demodulation techniques.
2) Understand the concept of Angle modulation and demodulation, and the effect of noise on it.
3) Attain the knowledge about the functioning of different AM, FM Transmitters and Receivers.
4) Analyze and design the various Pulse Modulation Techniques (Analog and Digital Pulse modulation)
5) Understand the concepts of Digital Modulation Technique, Baseband transmission and Optimum Receiver.

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II Year B.Tech. ECE- II Sem **L/T/P/C**
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(R20A0407) ELECTROMAGNETIC FIELDS & WAVES

COURSE OBJECTIVES:

1) To introduce the student to the coordinate system and its implementation to electro magnetics.
2) To elaborate the concept of electromagnetic waves and their practical applications.
3) To study the propagation, reflection, and refraction of plane waves in different media.
4) To Study time varying Maxwell equations and their applications in electromagnetic problems
5) Demonstrate the reflection and refraction of waves at boundaries

UNIT - I:

Vector Analysis & Co-ordinate system: Vector analysis- Representation, operations-Dot product and cross product, Basics of coordinate system- rectangular, cylindrical and spherical co-ordinate systems.

Electrostatics-I: Coulomb's Law, Electric Field Intensity - Fields due to Different Charge Distributions, Electric Flux Density; Illustrative Problems.

UNIT - II:

Electrostatics-II: Gauss Law and Applications, Electric Potential, Relations Between E and V, Maxwell's Equations for Electrostatic Fields, Dielectric Constant, Isotropic and Homogeneous Dielectrics, Continuity Equation, Relaxation Time, Poisson's and Laplace's Equations, Boundary conditions-conductor-Dielectric and Dielectric-Dielectric; Illustrative Problems.

UNIT - III:

Magnetostatics: Biot - Savart's Law , Ampere's Circuital Law and Applications, Magnetic Flux Density, Maxwell's Equations for Magnetostatic Fields, Magnetic Scalar and Vector Potentials, Ampere's Force law , Faraday's Law, Displacement Current Density, Maxwell's Equations for time varying fields, Illustrative Problems.

UNIT - IV:

EM Wave Characteristics-I : Wave Equations for Conducting and Perfect Dielectric Media, Uniform Plane Waves - Definition, Relation Between E & H, Wave Propagation in Lossless and Conducting Media, Wave Propagation in Good Conductors and Good Dielectrics, Illustrative Problems.

UNIT - V:

EM Wave Characteristics – II: Reflection and Refraction of Plane Waves – Normal incidence for both perfect Conductors and perfect Dielectrics, Brewster Angle, Critical Angle and Total Internal Reflection, Surface Impedance, Poynting Vector and Poynting Theorem – Applications, Illustrative Problems.

TEXT BOOKS:

1. Elements of Electromagnetics - Matthew N. O. Sadiku, 4th., Oxford Univ. Press.
2. Electromagnetic Waves and Radiating Systems - E.C. Jordan and K. G. Balmain, 2nd Ed., 2000, PHI.
3. Engineering Electromagnetic - William H. Hay Jr. and John A. Buck, 7thEd., 2006, TMH

REFERENCES BOOKS:

1) Engineering Electromagnetics - Nathan Ida, 2ndEd., 2005, Springer (India) Pvt. Ltd., New Delhi.
2) Electromagnetic Waves and Transmission Lines-Y Mallikarjuna Reddy, University Press.
3) Electromagnetics Fields Theory and Transmission Lines - G. Dashibhushana Rao, Wiley India, 2013.

COURSE OUTCOMES:

Upon the successful completion of the course, students will be able to;

1. Elaborate the concept of electromagnetic waves and their practical applications
2. Study time varying Maxwell equations and their applications in electromagneticproblems
3. Determine the relationship between time varying electric and magnetic field and electromotiveforce
4. Use Maxwell equation to describe the propagation of electromagnetic waves
5. Demonstrate the reflection and refraction of waves at boundaries

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II Year B.Tech. ECE- II Sem **L/T/P/C**
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(R20A0408) PROBABILITY AND RANDOM PROCESSES

COURSE OBJECTIVES:

1) To expose the students to the basics of probability theory and random processes essential for their subsequent study of analog and digital communication.
2) To understand the basic concepts of probability, single and multiple random variables and to introduce some standard distributions applicable to engineering which can describe real life phenomenon
3) To understand the basic concepts of random processes.
4) To understand the concept of correlation and spectral densities.
5) To understand the significance of linear systems with random inputs.

UNIT I:

PROBABILITY AND RANDOM VARIABLE

Probability: Set theory, Experiments and Sample Spaces, Discrete and Continuous Sample Spaces, Events, Probability Definitions and Axioms, Joint Probability, Conditional Probability, Total Probability, Bayes' Theorem, and Independent Events, Bernoulli's trials.

The Random Variable: Definition of a Random Variable, Conditions for a Function to be a Random Variable, Discrete and Continuous

UNIT II:

DISTRIBUTION AND DENSITY FUNCTIONS AND OPERATIONS ON ONE RANDOM VARIABLE

Distribution and density functions: Distribution and Density functions, Properties, Binomial, Uniform, Exponential, Gaussian and Conditional Distribution and Conditional Density function and its properties, problems.

Operation on One Random Variable: Expected value of a random variable, function of a random variable, moments about the origin, central moments, variance, characteristic function, moment generating function.

UNIT III:

MULTIPLE RANDOM VARIABLES AND OPERATIONS ON MULTIPLE RANDOM VARIABLES

Multiple Random Variables: Joint Distribution Function and Properties, Joint density Function and Properties, Marginal Distribution and density Functions, conditional Distribution and density Functions, Statistical Independence.

Operations on Multiple Random Variables: Expected Value of a Function of Random Variables, Joint Moments about the Origin, Joint Central Moments.

UNIT IV:

Random Processes-Temporal Characteristics: The Random process Concept, Classification of Processes, Deterministic and Nondeterministic Processes, Distribution and Density Functions, Statistical Independence and concept of Stationarity: First-Order Stationary Processes, Second-Order and Wide-Sense Stationarity, Nth-Order and Strict-Sense Stationarity, Autocorrelation Function and Its Properties, Cross-Correlation Function and Its Properties, Covariance Functions and its properties.

Linear system Response: Mean and Mean-squared value, Autocorrelation, Cross-Correlation.

Functions.

UNIT V:

Random Processes-Spectral Characteristics: The Power Spectrum and its Properties, Relationship between Power Spectrum and Autocorrelation Function, the Cross-Power Density Spectrum and Properties, Relationship between Cross-Power Spectrum and Cross- Correlation Function.

Spectral characteristics of system response: power density spectrum of response of linear system, cross power spectral density of input and output of a linear system.

TEXT BOOKS:

1) Probability, Random Variables & Random Signal Principles -Peyton Z. Peebles, TMH, 4th Edition, 2001.
2) Probability and Random Processes-Scott Miller, Donald Childers,2Ed,Elsevier,2012

REFERENCE BOOKS:

1) Theory of probability and Stochastic Processes-Pradip Kumar Gosh, University Press
2) Probability and Random Processes with Application to Signal Processing - Henry Stark and John W. Woods, Pearson Education, 3rd Edition.
3) Probability Methods of Signal and System Analysis- George R. Cooper, Clave D. MC Gillem, Oxford, 3rd Edition, 1999.
4) Statistical Theory of Communication -S.P. Eugene Xavier, New Age Publications 2003
5) Probability, Random Variables and Stochastic Processes Athanasios Papoulis and S.Unnikrishna Pillai, PHI, 4th Edition, 2002.

COURSE OUTCOMES

1) Exposed to the basics of probability theory and random processes essential for their subsequent study of analog and digital communication.
2) Understand the axiomatic formulation of modern Probability Theory and think of random variables as an intrinsic need for the analysis of random phenomena.
3) Characterize probability models and function of random variables based on single & multiples random variables.
4) Evaluate and apply moments & characteristic functions and understand the concept of inequalities and probabilistic limits.
5) Understand the concept of random processes and determine covariance and spectral density of stationary random processes.

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II Year B.Tech. ECE- II Sem **L/T/P/C**
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(R20A0061) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

COURSE OBJECTIVES:

1) To enable the student to understand and appreciate, with a practical insight, the importance of certain basic issues governing the business operations that are needed for sound economicdecision making.
2) The main purpose is to provide inputs on an overall analysis of an individual firm namely: demand and supply, production function, cost analysis, markets etc.
3) To understand and analyze the financial formats of the organization for smooth running of the business.

UNIT-I

Introduction to Managerial Economics: Definition, Nature and Scope of Managerial Economics, Micro and Macroeconomic Concepts.

Demand Analysis: Demand Determinants, Law of Demand and exceptions.

Elasticity of Demand: Definition, Types, Measurement and Significance of elasticity of Demand.

Demand Forecasting: Factors governing Demand Forecasting, Methods of Demand Forecasting (Survey Methods, Expert Opinion, Test Marketing, Controlled Experience, Judgemental Approach, and Time Series Analysis).

UNIT-II

Production & Cost Analysis: Production Function- Isocost and Isoquants, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production Function, Laws of Returns, Internal and External Economies of Scale.

Cost Analysis: Cost Concepts. Break-Even Analysis (BEA) - Determination of Break-Even Point (Simple Problems)

UNIT-III

Markets: Types of Competition and Markets, Features of Perfect Competition, Monopoly and Monopolistic Competition;

Pricing: Objectives, Methods of Pricing;

Business: Features of different forms of Business Organization (Sole Trader, Partnership, Joint Stock Company, Cooperative Society, and Public Enterprises).

UNIT-IV

Introduction to Capital and Financial Accounting: Need for Capital, Types of Capital, Working Capital Analysis, Methods and Sources of raising Finance.

Accounting: Definition, Concepts and Conventions (GAAP); Accounting Cycle; Formats for preparation of Trial Balance and Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet).

UNIT-V

Investment Decision: Capital Budgeting - Features, Objectives, and Methods (Payback Method, Accounting Rate of Return and Net Present Value) - advantages & disadvantages. (Simple Problems)

Financial Analysis: Analysis and Interpretation of Liquidity Ratios, Activity Ratios, Capital Structure Ratios and Profitability Ratios. (Simple Problems)

TEXT BOOKS

1) Managerial Economics & Financial Analysis, Special Edition-MRCET. McGraw Hill Publications, 2017
2) D.N. Dwivedi, Managerial Economics, Vikas Publications.
3) Justin Paul, Leena, Sebastian, Managerial Economics, Cengage
4) P.L. Mehta, Managerial Economics: Analysis, Problems and Cases, Sultan Chand & Sons.
5) S. N. Maheswari & S. K. Maheswari, Financial Accounting, Vikas Publications.
6) M. Y. Khan and P. K. Jain, Financial Management, McGraw Hill

COURSE OUTCOMES

1) To understand the basic economic principles, forecast demand and supply.
2) To estimate cost and understand market structure, pricing practices.
3) To interpret the financial results of the organization.

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II Year B.Tech. ECE- II Sem **L/T/P/C**
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(R20A0483) ANALOG CIRCUITS LAB

COURSE OBJECTIVES:

1) To design Multistage, Power amplifiers and multivibrators according to given specifications.
2) To analyze various amplifiers such as Common Emitter, Common Source, Cascade and Cascode amplifiers.
3) To build circuit construction skills using circuit simulation software tool.
4) To simulate different amplifier circuits.
5) To design Feedback amplifiers.

Part – I:

Design and Simulation in Simulation Laboratory using any Simulation Software. (Minimum eight experiments)

1) Common Emitter Amplifier.
2) Common Source Amplifier.
3) Two Stage RC Coupled Amplifier
4) Current shunt and Voltage Feedback Amplifier
5) Cascade Amplifier
6) Class A Power Amplifier (Transformer less)
7) Switching characteristics of a transistor
8) Design a Bistable Multivibrator and draw its waveforms
9) Design a Astable Multivibrator and draw its waveforms
10) Design a Monostable Multivibrator and draw its waveforms

Equipments required for Laboratories:

For software simulation of Electronic circuits

i. Computer Systems with latest specifications
ii. Connected in LAN (Optional)
iii. Operating system (Windows XP)
iv. Suitable Simulations software.

Part –II: Components Testing in the Hardware Laboratory (Minimum 8 Experiments):

1) Common Emitter Amplifier.
2) Two Stage RC Coupled Amplifier
3) Class A Power Amplifier
4) Class C Power Amplifier
5) Switching characteristics of a transistor
6) Design a Bistable Multivibrator and draw its waveforms
7) Design a Astable Multivibrator and draw its waveforms
8) Design a Monostable Multivibrator and draw its waveforms
9) Design of schmitter trigger
10) Logics gates

Equipment required for Laboratories:

1) Regulated Power Supply (0-30V)
2) CROs
3) Functions Generators
4) Multimeters & Components

COURSE OUTCOMES

1) Design Multistage, Power amplifiers and multivibrators according to given specifications.
2) Analyze various amplifiers such as Common Emitter, Common Source, Cascade and Cascode amplifiers.
3) Build circuit construction skills using circuit simulation software tool.
4) Simulate different amplifier circuits.
5) Design Feedback amplifiers

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II Year B.Tech. ECE- II Sem **L/T/P/C**
-/-/3/1.5

(R20A0484) ANALOG AND DIGITAL COMMUNICATIONS LAB

COURSE OBJECTIVES:

1) Familiarize the students with basic analog and digital communication systems.
2) Integrate the concepts of analog modulation techniques studied in theory with experiments.
3) Integrate the concepts of pulse modulation techniques studied in theory with experiments.
4) Integrate the concepts of Time and Frequency division multiplexing techniques studied in theory with experiments.
5) Integrate the concepts of digital modulation techniques studied in theory with experiments so that the students appreciate the knowledge gained from the theory course.

Note: Minimum 12 Experiments should be conducted: All these experiments are to be simulated first using MATLAB, COMSIM or any other simulation package and then to be realized in hardware.

LIST OF EXPERIMENTS

Analog Communication Experiments:

1) (i) Amplitude modulation and demodulation (ii) Spectrum analysis of AM
2) (i) Frequency modulation and demodulation (ii) Spectrum analysis of FM
3) DSB-SC Modulator & Detector
4) SSB-SC Modulator & Detector (Phase Shift Method)
5) Frequency Division Multiplexing & De multiplexing
6) Pulse Amplitude Modulation & Demodulation
7) Pulse Width Modulation & Demodulation
8) Pulse Position Modulation & Demodulation

Digital Communication Experiments:

1) PCM Generation and Detection
2) Time Division Multiplexing & Demultiplexing
3) Differential Pulse Code Modulation & Demodulation
4) Delta Modulation
5) Amplitude Shift Keying: Generation & Detection
6) Frequency Shift Keying: Generation & Detection
7) Binary Phase Shift Keying: Generation & Detection
8) Generation & Detection of DPSK

COURSE OUTCOMES

1. Analyze and understand the operation of a basic communication system.
2. Design the different analog modulation, demodulation circuits such as amplitude and frequency modulation, and also analyze their Spectrum.
3. Design various analog and digital pulse modulation techniques such as PAM, PPM, PWM, PCM, DPCM and DM.
4. Design and Analyze the TDM & FDM circuits.
5. Design the different digital modulation and demodulation circuits such as ASK, FSK, BPSK, and Differential PSK.

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MANDATORY COURSE – IV
(R20A0004) FOREIGN LANGUAGE-FRENCH

INTRODUCTION

In view of the growing importance of foreign languages as a communication tool in some countries of the world, French has been identified as one of the most popular languages after English. As a result, French program is introduced to develop the linguistic and communicative skills of engineering students and to familiarize them to the French communication skills. This course focuses on basic oral skills.

COURSE OBJECTIVES:

1) To inculcate the basic knowledge of the French language
2) To hone the basic sentence constructions in day to day expressions for communication in their vocation
3) To form simple sentences that aids in day-to-day communication
4) To prepare the students towards DELF A1
5) To develop in the student an interest towards learning languages.

UNIT - I:

Speaking: Introduction to the French language and culture –Salutations - French alphabet - Introducing people
Writing: Understand and fill out a form
Grammar:The verbs “to be ' and “to have '' in the present tense of theindicative
Vocabulary: The numbers from 1 to 20 - Professions- Nationalities

UNIT - II:

Speaking: Talk about one’s family – description of a person - express his tastes and preferences - express possession - express negation
Writing: Write and understand a short message
Grammar: Nouns (gender and number) - Articles - The–erverbs in the present- Possessive adjectives - Qualifying adjectives
Vocabulary: The family – Clothes-Colors- The numbers from 1 to 100-The classroom

UNIT - III

Speaking: Talk about your daily activities - be in time - ask and indicate the date and time - talk about sports and recreation - express the frequency
Writing:A letter to a friend
Grammar: The expression of time– The –ir verbs in the present- The verbs do, go, take, come,- Adverbs-Reflexive verbs
Vocabulary: The days and months of the year-The sports-Hobbies

UNIT - IV

Speaking:Express the quantity - ask and give the price - express the need, the will and the capacity - compare (adjective) - speak at the restaurant / in the shops
Writing:A dialogue between a vendor and a customer at the market
Grammar: Verbs “to want”, “to can”- Express capacity / possibility- Express will / desire

– the future tense

Vocabulary:The food – Meals-Fruits and vegetables– The parts of the body

UNIT - V

Speaking: Express the prohibition and the obligation - describe an apartment - talk about the weather / ask the weather - ask the opinion - give your opinion - express your agreement or disagreement

Writing: Descriptions

Grammar: Demonstrative adjectives-Prepositions-The verb 'must 'to indicate obligation and necessity in the present

Vocabulary: Seasons – Holidays-The city– Furniture

NOTE: The students are exposed to simple listening and reading activities.

REFERENCE BOOKS

1) Apprenons le Français 1& 2, New Saraswati House, 2015
2) A propos, A1, Langers International, 2010
3) Easy French Step-by-step by Myrna Bell Rochester
4) Ultimate French Beginner-Intermediate (Coursebook) By Livid Language
5) Ã L'Aventure: An Introduction to French Language and Francophone Cultures by Evelyne Charvier-Berman, Anne C. Cummings.

COURSE OUTCOMES

1) The students will be able to communicate in French at A1 level.
2) The student will have an advantage in the competitive job market.
3) This course benefits the graduates when pursuing study *opportunities* in the countries where French is the official language.

OPEN ELECTIVE – I

S.NO	SUBJECT CODE	TITLE OF THE SUBJECT
1	R20A1251	WEB DESIGNING TOOLS
2	R20A0551	INTRODUCTION TO DBMS
3	R20A0351	INTELLECTUAL PROPERTY RIGHTS
4	R20A0051	ENTERPRISE RESOURCE PLANNING
5	R20A0451	BASICS OF COMPUTER ORGANIZATION

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II Year B.Tech. ECE- II Sem **L/T/P/C**
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OPEN ELECTIVE - I
(R20A1251) WEB DESIGNING TOOLS

COURSE OBJECTIVES:

1) To learn the basics of web & html programming
2) To learn about CSS and its style
3) To learn about Java Scripting & Dynamic Html
4) To learn about web server software AJAX
5) To learn about PHP

UNIT I

Web Basics- Introduction, Concept of Internet- History of Internet, Protocols of Internet, World Wide Web, URL, Web Server, Web Browser,HTML-Introduction HTML-Basic Formatting Tags , HTML- Grouping Using Div Span, HTML-Lists,: HTML-Images, HTML- Hyperlink, HTML-Table, HTML- Iframe,HTML – Form HTML – Headers, HTML-Miscellaneous using tool Dreamweaver/ Visual studio.

UNIT II

CSS –Introduction, Syntax, CSS-Selectors, CSS-Color Background Cursor, CSS-Text Fonts, CSS- Lists Tables, CSS -Box Model, CSS-Display Positioning, CSS Floats. Using tool using tool Dreamweaver/ Visual studio, Net Bean

UNIT III

Introduction of Java Script, JavaScript characteristics, Objects in Java Script, Dynamic HTML with Java Script. XMLHttpRequest- Introduction, XMLHttpRequest, The XMLHttpRequest Object, Events for the XMLHttpRequest Object, Request Object for XMLHttpRequest, Response Object for XMLHttpRequest. Using tool using tool Visual studio, Net Bean & Eclipse

UNIT IV

AJAX Introduction- Introduction, AJAX Introduction, AJAX Components, Handling Dynamic HTML with Ajax, CSS to Define Look and Feel, Understand the XML Mark-up, XMLHttpRequest. AJAX using XML and XML HttpRequest- Introduction, Ajax Using XML and XMLHttpRequest, Accessing, Creating and Modifying XML Nodes, Loading XML Data into an HTML Page, Receiving XML Responses, Handling Response XML. Using tool using tool Visual studio, Net Bean & Eclipse

UNIT V

PHP Introduction- PHP Introduction, Structure of PHP, PHP Functions, AJAX with PHP, PHP Code and the Complete AJAX Example. AJAX with Database- Introduction, AJAX Database, Working of AJAX with PHP, Ajax PHP Database Form, AJAX PHP MySQL Select Query. Using tool using tool Visual studio, Net Bean & Eclipse.

TEXT BOOKS:

1) Web Programming ,Building Internet Applications, CHRIS BATES II Edition, Wiley Dreamtech.
2) Programming world wide web ,SEBESTA,PEARSON.

REFERENCE BOOKS:

1) Internet and World Wide Web – How to program, Dietel and Nieto PHI/Pearson
2) Ajax: The Complete Reference By Thomas Powell
3) PHP: The Complete reference-steven Holzner Tata McGraw-Hill.
4) An Introduction to web Design and Programming –Wang-Thomson
5) Web Warrior Guide to Web Programming -Bai/Ekedaw-Thomas
6) Beginning Web Programming-Jon Duckett WROX

COURSE OUTCOMES:

1) Ability to learn to web application.
2) To develop a own style sheet
3) Ability to create a own java scripting web application.
4) Ability to create a own web design using of AJAX
5) Ability to create a own web design using of PHP

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II Year B.Tech. ECE- II Sem **L/T/P/C**
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OPEN ELECTIVE - I
(R20A0551) INTRODUCTION TO DBMS

COURSE OBJECTIVES:

1) To understand the basic concepts and the applications of database systems
2) To Master the basics of SQL and construct queries using SQL
3) To understand the relational database design principles
4) To become familiar with the basic issues of transaction processing and concurrency control
5) To become familiar with database storage structures and access techniques

UNIT I:

INTRODUCTION

Database: Purpose of Database Systems,File Processing System Vs DBMS, History, Characteristic-Three schema Architecture of a database, Functional components of a DBMS.DBMS Languages-Database users and DBA.

UNIT II:

DATABASE DESIGN

ER Model: Objects, Attributes and its Type. Entity set and Relationship set-Design Issues of ER model-Constraints. Keys-primary key, Super key, candidate keys. Introduction to relational model-Tabular, Representation of Various ER Schemas. ER Diagram Notations- Goals of ER Diagram- Weak Entity Set- Views.

UNIT III:

STRUCTURED QUERY LANGUAGE

SQL: Overview, The Form of Basic SQL Query -UNION, INTERSECT, and EXCEPT– join operations: equi join and non equi join-Nested queries - correlated and uncorrelated- Aggregate Functions-Null values.Views, Triggers.

UNIT IV :

DEPENDENCIES AND NORMAL FORMS

Importance of a good schema design,:- Problems encountered with bad schema designs, Motivation for normal forms- functional dependencies, -Armstrong's axioms for FD's- Closure of a set of FD's,- Minimal covers-Definitions of 1NF,2NF, 3NF and BCNF- Decompositions and desirable properties.

UNIT V:

Transactions: Transaction concept, transaction state, System log, Commit point, Desirable Properties of a Transaction, concurrent executions, serializability, recoverability, implementation of isolation, transaction definition in SQL, Testing for serializability**,** Serializability by Locks-Locking Systems with Several Lock Modes- Concurrency Control by Timestamps, validation.

TEXT BOOKS:

1) Abraham Silberschatz, Henry F. Korth, S. Sudarshan,‖ Database System Concepts‖, McGraw- Hill, 6th Edition , 2010.
2) Fundamental of Database Systems, by Elmasri, Navathe, Somayajulu, and Gupta,

Pearson Education.

REFERENCE BOOKS:

1) Raghu Ramakrishnan, Johannes Gehrke, -Database Management System||, McGraw Hill., 3rd Edition 2007.
2) Elmasri&Navathe,||Fundamentals of Database System,|| Addison-Wesley Publishing, 5th Edition, 2008.
3) Date.C.J, -An Introduction to Database||, Addison-Wesley Pub Co, 8th Edition, 2006.
4) Peterrob, Carlos Coronel, -Database Systems – Design, Implementation, and Management||, 9th Edition, Thomson Learning, 2009.

COURSE OUTCOMES:

1) Understand the basic concepts and the applications of database systems
2) Master the basics of SQL and construct queries using SQL
3) Understand the relational database design principles
4) Familiarize with the basic issues of transaction processing and concurrency control
5) Familiarize with database storage structures and access techniques

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II Year B.Tech. ECE- II Sem **L/T/P/C**
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OPEN ELECTIVE - I
(R20A0351) INTELLECTUAL PROPERTY RIGHTS

COURSE OBJECTIVES:

1) To learn the basics, role, issues and agreement on trade aspects of IPR
2) To know the Parties to IP Rights
3) To learn how to ensure the value of IP
4) To learn about how to manage IP rights
5) To learn the remedies and IPR evaluation

UNIT-I

Introduction: Intellectual property rights basics, the role and value of IP in international commerce, Issues affecting IP internationally. Agreement on trade related aspects of Intellectual Property Rights. (TRIPS) - Agreement on TRIPS and India.

UNIT-II

Parties to IP Rights: Owner, customer, authorized user, licensee, attorney, protection of the weak and strong, finalizing ownership and use rights.

UNIT-III

Ensuring the value of IP: Ensuring the value of IP at creation stage, after creation stage, precise contractual protection of IP rights. Key issues related to IP internationally. IP rights in international forums. Fundamentals in Country legal systems, generalities. Validity of IP rights locally: specifics.

UNIT-IV

Managing IP Rights: Acquiring IP Rights: letters of instruction, joint collaboration agreement, work made for hire agreement - Protecting IP Rights: non disclosure agreement, cease and desist letter, settlement memorandum. Transferring IP Rights: assignment contract, license agreement, deed of assignment or license agreement, addendum to unrecorded assignment or license.

UNIT-V

Remedies and IPR Evaluation - GATT - WTO - Role of WTO in solving IPR issues.

REFERENCES:

1) A short course in International Intellectual Property Rights – Karla C. Shippey, World Trade Press – 2nd Edition.
2) Intellectual Property Rights – Heritage, Science, & Society under international treaties – A. Subbian, - Deep & Deep Publications – New Delhi.
3) Intellectual Property Rights: N K Acharya: ISBN: 9381849309
4) Intellectual Property Rights: C B Raju : ISBN-8183870341
5) Intellectual Property : Examples and Explanation – Stephen M McJohn, 2/e, ISBN-13: 978-0735556652
6) Intellectual Property Rights in the Global Economy – Keith E Maskus, PIIE, ISBN paper 0-88132-282-2

COURSE OUTCOMES

1) Understand the basics, role, issues and agreement on trade aspects of IPR
2) Understand and identifying the Parties to IP Rights
3) Learn how to ensure the value of IP
4) Understand about how to manage IP rights
5) Learn the remedies and IPR evaluation

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II Year B.Tech. ECE- II Sem **L/T/P/C**
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OPEN ELECTIVE - I
(R20A0051) ENTERPRISE RESOURCE PLANNING

COURSE OBJECTIVES:

1) To know the basics of ERP
2) To understand the key implementation of ERP
3) To know the business modules of ERP
4) To learn about the post implementation of ERP
5) To evaluate the current and future trends in ERP

UNIT 1

INTRODUCTION: Overview and Benefits of ERP, ERP Related Technologies- Business Process Reengineering (BPR), Online Analytical Processing (OLAP), Supply chain Management (SCM). Applications of ERP.

UNIT II

ERP IMPLEMENTATION: Implementation and Product Lifecycle, Implementation Methodology, Planning Evaluation and selection of ERP systems, Organizing the Project Management and Monitoring. Case Study on Manufacturing.

UNIT III

ERP MODULES: Business modules in an ERP Package- Manufacturing, Human Resources, Plant Maintenance, Materials Management, Data Warehousing, Data Mining, Quality Management, Sales and Distribution. Case Study in Banking Sector.

UNIT IV

POST IMPLEMENTATION: Overview of ERP software solution. Maintenance of ERP-Organizational and Industrial impact; Success and Failure factors of ERP Implementation. Case Study of Success Story and Failure of Processing Sector.

UNIT V

EMERGING TRENDS IN ERP: Extended ERP system, ERP add–ons –Customer Relations Management (CRM), Customer satisfaction (CS). Business analytics etc- Future trends in ERP systems-web enabled, Wireless technologies. Case Study in Service Sector.

TEXT BOOKS:

1) Jagan Nathan Vaman, ERP in Practice, Tata McGraw-Hill,2008
2) Alexis Leon, “ERP Demystified”, Tata McGraw Hill, New Delhi, 2000
3) Mahadeo Jaiswal and Ganesh Vanapalli, ERP Macmillan India, 2009.

REFERENCE BOOKS:

1) Alexis Leon, Enterprise Resource Planning, second edition, Tata McGraw-Hill,2008.
2) Vinod Kumar Grag and N.K. Venkitakrishnan, ERP- Concepts and Practice, Prentice Hall of India,2 nd edition, 2006.
3) Joseph A Brady, Ellen F Monk, Bret Wagner, “Concepts in Enterprise Resource Planning”, Thompson Course Technology, USA, 2001.

COURSE OUTCOMES:

1) Understand the basics of ERP
2) Understand the key implementation of ERP
3) Learn the business modules of ERP
4) Learn about the post implementation of ERP
5) Evaluating the current and future trends in ERP

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II Year B.Tech. ECE- II Sem **L/T/P/C**
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OPEN ELECTIVE - I
(R20A0451) BASICS OF COMPUTER ORGANIZATION

COURSE OBJECTIVES:

1) To understand basic components and operations in asystem
2) To understand the execution of an instruction in a computer.
3) To acquire the knowledge to design of CPU.
4) To explore the memory organization.
5) To explore I/O organization and parallel processing in depth.

UNIT I

Basic Structure of Computers: Computer Types, Functional Units, Computer Registers, Basic Operational Concepts, Bus Structures, Software, Performance, Multiprocessors and Multi Computers. **Data Representation**: Fixed Point Representation, Floating – Point Representation.
Register Transfer Language and Micro Operations: RTL- Register transfers, Bus and Memory Transfers. **Micro operations:** Arithmetic, Logic, Shift micro operations, Arithmetic logic shift unit.

UNIT-II

Computer Arithmetic: Addition and Subtraction, Multiplication Algorithms, Division Algorithms. Error detection and Correction Codes
Basic Computer Organization and Design: Instruction codes, Timing and Control, Computer Instructions: Memory Reference Instructions, Register Transfer Instructions, Input– Output Instructions, Instruction cycle. Interrupt and Interrupt cycle, Complete Computer Description.

UNIT III

Central Processing Unit organization: General Register Organization, Stack organization**,** Instruction formats, Addressing Modes, Data Transfer and Manipulation, Program Control, **CISC** and **RISC** processors.
Control Unit Design: Control Memory, Address sequencing, Design of CU: Micro Programmed Control, Hardware Control, Micro Program example. **Case Sudy-** Introduction to x86 architecture.

UNIT IV

Memory Organization: Memory Hierarchy, Memory Interleaving, **Main Memory-**RAM and ROM chips, **Associative Memory**-Hardware Organization, Match logic. Mapping functions- Associate, Direct, Set Associative Mapping. **Cache Memory**: Hit Ratio, Cache Coherence, Cache writes policies. **Auxiliary memory:** Magnetic Disks, Magnetic Tapes Optical devices, Page Replacement Algorithms.

UNIT V

Input –Output Organization: Peripheral Devices, Input-Output Subsystems, I/O Device Interface, I/O Processor, I/O Transfers–Program Controlled, Interrupt Driven, and DMA, Interrupts and Exceptions. I/O Device Interfaces – SCII, USB.
Pipelining and Vector Processing: Basic Concepts, Instruction level Parallelism Throughput

and Speedup, Pipeline hazards. Vector Processing: Applications, an Example for Vector Processing.

TEXT BOOKS:

1) Computer System Architecture‖ by M. Morris Mano, 3rd Edition.
2) Computer Organization and Design: The Hardware/Software Interface‖, 5th Edition by David A. Patterson and John L. Hennessy, Elsevier.
3) Computer Organization and Embedded Systems‖, 6th Edition by CarlHamacher, McGraw Hill Higher Education.

REFERENCE BOOKS:

1) Computer Architecture and Organization‖, 3rd Edition by John P. Hayes,WCB / McGraw-Hill
2) Computer Organization and Architecture: Designing for Performance‖, 10th Edition by William Stallings, Pearson Education.
3) Computer System Design and Architecture‖, 2nd Edition by Vincent P. Heuring and Harry F. Jordan, Pearson Education.

COURSE OUTCOMES:

1) Able to understand functional components and micro operations in a computer.
2) Able to understand arithmetic operations and computer instructions.
3) Able to understand CPU organization and design of control unit.
4) Able to understand the Memory organization.
5) Able to understand I/O Transfer and Parallel Processing.

III YEAR B.TECH
I SEMESTER SYLLABUS

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B.Tech. ECE- I Sem **L/T/P/C**

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(R20A0409) DIGITAL SIGNAL PROCESSING

COURSE OBJECTIVES:

1) To understand the basic concepts digital signal processing and discrete time signals and systems.
2) To Master the representation of discrete-time signals in the frequency domain, using z-transform, discrete Fourier transforms (DFT).
3) To Understand the implementation of the DFT in terms of the FFT, as well as some of its applications.
4) To learn the basic design and structure of FIR and IIR filters with desired frequency responses and design digital filters.
5) To acquaint in FFT algorithms, Multi-rate signal processing techniques.

UNIT I:

Introduction to Digital Signal Processing: Introduction to Digital Signal Processing: Discrete Time Signals & Sequences, Linear Shift Invariant Systems, Stability, and Causality.

Realization of Digital Filters: Solution of Difference Equations Using Z-Transform, Realization of Digital Filters - Direct, Canonic forms.

UNIT II:

Discrete Fourier Transforms: Properties of DFT, Computation of DFT, Linear Convolution of Sequences using DFT. Over-lap Add Method, Over-lap Save Method.

Fast Fourier Transforms: Fast Fourier Transforms (FFT) - Radix-2 Decimation-in-Time and Decimation-in-Frequency FFT Algorithms, Inverse FFT.

UNIT III:

IIR Digital Filters: Analog Filter Approximations - Butterworth and Chebyshev, Design of IIR Digital filters from Analog Filters, Bilinear Transformation Method.

UNIT IV:

FIR Digital Filters: Characteristics of FIR Digital Filters, Design of FIR Filters: using Window Techniques, Comparison of IIR & FIR filters.

UNIT V:

Multirate Digital Signal Processing: Introduction, Down sampling, Decimation, Up sampling, Interpolation, Sampling Rate Conversion, Applications of Multi Rate Signal Processing.

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, John Wiley, 2009

REFERENCE BOOKS:

1) Digital Signal Processing – Fundamentals and Applications – Li Tan, Elsevier, 2008.
2) Fundamentals of Digital Signal Processing using MATLAB – Robert J. Schilling, Sandra L. Harris, b Thomson, 2007.
3) Digital Signal Processing – S.Salivahanan, A.Vallavaraj and C.Gnanapriya, TMH, 2009.
4) Discrete Systems and Digital Signal Processing with MATLAB – Taan S. EIAli, CRC press, 2009.
5) Digital Signal Processing - A Practical approach, Emmanuel C. Ifeachor and Barrie W. Jervis, 2nd Edition, Pearson Education, 2009.
6) Digital Signal Processing - Nagoor Khani, TMG, 2012.

COURSE OUTCOMES

1) Understand time, frequency and z-transform analysis on signals and systems
2) Understand the inter relationship between DFT and various transforms
3) Understand the fast computation of DFT and Appreciate the FFT processing
4) Ability to design & analyze DSP systems like FIR and IIR Filter etc.
5) Understand the LTI system characteristics and Multi rate signal processing.

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III Year B.Tech. ECE- I Sem **L/T/P/C**

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(R20A0410) LINEAR AND DIGITAL ICs

COURSE OBJECTIVES:

1) To introduce the basic building blocks of linear integrated circuits.
2) To teach the linear and non-linear applications of operational amplifiers.
3) To introduce the theory and applications of analog multipliers and PLL.
4) To teach the theory of ADC and DAC.
5) To introduce the concepts of wave form generation and introduce some special function ICs.

UNIT – I:

Operational Amplifier: Ideal and Practical Op-Amp, Op-Amp Characteristics, DC and AC Characteristics, Features of 741 Op-Amp, Modes of Operation – Inverting, Non-Inverting, Differential, Instrumentation Amplifier, AC Amplifier, Differentiators and Integrators, Comparators, Schmitt Trigger, Introduction to Voltage Regulators.

UNIT – II:

Op-Amp, IC-555 & IC 565 Applications: Introduction to Active Filters, Characteristics of Band pass, Band reject and All Pass Filters, Analysis of 1^{st} order LPF & HPF Butterworth Filters, waveform Generators – Triangular, Saw tooth, Square wave, IC555 Timer – Functional Diagram, Monostable and Astable Operations, Applications, IC565 PLL – Block Schematic, Description of Individual Blocks, Applications.

UNIT – III:

Data Converters: Introduction, Basic DAC techniques, Different types of DACs-Weighted Resistor DAC, R-2R ladder DAC, Inverted R-2R DAC, Different Types of ADCs – Parallel Comparator Type ADC, Counter Type ADC, Successive Approximation ADC and Dual Slope ADC, DAC and ADC Specifications.

UNIT – IV:

Digital Integrated Circuits: Classification of Integrated Circuits, Comparison of Various Logic Families, CMOS Transmission Gate.

Combinational Logic ICs – Specifications and Applications of TTL-74XX & CMOS 40XX Series ICs – Code Converters, Decoders, Encoders, Priority Encoders, Multiplexers, Demultiplexers, Parity Generators/Checkers, Parallel Binary Adder/Subtractor, Magnitude Comparators.

UNIT – V:

Sequential Logic IC's and Memories: Familiarity with commonly available 74XX & CMOS 40XX Series ICs – All Types of Flip-flops, Synchronous Counters, Decade Counters, Shift Registers.

Memories – ROM Architecture, Types of ROMS & Applications, RAM Architecture, Static & Dynamic RAMs.

TEXT BOOKS:

1) Linear Integrated Circuits – D. Roy Chowdhury, New Age International (p) Ltd, 2nd Edition,2003.
2) Op-Amps & Linear ICs - Ramakanth A. Gayakwad, PHI, 2003.
3) Digital fundamentals – Floyd and Jain, Pearson Education,8th Edition ,2005

REFERENCES BOOKS:

1) Op Amps & Linear Integrated circuits-Concepts and Applications James M.Fiore, Cengage Learning/Jaico,2009.
2) Operational Amplifiers with linear integrated circuits by K.Lal kishore-Pearson,2009.
3) Linear integrated circuits and applications-Salivahana,TMH.
4) Modern digital electronics-RP Jain-4/e-TMH,2010.
5) Digital design principles and practices-John.F.Wakerly 3/e,2005.
6) Operational amplifiers with linear integrated cuircuits,4/e William D.Stanley, Pearson education India,2009.

COURSE OUTCOMES:

1) A thorough understanding of operational amplifiers with linear integrated circuits.
2) Also students will be able to design circuits using operational amplifiers for various applications.
3) Understanding of the different families of digital integrated circuits and their characteristics.
4) Understanding of D/A and A/D Converters.
5) Design of combinational and sequential circuits using the TTL & CMOS ICs.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B.Tech. ECE- I Sem **L/T/P/C**
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(R20A0411) COMPUTER ORGANIZATION AND ARCHITECTURE

COURSE OBJECTIVES:

The students will be exposed:

1. To how the Computer Systems work and its basic principles.
2. To ALU operations, Fixed point Arithmetic and floating point Arithmetic.
3. To Instruction set architecture and execution cycle and different types of Control Units.
4. To Memory System Design and different types of Memories.
5. To how the I/O devices are accessed and its principles.
6. To the concepts of pipelining and Parallel Processing.

UNIT-I:

Functional Blocks of a Computer: CPU, memory, Input-Output Unit, control unit, Basic operational Concepts, Von Neumann Architecture.

Data Representation: Signed number representation, fixed and floating point Representations, Computer Arithmetic– integer Addition and Subtraction, Ripple carry adder, carry look-ahead adder, Multiplication – shift-and add, Booth multiplier, carry save Addition, Division restoring and non-restoring techniques, Floating point arithmetic.

UNIT–II:

Introduction to x86 Architecture

Instruction set Architecture of a CPU: Register Transfer Language, Register Transfer, Memory Transfer, Instruction Cycle, Addressing modes, Instruction set, CISC vs RISC Architecture.

CPU Control unit design: Hardwired and Micro-programmed design approaches.

UNIT–III:

Memory system design: Semiconductor memory technologies, internal memory organization.

Memory Organization: Memory Hierarchy, Memory interleaving, Cache memory, mapping functions, write policies, Virtual Memory Management-Paging.

UNIT–IV:

Peripheral devices and their characteristics: I/O device interface, Data Transfer Modes, I/O transfers – program controlled, interrupt driven and DMA, interrupts and exceptions, I/O device interfaces–SCSI, USB

UNIT–V:

Pipelining: Basic concepts of pipelining, pipelining hazards.

Parallel Processors: Introduction to parallel processors, Shared Memory Multiprocessors and cache coherency.

TEXT BOOKS:

1. "Computer Organization and Embedded Systems", 6th Edition by Carl Hamacher, McGraw Hill Higher Education.
2. "Computer Organization and Design", The Hardware/Software Interface", 5th Edition by David A. Patterson and John L. Hennessy, Elsevier.
3. Computer System Architecture|, 3rd Edition by M. Morris Mano, Pearson.

REFERENCE BOOKS:

1. "Computer Architecture and Organization", 3rd Edition by John P. Hayes, WCB /McGraw-Hill
2. "Computer Organization and Architecture: Designing for Performance", 10th Edition by William Stallings, Pearson Education.
3. "Computer System Design and Architecture", 2nd Edition by Vincent P. Heuring and Harry F. Jordan, Pearson Education.

COURSE OUTCOMES:

1. Make students understand the working of Computer Systems work and its basic principles
2. Make students understand ALU operations, Fixed point Arithmetic and floating point Arithmetic.
3. Make students understand different types of instructions and Instruction execution cycle along with types of Control Units.
4. Make students understand Memory System Design and different types of Memories like cache and virtual memory.
5. Make students understand the access of I/O devices and its principles.
6. Make students understand the concepts of pipelining and Parallel Processing.

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III Year B.Tech. ECE- I Sem **L/T/P/C**

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PROFESSIONAL ELECTIVE -I
(R20A6214) FUNDAMENTALS OF CYBER SECURITY

COURSE OBJECTIVES:

This course will enable the students:

1. To understand the basic concepts of cyber-Security.
2. To study different attacks in cyber-crimes.
3. To understand different tools and methods used in cyber-crime.
4. To study cyber security challenges and implications.
5. To know about Cyber Security Organizational Issues, Policies.

UNIT I-Introduction to Cyber Security: Basic Cyber Security Concepts, layers of security, Vulnerability, threat, Harmful acts, Internet Governance – Challenges and Constraints, Computer Criminals, CIA Triad, Assets and Threat, motive of attackers, active attacks, passive attacks, Software attacks, hardware attacks, Spectrum of attacks, Taxonomy of various attacks, IP spoofing, Methods of defense, Security Models, risk management, Cyber Threats-Cyber Warfare, Cyber Crime, Cyber terrorism, Cyber Espionage, etc., Comprehensive Cyber Security Policy

UNIT II-Cyber Offenses: How Criminals Plan Them: Introduction, How Criminals plan the Attacks, Social Engineering, Cyber stalking, Cyber cafe and Cybercrimes, Botnets: The Fuel for Cybercrime, Attack Vector, Cloud Computing.

UNIT III

Cybercrime: Mobile and Wireless Devices: Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication service Security, Attacks on Mobile/Cell Phones, Mobile Devices: Security Implications for Organizations, Organizational Measures for Handling Mobile, Organizational Security Policies an Measures in Mobile Computing Era, Laptops.

UNIT IV

Types of Attacks and Cybercrime: Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Keyloggers and Spywares, Virus and Worms, Trojan Horse and Backdoors, Steganography, DoS and DDoS attacks, SQL Injection, Buffer Overflow.

UNIT V

Cyber Security Organizational Policies, Risk and Challenges: Organizational Implications. Introduction, Cost of Cybercrimes and IPR issues, Web threats for Organizations, Security and Privacy Implications, Social media marketing: Security Risks and Perils for Organizations, Social Computing and the associated challenges for Organizations.

TEXT BOOKS:

1. **Cyber Security:** *Understanding Cyber Crimes, Computer Forensics and Legal Perspectives*,Nina Godbole and Sunil Belapure, Wiley INDIA.

REFERENCE BOOKS:

1. Cyber Security Essentials, James Graham, Richard Howard and Ryan Otson, CRC Press.
2. Introduction to Cyber Security , Chwan-Hwa(john) Wu,J.David Irwin.CRC Press T&F Group

COURSE OUTCOMES: Student will be able to

1. Understand basic concepts ofCyber Crimes.
2. Ability to identify the attacks in CyberCrimes
3. Able to specify the suitable methods used in Cyber Crime
4. Ability to face cyber securitychallenges
5. Understand Cyber Security

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III Year B.Tech. ECE- I Sem **L/T/P/C**

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PROFESSIONAL ELECTIVE -I
(R20A0412) CELLULAR & MOBILE COMMUNICATIONS

COURSE OBJECTIVES:

The course Objectives are

1. To provide the students with an understanding of the cellular concept frequency reuse, handoff strategies.
2. To enable the students to analyze and understand wireless and mobile cellular communication systems over stochastic fading channels.
3. To provide the students with an understanding of Co-channel and Non-Co channel Interference.
4. To give students an understanding of cell coverage for signal and mobile antennas.
5. To give the students an understanding of frequency management channel assignment and types of handoff.

UNIT I

CELLULAR SYSTEMS:

Limitations of Conventional System, Basic Cellular Mobile System, First, second, third and fourth Generation cellular wireless systems. Operation of Cellular System. Uniqueness of Mobile Radio Environment –Fading, coherence bandwidth, Doppler Spread.

Fundamentals of cellular Radio System Design: concept of frequency reuse channels, Co- channel Interference, Co-channel Interference Reduction Factor, desired C/I from a normal case in a Omni directional Antenna system. Trunking and grade of service

UNIT II

CO-CHANNEL & NON CO-CHANNEL INTERFERENCE:

Measurement of Real Time Co-Channel Interference, design of Antenna system, Antenna parameters and their effects.

Non-co channel interference-adjacent channel interference, Near End far end interference, effect on coverage and interference by power decrease, antenna height decrease

UNIT III

CELL COVERAGE FOR SIGNAL AND TRAFFIC:

Signal reflections in flat and hilly terrain, effect of human made structures, phase difference between direct and reflected paths, constant standard deviation, straight line path loss slope, general formula for mobile propagation over water and flat open area, near and long distance propagation.

UNIT IV

CELL SITE AND MOBILE ANTENNAS:

Space diversity antennas, umbrella pattern antennas, minimum separation of cell site antennas, Mobile Antennas.

Frequency Management And Channel Assignment: Numbering and grouping, setup access and paging channels, channel assignments to cell sites and mobile units, channel sharing and borrowing, sectorization, overlaid cells, non-fixed channel assignment

UNIT V

HANDOFF TECHNIQUES:

Handoff Initiation, types of handoff, delaying handoff, advantages of Handoff, power difference handoff, forced handoff, mobile assisted and hard and soft handoff, Intersystem handoff.

TEXTBOOKS:

1. Mobile Cellular Telecommunications – W.C.Y. Lee, Tata McGraw Hill, 2rd Edn., 2006.
2. Wireless Communications – Theodore. S. Rapport, Pearson education, 2nd Edn., 2002.

REFERENCES:

1. Principles of Mobile Communications – Gordon L. Stuber, Springer International 2nd Edition, 2001.
2. Modern Wireless Communication –Simon Haykin Michael Moher, Persons Eduction,2005.
3. Wireless Communication theory and Techniques,Asrar U.H .Sheikh ,Springer,2004.

COURSE OUTCOMES:

1. The student will be able to understand impairments due to multipath fading channel
2. The student will be able to understand the fundamental techniques to overcome the different fading effects
3. The student will be able to understand co-channel and non-co-channel interferences
4. The student will be able to familiar with cell coverage/signal and mobile antennas.
5. The student will be able to understand the frequency management, channel assignment and types of handoffs

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III Year B.Tech. ECE- I Sem **L/T/P/C**
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PROFESSIONAL ELECTIVE -I
(R20A0413) DIGITAL DESIGN THROUGH VERILOG

COURSE OBJECTIVE:

1. This course teaches designing digital circuits, behavior and RTL modeling of digital circuits using Verilog HDL, verifying these Models and synthesizing RTL models to standard cell libraries and FPGAs.
2. Students aim practical experience by designing, modeling, implementing and verifying several digital circuits.
3. This course aims to provide students with the understanding of the different technologies related to HDLs, construct, compile and execute Verilog HDL programs using provided.

Software Tools: Design digital components and circuits that is testable, reusable, and synthesizable.

UNIT - I: Introduction to Verilog HDL: Verilog as HDL, Levels of Design Description, Concurrency, Simulation and Synthesis, Programming Language Interface, Module.
Language Constructs and Conventions: Introduction, Keywords, Identifiers, White Space, Characters, Comments, Numbers, Strings, Logic Values, Data Types, Scalars and Vectors, Operators.

UNIT - II: Gate Level Modeling: Introduction, AND Gate Primitive, Module Structure, Other Gate Primitives, Illustrative Examples, Tristate Gates, Array of Instances of Primitives, Design of Flip-Flops with Gate Primitives, Gate Delay, Strengths and Contention Resolution, Net Types.
Modeling at Dataflow Level: Introduction, Continuous Assignment Structure, Delays and Continuous Assignments, Assignment to Vector, Operators.

UNIT - III: Behavioral Modeling: Introduction, Operations and Assignments, 'Initial' Construct, always construct, Assignments with Delays, 'Wait ‘Construct, Design at Behavioral Level, Blocking and Non-Blocking Assignments, The 'Case' Statement, 'If' and 'if-Else' Constructs, 'Assign- De-Assign' Constructs, 'Repeat' Construct, for loop, 'The Disable' Construct, 'While Loop', Forever Loop, sequential and Parallel Blocks.

UNIT - IV: Switch Level Modeling: Basic Transistor Switches, CMOS Switches, Bidirectional Gates, Time Delays with Switch Primitives, instantiation with strengths and delays, Switch level modeling for NAND, NOR and XOR.

UNIT - V: System Tasks, Functions and Compiler Directives: Parameters, Path Delays, Module Parameters, System Tasks and Functions, User Defined Primitives, Compiler directives.

TEXT BOOKS:

1. T.R. Padmanabhan, B Bala Tripura Sundari, Design Through Verilog HDL, Wiley 2009.
2. Verilog HDL - Samir Palnitkar, 2nd Edition, Pearson Education, 2009.

REFERENCE BOOKS:

1. Fundamentals of Digital Logic with Verilog Design - Stephen Brown,Zvonkoc Vranesic, TMH, 2nd Edition.
2. Zainalabdien Navabi, Verliog Digital System Design, TMH, 2nd Edition.
3. Advanced Digital Logic Design using Verilog, State Machines & Synthesis for FPGA - Sunggu Lee, Cengage Learning, 2012.
4. Advanced Digital Design with Verilog HDL - Michel D. Ciletti, PHI, 2009.

COURSE OUTCOMES:

By the end of the course student should be able to:

- Describe Verilog HDL
- Design Digital circuits
- Write behavior model of digital circuits
- Write RTL models of digital circuits
- Verify behavior and RTL models
- Describe standard Cell Libraries and FPGAs
- Synthesize RTL models to standard cell libraries and FPGAs
- Implement RTL models on FPGAs and testing and verification

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III Year B.Tech. ECE- I Sem **L/T/P/C**
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PROFESSIONAL ELECTIVE – II
(R20A0510) COMPUTER NETWORKS

COURSE OBJECTIVES:

1. To understand the fundamentals of computer networks, TCP/IP & OSI model.
2. To analyze Data link layer Issues, Protocols.
3. To explain Network layer Protocols, IP addressing.
4. To identify end to end communication & various things in Transport layer.
5. To describe various user services in a network.

UNIT - I:

Introduction: Network, Uses of Networks, Types of Networks, Reference Models: TCP/IP Model,The OSI Model, Comparison of the OSI and TCP/IP reference model.
Physical Layer: Guided transmission media, Wireless transmission media, Switching

UNIT - II:

Data Link Layer - Design issues, Error Detection & Correction, Elementary Data Link Layer Protocols, Sliding window protocols
Multiple Access Protocols - ALOHA, CSMA, CSMA/CD, CSMA/CA, Collision free protocols, Ethernet- Physical Layer, Ethernet Mac Sub layer.

UNIT - III:

Network Layer: Network Layer Design issues, store and forward packet switching connection less and connection oriented networks, routing algorithms: optimality principle, shortest path, flooding, Distance Vector Routing, Count to Infinity Problem, Link State Routing, Path Vector Routing, Hierarchical Routing; Congestion control algorithms,
IP addresses, CIDR, Sub netting, Super Netting, IPv4, Packet Fragmentation, IPv6 Protocol,Transition from IPv4 to IPv6, ARP, RARP.

UNIT - IV:

Transport Layer: Services provided to the upper layers elements of transport protocol, addressing, connection establishment, Connection release, Error Control & Flow Control, Crash Recovery.
The Internet Transport Protocols: UDP, Introduction to TCP, The TCP Service Model, The TCP Segment Header, The Connection Establishment, The TCP Connection Release, The TCP Sliding Window, The TCP Congestion Control Algorithm.
UNIT - V: Application Layer- Introduction, providing services, Applications layer paradigms: Clientserver model, HTTP, E-mail, WWW, TELNET, DNS.

TEXT BOOKS:

1. Computer Networks - Andrew S Tanenbaum, 4th Edition, PearsonEducation.
2. Data Communications and Networking - Behrouz A. Forouzan, Fifth Edition TMH, 2013.

REFERENCES BOOKS:

1. An Engineering Approach to Computer Networks - S. Keshav, 2nd Edition, PearsonEducation.
2. Understanding communications and Networks, 3rd Edition, W. A. Shay, CengageLearning.
3. Computer Networking: A Top-Down Approach Featuring the Internet, James F. Kurose, K.
   W. Ross, 3rd Edition, PearsonEducation.

COURSE OUTCOMES:

At the end of this course, students will be able to :

- Understand basics of Computer Networks and Reference Models.
- Understand the Datalink Layer Concepts
- Know allotment of IP addresses, best routing path calculations in network.
- Analyze TCP,UDP working and know how to handle congestion
- Get an idea of various things in Application Layer.

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III Year B.Tech. ECE- I Sem **L/T/P/C**
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PROFESSIONAL ELECTIVE – II
(R20A0414) ANTENNAS AND WAVE PROPAGATION

COURSE OBJECTIVES:

1) Understand basic terminology and concepts of Antennas.
2) To attain knowledge on the basic parameters those are considered in the antenna design process and the analysis while designing that.
3) Analyze the electric and magnetic field emission from various basic antennas and mathematical formulation of the analysis.
4) To have knowledge on antenna operation and types as well as their usage in real time.
5) Aware of the wave spectrum and respective band based antenna usage and also to know the propagation of the waves at different frequencies through different layers in the existing layered free space environment structure.

UNIT I

ANTENNA BASICS: Introduction, Basic Antenna Parameters – Patterns, Beam Area, Radiation Intensity, Beam Efficiency, Directivity-Gain-Resolution, Antenna Apertures, Illustrative Problems. Field Zones, Front – to-back Ratio, Retarded Potentials – Helmholtz Theorem.

THIN LINEAR WIRE ANTENNAS: Radiation from Small Electric Dipole, Quarter Wave Monopole and Half Wave Dipole – Current Distributions, Field Components, Radiated Power, Radiation Resistance, Beam Width, Directivity, Illustrative Problems.

UNIT II

VHF, UHF AND MICROWAVE ANTENNAS – I : Arrays with Parasitic Elements, Yagi-Uda Array, Folded Dipoles and their Characteristics, Helical Antennas – Helical Geometry, Helix Modes, Practical Design Considerations for Helical Antenna in Axial and Normal Modes, Horn Antennas – Types, Optimum Horns, Design Considerations of Pyramidal Horns, Illustrative Problems.

VHF, UHF AND MICROWAVE ANTENNAS – II: Micro strip Antennas – Introduction, Features, Advantages and Limitations, Rectangular Patch Antennas – Geometry and Parameters, Characteristics of Microstrip Antennas. Impact of Different Parameters on Characteristics, Reflector Antennas – Introduction, Flar Sheet and Corner Reflectors, Paraboloidal Reflectors –Reflector Types – Related Features, Illustrative Problems. Lens Antennas – Introduction, Geometry of Non-metallic Dielectric Lenses, Fermat's Principle, Zoning, Applications.

UNIT III

ANTENNA ARRAYS: Point Sources – Definition, Patterns, arrays of 2 Isotropic Sources – Different Cases, Principle of Pattern Multiplication, Uniform Linear Arrays – Broadside Arrays, End fire Arrays, Derivation of their Characteristics and Comparison, BSAs with Non- uniform Amplitude Distributions – General Considerations and Binomial Arrays, Illustrative Problems.

ANTENNA MEASUREMENTS: Introduction, Pattern Measurement Arrangement, Directivity Measurement, Gain Measurements (by Comparison, Absolute and 3- Antenna Methods)

UNIT IV

WAVE PROPAGATION – I: Introduction, Definitions, Categorizations and General Classifications, Different Modes of Wave Propagation, Ground Wave Propagation (Qualitative Treatment) – Introduction, Space and Surface Waves, Wave Tilt. Space Wave Propagation – Introduction, Field Strength Variation with Distance and Height, Super Refraction, M-Curves and Duct Propagation, Scattering Phenomena, Tropospheric Propagation.

UNIT V

WAVE PROPAGATION – II: Sky Wave Propagation – Introduction, Structure of Ionosphere, Refraction and Reflection of Sky Waves by Ionosphere, Ray Path, Critical Frequency, MUF, LUF, OF, Virtual Height and Skip Distance, Relation between MUF and Skip Distance, Multi hop Propagation.

TEXT BOOKS:

1) Antennas and Wave Propagation – J.D. Kraus, R.J. Marhefka and Ahmad S. Khan, TMH, New Delhi, 4th ed., (Special Indian Edition), 2010.
2) Electromagnetic Waves and Radiating Systems–E.C. Jordan and K.G. Balmain, PHI, 2nded.,
3) A.Harish, M.Sachidanada," Antennas and Wave Propagation", Oxford University Press,2007

REFERENCE BOOKS:

1) Antenna Theory – C.A. Balanis, John Wiley & Sons, 3rd Ed.,2005.
2) Antennas and Wave Propagation–K.D. Prasad, Satya Prakashan, Tech India Publications, New Delhi, 2001.
3) Transmission and Propagation – E.V.D. Glazier and H.R.L. Lamont, The Services Text Book of Radio, vol. 5, Standard Publishers Distributors, Delhi.
4) Antennas – John D. Kraus, McGraw-Hill (International Edition), 2nd Ed. 1988.
5) Electronic and Radio Engineering – F.E. Terman, McGraw-Hill, 4th edition, 1955.

COURSE OUTCOMES:

1) Aware of antenna parameter considerations
2) Capable to analyze the designed antenna and field evaluation under various conditions and formulate the electric as well as magnetic fields equation set for far field and near field conditions
3) Understand the array system of different antennas and field analysis under application of different currents to the individual antenna elements
4) Understand the design issues, operation of fundamental antennas and their operation methodology in practice.
5) Design a lens structure and also the bench set up for antenna parameter measurement of testing for their effectiveness.

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III Year B.Tech. ECE- I Sem **L/T/P/C**
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PROFESSIONAL ELECTIVE – II
(R20A0415) INSTRUMENTATION ENGINEERING

COURSE OBJECTIVES:

1) An introduction to measurement techniques and instrumentation design and operation
2) The basic concept of units, measurement error and accuracy, the construction and design of measuring devices and circuits, measuring instruments and their properapplications.
3) To learn the working of different types of Signal generators.
4) To learn the basics of oscilloscope and it types.
5) To use different measuring techniques and the measurement of different physical parameters using different transducers.

UNIT I

BLOCK SCHEMATICS OF MEASURING SYSTEMS: Performance characteristics, Static characteristics, Accuracy, Precision, Resolution, Types of Errors, Gaussian Error, Dynamic Characteristics, Repeatability, Reproducibility, Fidelity, Lag; Measuring Instruments: DC Voltmeters, D' Arsonval Movement, DC Current Meters, AC Voltmeters and Current Meters, Ohmmeters, Extension of Range, Millimeters, True RMS Responding Voltmeters.

UNIT II

SIGNAL ANALYZERS: AF, HF Wave Analyzers, Harmonic Distortion, Heterodyne wave Analyzers, Spectrum Analyzers, Capacitance-Voltage Meters.

SIGNAL GENERATORS: AF, RF Signal Generators, Sweep Frequency Generators, Pulse and Square Wave Generators, Function Generators, Arbitrary waveform Generator.

UNIT III

OSCILLOSCOPES: CRT, Block Schematic of CRO, Time Base Circuits, Lissajous Figures, CRO Probes, High Frequency CRO Considerations, Delay lines, Applications: Measurement of Time, Period and Frequency.

SPECIAL PURPOSE OSCILLOSCOPES: Dual Trace, Dual Beam CROs, Sampling Oscilloscopes, Storage Oscilloscopes, Digital Storage CROs.

UNIT IV

BRIDGES: Wheat Stone Bridge, Kelvin Bridge, and Maxwell Bridge.

TRANSDUCERS: Classification, Strain Gauges, Bounded, unbounded; Force and Displacement Transducers, Resistance Thermometers, Hotwire Anemometers, LVDT, Thermocouples, Synchros, Piezoelectric Transducers, Magneto Strictive Transducers.

UNIT V

MEASUREMENT OF PHYSICAL PARAMETERS: Flow Measurement, Displacement Meters, Liquid level Measurement, Measurement of Humidity and Moisture, Velocity, Force, Pressure – High Pressure, Vacuum level, Temperature Measurements, Data Acquisition Systems.

TEXTBOOKS:

1) Electronic instrumentation: H.S.Kalsi – TMH, 2nd Edition 2004.
2) Modern Electronic Instrumentation and Measurement Techniques: A.D. Helbincs, W.D. Cooper: PHI, 5th Edition, 2003.

REFERENCE BOOKS:

1) Electronic Instrumentation and Measurements – David A. Bell, Oxford Uiv. Press, 1997.
2) Electronic Measurements and Instrumentation: B. M. Oliver, J. M. Cage TMHReprint.
3) Measurement Systems – Emest O. Doebelin and Dhanesh N Manik, 6th Ed., TMH.
4) Electronic Measurements and Instrumentations by K. Lal Kishore, Pearson Education – 2010.
5) Industrial Instrumentation: T. R. Padmanabham Spiriger 2009.

COURSE OUTCOMES:

1. Describe the fundamental concepts and principles of instrumentation
2. Explain the operation of various instruments required in measurements
3. Apply the measurement techniques for different types of tests.
4. To select specific instruments for specific measurement function.
5. Students will understand functioning, specification and application of signal analyzing instruments.

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III Year B.Tech. ECE- I Sem **L/T/P/C**

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(R20A0485) DIGITAL SIGNAL PROCESSING LAB

COURSE OBJECTIVES:

1) To implement Linear and Circular Convolution
2) To implement FIR and IIR filters
3) To Estimate power spectral densities using a variety of techniques
4) To Study the architecture of DSP processor
5) To learn programming of DSP hardware for real-time signal processing applications

Note:

1) Minimum of 12 experiments has to be conducted.
2) The programs shall be implemented in software (Using MATLAB / Lab view / C programming/ Equivalent) and hardware (Using TI / Analog devices / Motorola / Equivalent DSP processors).

List of Experiments:

1. To find DFT / IDFT of given DT signal
2. Implementation of Linear Convolution between two finite length sequences
3. Implementation of Circular Convolution between two finite length sequences.
4. To find frequency response of a given system (in Transfer Function/ Differentialequation form).
5. Implementation of FFT/IFFT of given sequence
6. Determination of power spectrum of a given signal(s).
7. Implementation of LP FIR filter for given sequence
8. Implementation of HP FIR filter for given sequence
9. Implementation of LP IIR filter for given sequence
10. Implementation of HP IIR filter for given sequence
11. Generation of sinusoidal signal through filtering
12. Implementation of Decimation Process
13. Implementation of Interpolation Process
14. Implementation of I/D sampling rate converters.
15. Audio application such as to plot a time and frequency display of microphone plus a cosineusing DSP. Read a .wav file and match with their respective spectrograms.
16. Impulse response of first order and second order systems.

COURSE OUTCOMES

1. Generate & Perform different operations on discrete time signals and systems.
2. Analyze and implement digital systems using the Discrete Fourier Transform and Fast Fourier Transform (FFT) techniques using MATLAB and signal processing toolboxes.
3. Use Z transforms to analyze a digital system finding the region of convergence usingMATLAB and signal processing toolboxes.
4. Design and Implement digital FIR and IIR filters.
5. Design Up converter, down converter & Sample rate converter.

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III Year B.Tech. ECE- I Sem **L/T/P/C**

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(R20A0486) LINEAR AND DIGITAL IC LAB

COURSE OBJECTIVES:

1) To study the hands-on experience on 741 Op-Amp applications.
2) To apply the perceptions of IC 555 Timer and PLL applications.
3) To Design and verify the IC 723 Voltage Regulator and Three terminal voltageregulators.
4) To apply the concepts of basic combinational logic and sequential circuit elements using HDL program.
5) To develop familiarity and confidence with designing, building and testing digital circuits, including the use of CAD tools.

Note: To perform any twelve experiments (choosing at least five from each part).

Part – I: Linear IC Experiments

1. OP AMP Applications – Adder, Subtractor, Comparators.
2. Integrator and Differentiator Circuits using IC 741.
3. Active Filter Applications – LPF, HPF (first order)
4. IC 741 Waveform Generators – Sine, Square wave and Triangular waves.
5. IC 555 Timer – Monostable and Astable Multivibrator Circuits.
6. Schmitt Trigger Circuits – Using IC 741
7. IC 565 – PLL Applications.
8. Voltage Regulator using IC 723, Three Terminal Voltage Regulators – 7805, 7809, 7912.

EQUIPMENT REQUIRED:

1) 20 MHz / 40 MHz / 60 MHz Oscilloscope.
2) 1 MHz Function Generator (Sine, Square, Triangular and TTL).
3) Regulated Power Supply.
4) Multimeter / Volt Meter.

Part – II: HDL Simulation programs:

Programming can be done using any compiler. Download the programs on FPGA / CPLD boards and performance testing may be done using pattern generator / logic analyzer apart from verification by simulation using Cadence / Mentor Graphics / Synopsys / Equivalent front end CAD tools.

1. HDL code to realize all the logic gates
2. Design of 2-to-4 decoder
3. Design of 8-to-3 encoder (without and with Priority)
4. Design of 8-to-1 multiplexer and 1 x 8 Demultiplexer.
5. Design of 4-bit binary to gray code converter
6. Design of 4-bit comparator

7. Design of Full adder using 3 modeling styles
8. Design of flip flops: SR, JK, T
9. Design of 4-bit binary, BCD counters (synchronous/ asynchronous reset)

COURSE OUTCOMES

1. Understand the various applications of linear IC's like 741 Op-amp applications.
2. Design the Multivibrator circuits using IC 555 and determine the frequency of oscillationand time delay.
3. Understand the functionality of IC 723 voltage regulator and determine the load and lineregulations.
4. Design and simulate the combinational and sequential logic circuits using hardware description languages.
5. Analyze the results of logic and timing simulations and to use these simulation result todebug digital systems.

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III Year B.Tech. ECE- I Sem **L/T/P/C**

-/-/4/2

(R20A0491) APPLICATION DEVELOPMENT I

The topic should be selected / chosen to ensure a direct connectivity between theoretical fundamentals and applications and, thus reduce the gap between the world of work and the world of study.

The application should meet the following criteria

- Relevance to social needs of society
- Relevance to value addition to existing facilities in the institute
- Relevance to industry need
- Research and development in various domain

The student should complete the following:

- Literature survey related to Problem Definition
- Motivation for study and Objectives
- Preliminary design / feasibility / modular approaches
- Implementation and Verification
- Report and presentation

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MANDATORY COURSE – V
(R20A0007) INDIAN CONSTITUTION

INTRODUCTION

The Indian judiciary and particularly the Supreme Court of India has played an historic role as the guardian of people. It has been protecting not only basic ideals of the Constitution but also strengthened the same through progressive interpretations of the text of the Constitution. The judicial activism of the Supreme Court of India and its historic contributions has been recognized throughout the world and it gradually made it "as one of the strongest court in the world".

This course "Indian Constitution" has been designed to develop understanding of the Indian Constitution among the students.

COURSE OBJECTIVES:

1) To enrich the students' understanding of the constitution's origin and its power
2) To facilitate students to analyze the political principles
3) To assist the students to be aware of their fundamental rights and duties
4) To enable learning about the federal structure Parliamentary form of government
5) To be acquainted with the historical perspectives of the constitutional amendments.

UNIT I

Meaning of constitution law and constitutionalism, Historical perspective of the constitution of India, Salient features and characteristics of the constitution of India.

UNIT II

Scheme of fundamental rights, The scheme of the fundamental duties and its legal status The Directive Principles of State Policy-its importance and implementation.

UNIT III

Federal structure and distribution of legislative and financial powers between the Union and the States, Parliamentary Form of Government in India-the constitution powers and status of the president of India, Amendment of the Constitutional Powers and Procedure.

UNIT IV

The historical perspectives of the constitutional amendments in India., Emergency provisions: National Emergency, President Rule, Financial Emergency, Local self-Government-Constitutional scheme in India.

UNIT V

Scheme of fundamental Right to Equality, Scheme of fundamental Right to certain Freedom under Article 19, Scope of the Right to Life and Personal Liberty under Article 21

COURSE OUTCOMES:

1. Improve their knowledge about Indian constitution
2. Value their identity and exercise their fundamental rights
3. Comprehend how differently government bodies function
4. Define their rights as voters of the country
5. Analyze the constitution and become responsible citizens

OPEN ELECTIVE – II

S.NO	SUBJECT CODE	TITLE OF THE SUBJECT
1	R20A1252	MANAGEMENT INFORMATION SYSTEMS
2	R20A0552	JAVA PROGRAMMING
3	R20A1253	SOFTWARE PROJECT MANAGEMENT
4	R20A0452	INTERNET OF THINGS & ITS APPLICATIONS
5	R20A0553	OPERATING SYSTEM CONCEPTS
6	R20A0066	PUBLIC POLICY & GOVERNANCE

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OPEN ELECTIVE - II
(R20A1252) MANAGEMENT INFORMATION SYSTEMS

COURSE OBJECTIVES:

1) To understand the importance of MIS, structure and types of MIS
2) To learn business applications of Information Systems
3) To learn about the Management of Information Systems
4) To learn how to build Information Systems
5) To know about Cybercrime.

UNIT I:

Introduction: MIS importance, definition, nature and scope of MIS, Structure and Classification of MIS, Information and Systems Concept, Types of Information, Information systems for competitive advantage.

Case Study: MIS at any business establishment.

UNIT II:

Business Applications of Information Systems: E-Commerce, ERP Systems, DSS, Business Intelligence and Knowledge Management System.

Case Study: Knowledge Management Systems at an Enterprise.

UNIT III:

Management of IS: Information system planning, system acquisition, systems implementation, evaluation & maintenance of IS, IS Security and Control.

Effectiveness of MIS: A Case Study.

UNIT IV:

Building of Information Systems: System Development Stages, System Development Approaches. Systems Analysis and Design-Requirement Determination, Strategies for Requirement Determination. Structured Analysis Tools, System Design – Design Objectives, Conceptual Design, and Design Methods. Detailed system design.

UNIT V:

Introduction to Cyber Crime: Cyber Crime Definition and orgin of the word, cyber crime and information security, cyber criminals. Classification of cyber criminals-Legal Perspectives- Indian Perspectives-Cyber crimes and ndian ITA 2000, Global perspective on cybercrime- Cybercrime era.(Refer : Nina Godbole et al)

TEXT BOOK

1) D P Goyal, Management Information Systems–Managerial Perspective, MacMillan, 3rd Edition, 2010.

REFERENCES:

1) Nina Godbole & Sunit Belapure " Cyber Security" Wiley india 2012.
2) Jawadekar, MIS Text and Cases, TMH, 2012.
3) Dr Milind M Oka "Cases in Management Information system 'Everest, 2012.
4) A K Gupta, Sharma "Management of Systems" Macmillan, 2012.
5) Sandra Senf "Information Technology Control and Audit" 3e, CRC Press, 2012.
6) Apache OFBiz for Ecommerce and ERP – https://ofbiz.apache.org/
7) Magneto for Ecommerce (B2B Commerce) – https://magento.com/
8) Adempiere – ERP : http://www.adempiere.net/web/guest/welcome
9) Analytica – DSS – http://www.lumina.com
10) OpenRules–Business Rules and Decision Management system – http://openrules.com/

COURSE OUTCOMES:

1) Understand the importance of MIS, structure and types of MIS
2) Understand business applications of Information Systems
3) Learning about the Management of Information Systems
4) Learning about how to build Information Systems
5) Knowing about Cyber crime

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OPEN ELECTIVE - II
(R20A0552) JAVA PROGRAMMING

COURSE OBJECTIVES:

1. To create Java programs that leverage the object-oriented features of the Java language,such as encapsulation, inheritance and polymorphism;
2. Use data types, arrays and strings;
3. Implement error-handling techniques using exception handling,
4. To know about Applets and Event Handling
5. Create and event-driven GUI using AWT components.

UNIT I:

Java Programming-OOP Concepts, History of Java, Java buzzwords, Data types, Variables, Constants, Scope and Life time of variables, Operators, Type conversion and casting, Control Flow Statements, simple java programs, concepts of classes, objects, arrays, strings, constructors, methods, access control, this keyword, overloading methods and constructors, garbage collection, recursion.

UNIT II:

Inheritance – Types of Inheritance, super keyword, and preventing inheritance: final classes and methods.

Polymorphism – Dynamic binding, method overriding, abstract classes and methods.

Interfaces-Interfaces Vs Abstract classes, defining an interface, implement interfaces, extending interface.

Packages- Defining, creating and accessing a package, importing packages.

UNIT III:

Exception handling - Benefits of exception handling, exception hierarchy, Classification of exceptions - checked exceptions and unchecked exceptions, usage of try, catch, throw, throws and finally, built in exceptions.

Multi-threading- Differences between multi-threading and multitasking, thread life cycle, creating threads, synchronizing threads.

UNIT IV

Applets – Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets.

Event Handling: Events, Handling mouse and keyboard events.

Files- Streams, Byte streams, Character streams, Text input/output.

UNIT V

GUI Programming with Java – AWT class hierarchy, AWT controls - Labels, button, text field, check box, and graphics. Layout Manager – Layout manager types: border, grid and flow. Swing – Introduction, limitations of AWT, Swing vs AWT.

TEXT BOOKS:

1) Java- The Complete Reference, 7th edition, Herbert schildt, TMH.
2) Understanding OOP with Java, updated edition, T. Budd, Pearson education.
3) Core Java an integrated approach, Dream Tech publication, Dr. R.Nageswara Rao.

REFERENCE BOOKS:

1) Java for Programmers, P.J.Deitel and H.M.Deitel, PEA (or) Java: How to Program, P.J.Deitel and H.M.Deitel, PHI
2) Object Oriented Programming through Java, P. Radha Krishna, Universities Press.

COURSE OUTCOMES:

1) An understanding of the principles and practice of object-oriented programming and design in the construction of robust, maintainable programs which satisfy their requirements;
2) A competence to design, write, compile, test and execute straightforward programs using a high-level language;
3) An awareness of the need for a professional approach to design and the importance of good documentation to the finished programs.
4) Be able to make use of members of classes found in the Java API.
5) Demonstrate the ability to employ various types of constructs and a hierarchy of Java classes to provide solution to a given set of requirements.

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OPEN ELECTIVE - II
(R20A1253) SOFTWARE PROJECT MANAGEMENT

COURSE OBJECTIVES:

1) To understand the specific roles within a software organization as related to project and process management
2) To understand the basic infrastructure competences (e.g., process modeling and measurement)
3) To understand the basic steps of project planning, project management, quality assurance, and process management and their relationships
4) To understand the Flow Process and Check points of the process.
5) To understand Project Organizations and Responsibilities

UNIT I

Conventional Software Management: The waterfall Model, Conventional Software Management Performance, evolution of Software Economics: software Economics. Pragmatic Software Cost Estimation. Improving Software Economics: Reducing Software Product Size, Improving Software Processes, Improving Team Effectiveness, Improving Automation, Achieving Required Quality, Peer Inspections.

UNIT II

Conventional And Modern Software Management: Principles of Conventional Software Engineering, Principles of Modern Software Management, Transitioning to an interactive Process, Life Cycle Phases: Engineering and Production Stages Inception, Elaboration, Construction, Transition phases .

UNIT III

Artifacts of the Process: The Artifact Sets. Management Artifacts, Engineering Artifacts, Programmatic Artifacts. Model Based Software Architectures: A Management Perspective and Technical Perspective.

UNIT IV

Flows of the Process: Software Process Workflows, Iteration workflows. Checkpoints of the Process: Major Mile Stones, Minor Milestones, Periodic Status Assessments. Interactive Process Planning: Work Breakdown Structures, Planning Guidelines, Cocomo Cost Estimation model.

UNIT V

Project Organizations and Responsibilities: Line-of-Business Organizations, Project Organizations, and Evolution of Organizations. Process Automation Building Blocks, the Project Environment. Project Control and Process Instrumentation: Seven Core Metrics, Management Indicators, Quality Indicators, Life Cycle Expectations Pragmatic Software Metrics Automation.

TEXT BOOKS:

1. Walker Royce, -Software Project Management**||**, 1998, PEA.
2. Henry, -Software Project Management**||**, Pearson.

REFERENCE BOOKS:

1. Richard H.Thayer.‖ Software Engineering Project Management‖, 1997, IEEEComputer
2. Society.
3. Shere K.D.: -Software Engineering and Management**||**, 1998, PHI.
4. S.A. Kelkar, -Software Project Management: A Concise Study**||**,PHI.
5. Hughes Cotterell, Software Project Management‖, 2e, TMH. 88 5. Kaeron Conway, Software Project Management from Concept toD

COURSE OUTCOMES:

1. Understanding the specific roles within a software organization as related to project andprocess management.
2. Understanding the basic infrastructure competences (e.g., process modeling and measurement).
3. Understanding the basic steps of project planning, project management, quality assurance,and process management and their relationships.
4. Understanding the Flow Process and Check points of the process.
5. Understanding the Project Organizations and Responsibilities.

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OPEN ELECTIVE - II
(R20A0452) INTERNET OF THINGS AND ITS APPLICATIONS

COURSE OBJECTIVES:

1. To study the fundamentals about IoT
2. To study about IoT Access technologies
3. To study the design methodology and different IoT hardware platforms.
4. To study the basics of IoT Data Analytics and supporting services.
5. To study about various IoT case studies and industrial applications.

UNITI: FUNDAMENTALS OF IoT- Evolution of Internet of Things, Enabling Technologies, M2M Communication, IoT World Forum (IoTWF) standardized architecture, Simplified IoT Architecture, Core IoT Functional Stack, Fog, Edge and Cloud in IoT, Functional blocks of an IoT ecosystem, Sensors, Actuators, Smart Objects and Connecting Smart Objects.

UNIT II: IoT PROTOCOLS- IoT Access Technologies: Physical and MAC layers, topology and Security of IEEE 802.15.4, 802.11ah and Lora WAN, Network Layer: IP versions, Constrained Nodes and Constrained Networks,6LoWPAN, Application Transport Methods: SCADA, Application Layer Protocols: CoAP and MQTT.

UNIT III: DESIGN AND DEVELOPMENT- Design Methodology, Embedded computing logic, Microcontroller, System on Chips, IoT system building blocks.

IoT Platform overview: Overview of IoT supported Hardware platforms such as: Raspberry pi, Arduino Board details

UNIT IV: DATA ANALYTICS AND SUPPORTING SERVICES:

Data Analytics: Introduction, Structured Versus Unstructured Data, Data in Motion versus Data at Rest, IoT Data Analytics Challenges, Data Acquiring, Organizing in IoT/M2M,

Supporting Services: Computing Using a Cloud Platform for IoT/M2M Applications/Services,Everything as a service and Cloud Service Models.

UNIT V: CASE STUDIES/INDUSTRIAL APPLICATIONS: IoT applications in home, infrastructures, buildings, security, Industries, Home appliances, other IoT electronic equipment's, Industry 4.0 concepts.

TEXT BOOKS:

1. IoT Fundamentals: Networking Technologies, Protocols and Use Cases for Internet of Things, David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Rob Barton and Jerome Henry, Cisco Press, 2017
2. Internet of Things – A hands-on approach, Arshdeep Bahga, Vijay Madisetti, Universities Press, 2015
3. Internet of Things: Architecture, Design Principles And Applications, Raj Kamal, McGraw Hill, Higher Education

REFERENCE BOOKS:

1. The Internet of Things – Key applications and Protocols, Olivier Hersent, David Boswarthick, Omar Elloumi and Wiley, 2012 (for Unit2).
2. "From Machine-to-Machine to the Internet of Things – Introduction to a New Ageof Intelligence", Jan Ho¨ ller, Vlasios Tsiatsis, Catherine Mulligan, Stamatis, Karnouskos, Stefan Avesand. David Boyle and Elsevier, 2014.
3. Architecting the Internet of Things, Dieter Uckelmann, Mark Harrison, Michahelles and Florian (Eds), Springer,2011.
4. Recipes to Begin, Expand, and Enhance Your Projects, 2nd Edition, Michael Margolis, Arduino Cookbook and O"Reilly Media,2011.

COURSE OUTCOMES:

At the end of this course, students will be able to

- Understand the basics of IoT.
- Implement the state of the Architecture of an IoT.
- Understand design methodology and hardware platforms involved in IoT.
- Understand how to analyze and organize the data.
- Compare IOT Applications in Industrial & real world.

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OPEN ELECTIVE - II
(R20A0553) OPERATING SYSTEM CONCEPTS

COURSE OBJECTIVES:

1. To understand the basic concepts and functions of operating systems.
2. To understand Processes and Threads
3. To understand the concept of Deadlocks.
4. To analyze various memory management schemes.
5. To understand I/O management and File system

UNIT-I

Introduction: Concept of Operating Systems, OS Services, Structure of an Operating Systems
Processes: Definition, Process Relationship, Different states of a Process, Process State transitions, Process Control Block (PCB), Context switching
Thread: Definition, Various states, Benefits of threads, Types of threads, Concept of Multithreads.

UNIT-II

Process Scheduling: Foundation and Scheduling objectives, Types of Schedulers, Scheduling criteria: CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time; Scheduling algorithms: Pre-emptive and Non pre-emptive, FCFS, SJF, RR
Inter-process Communication: Critical Section, Race Conditions, Mutual Exclusion. Classical IPC Problems: Reader‘s & Writer Problem, Dinning Philosopher Problem, The Producer/Consumer Problem, Semaphores, Monitors.

UNIT-III

Memory Management: Basic concept, Logical and Physical address map, Memory allocation: Contiguous Memory allocation – Fixed and variable partition–Internal and External fragmentation; **Paging**: Principle of operation – Page allocation – Hardware support for paging, protection and sharing, Disadvantages of paging.
Virtual Memory: Basics of Virtual Memory, Page fault , Demand paging; **Page Replacement algorithms:** Optimal, First in First Out (FIFO), Second Chance (SC), Not recently used (NRU) and Least Recently used (LRU).

UNIT-IV

File Management: Concept of File, Access methods, File types, File operation, File System structure, Allocation methods (contiguous, linked, indexed), Directory structure, directory implementation (linear list, hash table), efficiency and performance.

UNIT-V

Deadlocks: Definition, Necessary and sufficient conditions for Deadlock, Deadlock Prevention, Deadlock Avoidance: Banker‘s algorithm, Deadlock detection and Recovery.

Disk Management: Disk structure, Disk scheduling - FCFS, SSTF, SCAN, C-SCAN, Disk reliability, Disk formatting, Boot-block, Bad blocks.

TEXT BOOKS:

1) Operating System Concepts Essentials, 9th Edition by Avi Silberschatz, Peter Galvin, Greg Gagne, Wiley Asia Student Edition.
2) Operating Systems: Internals and Design Principles, 5th Edition, William Stallings, Prentice Hall of India.

REFERENCE BOOKS:

1. Operating System: A Design-oriented Approach, 1st Edition by Charles Crowley, Irwin Publishing
2. Operating Systems: A Modern Perspective, 2nd Edition by Gary J. Nutt, Addison-Wesley
3. Design of the Unix Operating Systems, 8th Edition by Maurice Bach, Prentice- Hall of India
4. Understanding the Linux Kernel, 3rd Edition, Daniel P. Bovet, Marco Cesati, O'Reillyand Associates

COURSE OUTCOMES:

1. Create processes and threads.
2. Implement algorithms for process scheduling for a given specification of CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time.
3. Develop the techniques for optimally allocating memory to processes by increasing memory utilization and for improving the access time.
4. Design and implement file management system.
5. Analyze various disk scheduling schemes.

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III Year B.Tech. ECE- I Sem **L/T/P/C**
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OPEN ELECTIVE - II
((R20A0066) PUBLIC POLICY AND GOVERNANCE

Course objectives:

1. To make the students understand in-depth analysis of public policy and to solve its ills prevailing in the society.
2. To provide an opportunity for the students to learn the basic areas of public policy analysis, implementation and evaluation.
3. To make understand the process and various approaches in public policy making
4. To understand the theories and issues of social coordination and the nature of all patterns of rule.
5. To make the students understand the techniques of governance and emerging trends in public and private governance its policy-making and implementation.

Unit-I

Introduction of Public Policy: Definition, Nature, Scope and Importance of Public Policy, Evolution of Public Policy and Policy Sciences, Public Policy and Public Administration. **Approaches to Public Policy Analysis:** The Process Approach, The Logical Positivist Approach, The Phenomenological Approach, The Participatory Approach and Normative Approach

Unit-II

Theories and Process of Public Policy Making: Theories and Models of Policy Making, Perspectives of Policy Making Process, Institutions of Policy Making.

Unit-III

Policy Implementation and Evaluation: Concept of Policy Implementation, Techniques of Policy Implementation, Concept of Policy Evaluation, Constraints of Public Policy Evaluation

Unit-IV

Introduction of Governance: Definitions, Issues and Controversies, Reinventing Government, Reforming Institutions: The State, Market and Public domain. **State and Governance:** Origin and types of State, Democratic State and Democratic Administration, Neo-Liberalism and Rolling Back State and Governance as Government.

Unit-V

Citizen and Techniques of Governance: Rule of Law and Human Rights, Accountability, Participation, Representation. **Techniques of Governance**: Openness and Transparency, Citizen Charter, Social Audit. **Emerging Trends in Public and Private Governance:** An Overview, Market, Civil Society, Information and Communication Technology.

Text and Reference books

1. Introduction to Public Policy- Charles Wheelan, Naked Economics 2010.
2. Birkland Thomas A., (2005), An Introduction to The Policy Process: Theories, Concepts, And Models of Public Policy Making, Armonk; M.E. Sharpe.
3. Anderson J.E., (2006) Public Policy-Making: An Introduction, Boston, Houghton
4. Bardach, Eugene (1977), The Implementation Game: What Happens After a Bill Becomes a Law, Cambridge, MA: MIT.
5. Bell, S., and Hind moor, A. (2009) Rethinking Governance: The Centrality of the State in Modern Society, Cambridge: Cambridge University Bell, Stephen and Andrew Hind moor.
6. Joyee M. Mitchell & William C. Mitchell, Political Analysis & Public Policy: An Introduction to Political Science, Thomson Press Limited, New Delhi, 1972.
7. R.K. Sapru, Public Policy, Art and Craft of policy Analysis, PHI learning private limited, New Delhi, 2011.
8. Brian W. Hogwood & Lewis A. Gunn, Policy Analysis for the Real world, Oxford University, Press, 1986.

Course outcomes

After completion of the course, student will be able to

1. Understand public policy analysis and they will be able to understand policy evaluation and implementation.
2. Understand the public policy and governance on the largest gamut of its canvas.
3. Students will understand the what are emerging trends in public and private governance and various theories in public policy making
4. Understands various concepts, and techniques of governance and its policy-making decisions

III YEAR B.TECH
II SEMESTER SYLLABUS

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III Year B.Tech. ECE- II Sem **L/T/P/C**
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(R20A0416) MICROPROCESSORS AND MICROCONTROLLERS

COURSE OBJECTIVES:

1) To study the basics of microprocessors and microcontrollers architectures and its functionalities.
2) To develop an in-depth understanding of the operation of microprocessors and microcontrollers, machine language programming & interfacing techniques.
3) To design and develop Microprocessor/ microcontroller based systems for real time applications using low level language like ALP.
4) To study the architecture and functionalities of 8051 Microcontroller.
5) To study the concepts of ARM processor.

UNIT –I

8086 ARCHITECTURE: Architecture of 8086, Register Organization, Memory addresses, Memory Segmentation, Physical Memory Organization, Signal descriptions of 8086- Common Function Signals, Minimum and Maximum mode signals, Timing diagrams.

UNIT –II

INSTRUCTION SET AND ASSEMBLY LANGUAGE PROGRAMMING OF 8086: Addressing modes, Instruction Set, Assembler Directives, Procedures, Macros, Simple Programs involving Logical, Branch and Call Instructions, Sorting, Evaluating Arithmetic Expressions, String Manipulations.

UNIT –III

I/O INTERFACE: 8255 PPI, Various Modes of Operation and Interfacing to 8086, D/A and A/D Converter, Stepper motor, Interfacing of DMA controller 8257.Memory Interfacing to 8086, Interrupt Structure of 8086, Interrupt Vector Table.

COMMUNICATION INTERFACE: Serial Communication Standards, Serial Data Transfer Schemes, 8251 USART Architecture and Interfacing.

UNIT –IV

INTRODUCTION TO MICROCONTROLLERS: Overview of 8051 Microcontroller, Architecture, I/O Ports, Memory Organization, Addressing Modes and Instruction set of 8051, Simple Programs.

UNIT –V

8051 REAL TIME CONTROL: Programming Timer Interrupts, Programming External Hardware Interrupts, Programming the Serial Communication Interrupts, Programming 8051 Timers and Counters.

ARM PROCESSOR: Fundamentals, Registers, Current program status register, Pipeline, Interrupt and the vector table.

TEXT BOOKS

1) D. V. Hall, Microprocessors and Interfacing, TMGH, 2nd Edition2006.
2) Kenneth. J. Ayala, The 8051 Microcontroller, 3rd Ed., Cengage Learning.
3) ARM System Developer's Guide: Designing and Optimizing System Software- Andrew N. Sloss, Dominic Symes, Chris Wright, Elsevier Inc.,2007

REFERENCE BOOKS:

1) Advanced Microprocessors and Peripherals – A. K. Ray and K.M. Bhurchandani, TMH, 2nd Edition2006.
2) The 8051Microcontrollers, Architecture and Programming and Applications -K.Uma Rao, Andhe Pallavi, Pearson, 2009.
3) Micro Computer System 8086/8088 Family Architecture, Programming and Design – Liu and GA Gibson, PHI, 2ndEd.
4) Microcontrollers and Application – Ajay. V. Deshmukh, TMGH,2005.

COURSE OUTCOMES:

1) Learn the basics of microprocessors and microcontrollers architectures and its functionalities.
2) Develop an in-depth understanding of the operation of microprocessors and microcontrollers, machine language programming & interfacing techniques.
3) Design and develop Microprocessor/ microcontroller based systems for real time applications using low level language like ALP.
4) Learn the architecture and functionalities of 8051 Microcontroller.
5) Learn the concepts of ARM processor.

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III Year B.Tech. ECE- II Sem **L/T/P/C**
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(R20A0) ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

COURSE OBJECTIVES:

1) Understanding artificial intelligence (AI) principles and approaches.
2) Develop a basic understanding of the building blocks of AI as presented in terms of intelligent agents
3) Implementing Search techniques, Knowledge representation, inference, logic, and learning.
4) To introduce the basic concepts and techniques of machine learning and the need for Machine learning techniques for real world problem
5) To provide understanding of various Machine learning algorithms and the way to evaluate the performance of ML algorithms

UNIT-I

AI Fundamentals: Defining Artificial Intelligence, Defining AI techniques, AI Applications.

State Space Search and Heuristic Search Techniques: Defining problems as State Space search, Production systems and characteristics, Hill Climbing, Breadth first and depth first search, Best first search

Knowledge Representation Issues: Representations and Mappings, Approaches to knowledge representation

UNIT-II

Using Predicate Logic and Representing Knowledge as Rules:

Representing simple facts in logic, Computable functions and predicates, Procedural vs. Declarative knowledge, Logic Programming, Forward vs. backward reasoning

Symbolic Reasoning under Uncertainty: Non-monotonic Reasoning, Logics for non- monotonic reasoning

UNIT-III

Statistical Reasoning: Probability and Bayes Theorem, Certainty factors, Probabilistic Graphical Models, Bayesian Networks, Markov Networks, Fuzzy Logic.

Introduction to Machine Learning:

Idea of Machines learning from data, Classification of problem – Regression and Classification, Supervised and Unsupervised learning.

UNIT-IV

Supervised learning: Linear Regression: Model representation for single variable, Single variable Cost Function, Gradient Decent for Linear Regression, Multivariable model representation, Multivariable cost function, Gradient Decent in practice, Normal Equation and non-invertibility

Logistic Regression

Classification, Hypothesis Representation, Decision Boundary, Cost function, Advanced Optimization, Multi-classification (One vs. All), Problem of Over fitting, Regularization

Classification Problems: Support Vector Machines: Optimization Objective, Large Margin Classifiers, Kernels, SVM practical considerations

UNIT-V

Unsupervised learning: Unsupervised learning introduction, k-Means Algorithm, Optimization objective, Random Initialization, Choosing number of clusters

Neural Networks: Non-linear Hypothesis, Biological Neurons, Model representation, Intuition for Neural Networks, Multiclass classification, Cost Function, Back Propagation Algorithm, Back Propagation Intuition, Weights initialization, Neural Network Training

TEXT BOOKS

1) Artificial Intelligence, Elaine Rich and Knight, McGraw-Hill Publications
2) MACHINE LEARNING An Algorithmic Perspective 2nd Edition, Stephen Marsland,2015, by Taylor & Francis Group, LLC
3) Introduction to Machine Learning ,The Wikipedia Guide

REFERENCE BOOKS

1) Introduction To Artificial Intelligence & Expert Systems, Patterson, PHI
2) Multi Agent systems- a modern approach to Distributed Artificial intelligence, Weiss.G,MITPress.
3) Artificial Intelligence: A modern Approach, Russell and Norvig, Printice Hall

COURSE OUTCOMES

1) Apply difficult real life problems in a state space representation so as to solve those using AI techniques like searching and game playing.
2) Design and evaluate intelligent expert models for perception and prediction from intelligent environment.
3) Formulate valid solutions for problems involving uncertain inputs or outcomes by using decision making techniques.
4) Apply machine learning techniques in the design of computer systems
5) To differentiate between various categories of ML algorithms

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III Year B.Tech. ECE- II Sem **L/T/P/C**
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PROFESSIONAL ELECTIVE-III

(R20A0417) WIRELESS COMMUNICATIONS

COURSE OBJECTIVES:

1. To understand the basics of propagation of radio signals
2. To understand the basic concepts of basic Cellular System and the design requirements
3. To gain insights into various mobile radio propagation models and how the diversity can be exploited to improve performance
4. To gain knowledge and awareness of the technologies for how to effectively share spectrum through multiple access techniques i.e. TDMA, CDMA, FDMA etc.
5. To have in-depth understanding of the design consideration and architecture for different Wireless Systems like GSM, CDMA, GPRS etc

UNIT I

Introduction to Wireless Communication System: Evolution of mobile communications, Mobile Radio System around the world, Types of Wireless Communication System, Comparison of Common wireless system, Trend in Cellular radio and personal communication. Second generation Cellular Networks, Third Generation (3G) Wireless Networks, Wireless Local Loop(WLL),Wireless Local Area network(WLAN), Bluetooth and Personal Area Networks.

UNIT II

The Cellular Concept- System Design Fundamentals: Cellular system, Hexagonal geometry cell and concept of frequency reuse, Channel Assignment Strategies Distance to frequency reuse ratio, Channel & co-channel interference reduction factor, S/I ratio consideration and calculation for Minimum Co-channel and adjacent interference, Handoff Strategies, Umbrella Cell Concept, Trunking and Grade of Service, Improving Coverage & Capacity in Cellular System-cell splitting, Cell sectorization, Repeaters, Micro cell zone concept, Channel antenna system design considerations.

UNIT III

Mobile Radio Propagation Model, Small Scale Fading and diversity: Large scale path loss:- Free Space Propagation loss equation, Pathloss of NLOS and LOS systems, Reflection, Ray ground reflection model, Diffraction, Scattering, Link budget design, Max. Distance Coverage formula, Empirical formula for path loss, Indoor and outdoor propagation models, Small scale multipath propagation, Impulse model for multipath channel, Delay spread, Feher's delay spread, upper bound Small scale, Multipath Measurement parameters of multipath channels, Types of small scale Fading, Rayleigh and rician distribution, Statistical for models multipath fading channels and diversity techniques in brief.

UNIT IV

Multiple Access Techniques: Introduction, Comparisons of multiple Access Strategies TDMA,CDMA, FDMA, OFDM , CSMA Protocols.

UNIT V

Wireless Systems: GSM system architecture, Radio interface, Protocols, Localization and calling, Handover, Authentication and security in GSM, GSM speech coding, Concept of spread spectrum,

Architecture of IS-95 CDMA system,Air interface, CDMA forward channels,CDMA reverse channels, Soft handoff, CDMA features, Power control in CDMA, Performance of CDMA System, RAKE Receiver, CDMA2000 cellular technology, GPRS system architecture.

TEXT BOOKS

1) Wireless Communication, Theodore S. Rappaport, Prentice hall
2) Mobile Communications Engineering, William C. Y. Lee, Mc Graw Hill Publications

REFERENCE BOOKS

1) Wireless Communications and Networking,Vijay Garg, Elsevier
2) Wireless digital communication, Kamilo Feher, PHI
3) Mobile and personal Communication system and services by Rajpandya, IEEE press (PHI).
4) Wireless Communications-T.L.Singh-TMH
5) Adhoc Mobile Wireless network, C.K.Toh Pearson.

COURSE OUTCOMES

1. Understand the basics of propagation of radio signals
2. Understand the basic concepts of basic Cellular System and the design requirements
3. Gain insights into various mobile radio propagation models and how the diversity can beexploited to improve performance
4. Gain knowledge and awareness of the technologies for how to effectively share spectrumthrough multiple access techniques i.e. TDMA, CDMA, FDMA etc.
5. Have in-depth understanding of the design consideration and architecture for differentWireless Systems like GSM, CDMA, GPRS etc

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PROFESSIONAL ELECTIVE-III

(R20A0418) DIGITAL CONTROL SYSTEMS

COURSE OBJECTIVES:

1. Basic and digital control system for the real time analysis
2. Design of control systems.
3. To provide comprehensive knowledge of concepts of stability analysis
4. Design of discrete time systems.
5. To expose the students to the concepts of optimal control for discrete domain.

UNIT – I

SAMPLING AND RECONSTRUCTION:

Introduction, Examples of Data control systems – Digital to Analog conversion and Analog toDigital conversion, sample and hold operations.

THE Z – TRANSFORMS:

Introduction, Linear difference equations, pulse response, Z – transforms, Theorems of Z – Transforms, the inverse Z – transforms, Modified Z- Transforms-Plane analysis of discrete- time control system, Z-Transform method for solving difference equations; Pulse transforms function, block diagram analysis of sampled – data systems, mapping between S-plane and Z-plane.

UNIT – II

STATE SPACE ANALYSIS:

State Space Representation of discrete time systems, Pulse Transfer Function Matrix solving discrete time state space equations, State transition matrix and it‘s Properties, Methods for Computation of State Transition Matrix, Discretization of continuous time state – space equations.

CONTROLLABILITY AND OBSERVABILITY:

Concepts of Controllability and Observability, Tests for controllability and observability. Duality between Controllability and Observability, Controllability and Observability conditions for Pulse Transfer Function.

UNIT – III

STABILITY ANALYSIS:

Mapping between the S-Plane and the Z-Plane – Primary strips and Complementary Strips – Constant frequency loci, Constant damping ratio loci, Stability Analysis of closed loop systems in the Z-Plane. Jury stability test – Stability Analysis by use of the Bilinear Transformation and Routh Stability criterion.

UNIT – IV

DESIGN OF DISCRETE TIME CONTROL SYSTEM BY CONVENTIONAL METHODS:

Transient and steady – State response Analysis – Design based on the frequency response method – Bilinear Transformation and Design procedure in the w-plane, Lead, Lag, Lead-Lag and Lag- Lead compensators and digital PID controllers.

UNIT – V

STATE FEEDBACK CONTROLLERS AND OBSERVERS:

Design of state feedback controller through pole placement – Necessary and sufficientconditions, Ackerman's formula. State Observers – Full order and Reduced order observers.

TEXT BOOKS:

1. Discrete-Time Control systems - K. Ogata, Pearson Education/PHI, 2nd Edition.
2. Digital Control and State Variable Methods by M.Gopal, TMH.
3. Digital Control System Analysis and Design, 3rd Edition by Charles L. Phillips, H. Troy Nagle.

REFERENCE BOOKS:

1. Digital Control Systems, Kuo, Oxford University Press, 2nd Edition, 2003.
2. Digital Control Engineering, M.Gopal New age international publishers.
3. Advanced Control Theory by NAGOOR KANI, 2nd Edition, RBA Publications.
4. Digital Control Systems, Design, Identification and Implementation by Landau, IonaDore,ZitoGianluca,Springer1st edition.
5. Digital control systems by R.Isermann, Springer; 1st edition.

COURSE OUTCOMES:

Upon completion of the course, the student will be able to:

1) Learn the basics and digital control system for the real time analysis
2) Design of control systems.
3) Learn comprehensive knowledge of concepts of stability analysis
4) Understand the design of discrete time systems
5) Understand the concepts of optimal control for discrete domain.

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III Year B.Tech. ECE- II Sem **L/T/P/C**
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PROFESSIONAL ELECTIVE-III

(R20A0419) DESIGN OF FAULT TOLERANT SYSTEMS

COURSE OBJECTIVES:

1. To create understanding of the fundamental concepts of fault-tolerance
2. To learn basic techniques for achieving fault-tolerance in electronics, communicationand software systems
3. To develop skills in modeling and evaluating fault-tolerant architectures in terms ofreliability, availability and safety
4. To gain knowledge in sources of faults and means for their prevention andforecasting
5. To understand merits and limitations of fault-tolerant design

UNIT – I: Fault Tolerant Design

Basic Concepts: Reliability Concepts, Failure & Faults, Reliability and Failure rate, Relation between Reliability and Meantime between failure, Maintainability and Availability, Reliability of series, Parallel and Parallel-Series combinational circuits

Fault Tolerant Design: Basic Concepts – Static, dynamic, Hybrid Triple Modular Redundant System, Self-purging redundancy, SIFT out redundancy (SMR), 5 MR Re-Configuration techniques, Use of Error Correcting codes, Time redundancy and software redundancy

UNIT – II: Self Checking Circuits & Fail Safe Design

Self-Checking circuits: Basic concepts of self-checking circuits, Design of Totally self-checkingchecker, checkers using m out of n codes, Berger code, Low cost residue code

Fail Safe Design: Strongly fault secure circuits, fail safe design of sequential circuits usingpartition theory and Berger code

UNIT – III ATPG Fundamentals & Design for Testability for Combinational Circuits

Introduction to ATPG, ATPG Process – Testability and Fault analysis methods – Faultmasking, Transition delay fault, Path delay

Design for Testability for Combinational Circuits: Basic concepts of Testability, Controllability and Observability, The Reed Muller's expansion technique, OR-AND-OR Design, Use of control and Syndrome Testable Designs

UNIT – IV Scan Architectures & Techniques

Introduction to Scan Based testing, Functional testing, The Scan Effective Circuit, The MUX-DStyle Scan flip-flops, The Scan shift register, Scan cell operation

Scan Test Sequencing, Scan test timing, Partial Scan, Multiple Scan Chains, Scan based Design rules (LSSD), At-speed scan testing and Architecture, multiple clock and scan domain operation, critical paths for at speed scan test

UNIT – V Built in Self-Test (BIST)

BIST concepts, Test Pattern generation for BIST exhaustive testing, Pseudorandom testing, pseudo exhaustive testing, constant weight patterns, Generic offline BIST architectures, Memory Test architecture, BILBO

TEXT BOOKS:

1. Fault Tolerant & Fault Testable Hardware Design – Parag K. Lala, 1984, PHI.
2. Design for Test for Digital IC's and Embedded Core Systems – Alfred L. Crouch,2008, Pearson Education.

REFERENCES:

1. Digital Systems Testing and testable Design – Miron Abramovici, Melvin A. Breuerand Arthur D. Friedman, Jaico Books
2. Essentials of Electronic Testing - Bushnell & Vishwani D.Agarwal, Springers.

COURSE OUTCOMES:

On completion of this course, it is expected that the student will be able to:

1. Understand the fundamental concepts of fault-tolerance
2. Learn basic techniques for achieving fault-tolerance in electronics, communicationand software systems
3. Develop skills in modeling and evaluating fault-tolerant architectures in terms ofreliability, availability and safety
4. Gain knowledge in sources of faults and means for their prevention and forecasting
5. Understand merits and limitations of fault-tolerant design

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III Year B.Tech. ECE- II Sem **L/T/P/C**
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PROFESSIONAL ELECTIVE-IV

(R20A0420) SATELLITE COMMUNICATIONS

COURSE OBJECTIVES:

1) To prepare the student to excel in basic knowledge of satellite communication principles.
2) To provide students with solid foundation in orbital mechanics and launches for the satellite communication
3) To train the students with the basic knowledge of link design of satellite with a design examples.
4) To provide the better understanding of multiple access systems and earth station technology.
5) To prepare the students with knowledge in satellite navigation and GPS and satellite packet communication

UNIT -I:

Communication Satellite: Orbit and Description: A Brief history of satellite Communication, satellite Frequency Bands, Satellite Systems, Applications, Orbital Period and Velocity, effects of orbital Inclination, Azimuth and Elevation, Coverage angle and slant Range, Eclipse, Orbital Perturbations, Placement of a Satellite in a Geo-Stationary orbit.

UNIT -II:

Satellite Sub-Systems: Attitude and Orbit Control system, TT&C subsystem, Attitude Control subsystem, Power systems, Communication subsystems, Satellite Antenna Equipment.
Satellite Link: Basic Transmission Theory, System Noise Temperature and G/T ratio, Basic Link Analysis, Interference Analysis, Design of satellite Links for a specified C/N, (With and without frequency Re-use), Link Budget.

UNIT -III:

Propagation Effects:Introduction, Atmospheric Absorption, Cloud Attenuation, Tropospheric and Ionospeheric Scintillation and Low angle fading, Rain induced attenuation, rain induced cross polarization interference. Multiple Access:Frequency Division Multiple Access (FDMA) - Intermodulation, Calculation of C/N, Time Division Multiple Access (TDMA) -Frame Structure, Burst Structure, Satellite switched TDMA, On-board Processing, Demand Assignment Multiple Access (DAMA) –Types of Demand Assignment, Characteristics, CDMA Spread Spectrum Transmission and Reception.

UNIT -IV:

Earth Station Technology: Transmitters, Receivers, Antennas, Tracking Systems, Terrestrial Interface, Power Test Methods, Lower Orbit Considerations.Satellite Navigation and Global Positioning Systems:Radio and Satellite Navigation, GPS Position Location Principles, GPS Receivers, GPS C/A Code Accuracy, Differential GPS.

UNIT -V:

Satellite Packet Communications: Message Transmission by FDMA: M/G/1 Queue, Message Transmission by TDMA, PURE ALOHA-Satellite Packet Switching, Slotted Aloha, Packet Reservation, Tree Algorithm.

TEXT BOOKS:

1) Satellite Communications –Timothy Pratt, Charles Bostian, Jeremy Allnutt, 2ndEdition, 2003, John Wiley & Sons.
2) Satellite Communications Engineering –Wilbur, L. Pritchand, Robert A. Nelson and Heuri
3) G. Suyderhoud, 2ndEd., Pearson Publications.
4) Digital Satellite Communications-Tri.T.Ha, 2ndEdition, 1990, Mc.Graw Hill.

REFERENCE BOOKS:

1) Satellite Communications-Dennis Roddy, 2ndEdition, 1996, McGraw Hill.
2) Satellite Communications: Design Principles –M. Richcharia, 2ndEd., BSP, 2003.
3) Digital Satellite Communications –Tri. T. Ha, 2ndEd., MGH, 1990.
4) Fundamentals of Satellite Communications –K. N. Raja Rao, PHI, 2004.

COURSE OUTCOMES

1) Student will understand the historical background, basic concepts and frequency allocations for satellite communications
2) Students will demonstrate the orbital mechanics, launch vehicles and launchers
3) Student will demonstrate the design of satellite links for specified C/N with system design examples
4) Students will be able to visualize satellites sub systems like telemetry, tracking, command and monitoring power systems etc.,
5) Students will understand the various multiple access systems for satellite communication systems and satellite packet communications

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III Year B.Tech. ECE- II Sem **L/T/P/C**
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PROFESSIONAL ELECTIVE-IV
(R20A0421) FIBER OPTICAL COMMUNICATIONS

COURSE OBJECTIVES:

1) To realize the significance of optical fiber communications.
2) To understand the construction and characteristics of optical fiber cable.
3) To develop the knowledge of optical signal sources and power launching.
4) To identify and understand the operation of various optical detectors.
5) To understand the design of optical systems and WDM.

UNIT I

OVERVIEW OF OPTICAL FIBER COMMUNICATION: Historical development, The general system, advantages of optical fiber communications. Optical fiber wave guides- Introduction, Ray theory transmission, Total Internal Reflection, Acceptance angle, Numerical Aperture, Skew rays. Cylindrical fibers- Modes, V number, Mode coupling, Step Index fibers, Graded Index fibers.
Single mode fibers- Cut off wavelength, Mode Field Diameter, Effective Refractive Index. Fiber materials — Glass, Halide, Active glass, Chalgenide glass, Plastic optical fibers.

UNIT II

SIGNAL DISTORTION IN OPTICAL FIBERS: Attenuation, Absorption, Scattering and Bending losses, Core and Cladding losses. Information capacity determination, Group delay, Types of Dispersion – Material dispersion, Wave-guide dispersion, Polarization mode dispersion, Intermodal dispersion. Pulse broadening. Optical fiber Connectors- Connector types, Single mode fiber connectors, Connector return loss.

UNIT III

FIBER SPLICING: Splicing techniques, Splicing single mode fibers. Fiber alignment and joint loss- Multimode fiber joints, single mode fiber joints, Optical sources- LEDs, Structures, Materials, Quantum efficiency, Power, Modulation, Power bandwidth product. Injection Laser Diodes- Modes, Threshold conditions, External quantum efficiency, Laser diode rate equations, Resonant frequencies. Reliability of LED & ILD.
SOURCE TO FIBER POWER LAUNCHING: Output patterns, Power coupling, Power launching, Equilibrium Numerical Aperture, Laser diode to fiber coupling.

UNIT IV

OPTICAL DETECTORS:Physical principles of PIN and APD, Detector response time, Temperature effect on Avalanche gain, Comparison of Photo detectors. Optical receiver operation- Fundamental receiver operation, Digital signal transmission, error sources, Receiver configuration, Digital receiver performance, Probability of error, Quantum limit, Analog receivers.

UNIT V

OPTICAL SYSTEM DESIGN : Considerations, Component choice, Multiplexing. Point-to- point links, System considerations, Link power budget with examples. Overall fiber dispersion in Multi mode and Single mode fibers, Rise time budget with examples.Transmission distance, Line coding in Optical links, WDM, Necessity, Principles, Types of WDM, Measurement of Attenuation and Dispersion, Eye pattern.

TEXT BOOKS:

1) Optical Fiber Communications – Gerd Keiser, Tata Mc Graw-Hill International edition, 4th Edition, 2008.
2) Optical Fiber Communications – John M. Senior, PHI, 2nd Edition, 2002.

RERFERENCE BOOKS:

1. Fiber Optic Communications – D.K. Mynbaev , S.C. Gupta and Lowell L. Scheiner,PearsonEducation, 2005.
2. Text Book on Optical Fibre Communication and its Applications – S.C.Gupta, PHI, 2005.
3. Fiber Optic Communication Systems – Govind P. Agarwal , John Wiley, 3rd Ediition, 2004.
4. Fiber Optic Communications – Joseph C. Palais, 4th Edition, Pearson Education,2004.

COURSE OUTCOMES:

1) Understand and analyze the constructional parameters of optical fibers.
2) Be able to design the optical system.
3) Estimate the losses due to attenuation, absorption, scattering andbending.
4) Compare various optical detectors and choose suitable one for different applications.
5) To understand the design of optical systems and WDM.

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III Year B.Tech. ECE- II Sem **L/T/P/C**
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PROFESSIONAL ELECTIVE-IV
(R20A0422) SPEECH AND AUDIO PROCESSING

COURSE OBJECTIVES:

1. Focus on the fundamentals of digital speech processing and their application to coding,synthesis and recognition.
2. Emphasize on how digital signal processing techniques can be applied in problems related tospeech communication.
3. Provide an overview of the way in which digital speech processing is being applied inpresent day applications.
4. To learn about Speech Enhancement
5. To learn about Speech and Speaker recognition.

UNIT – I

FUNDAMENTALS OF DIGITAL SPEECH PROCESSING

Anatomy & Physiology of Speech Organs, The process of Speech Production, The Acoustic Theory of Speech Production, Loss less tube models, Digital Speech Processing, Digital models for speech signals.

UNIT – II

TIME DOMAIN MODELS FOR SPEECH PROCESSING

Introduction- Window considerations, Short time energy and average magnitude Short time average zero crossing rate ,Speech vs. silence discrimination using energy and zero crossing, Pitch period estimation using a parallel processing approach, The short time autocorrelation function, The short time average magnitude difference function, Pitch period estimation using the autocorrelation function.

UNIT – III

LINEAR PREDICTIVE CODING (LPC) ANALYSIS

Basic principles of Linear Predictive Analysis: The Autocorrelation Method, The Covariance Method, Solution of LPC Equations: Cholesky Decomposition Solution for Covariance Method, Durbin's Recursive Solution for the Auto Correlation Equations, Comparison between the Methods of Solution of the LPC Analysis Equations, Applications of LPC Parameters: Pitch Detection using LPC Parameters, Formant Analysis using LPC Parameters.

UNIT – IV

SPEECH ENHANCEMENT

Nature of interfering sounds, Speech enhancement techniques: Single Microphone Approach: spectral subtraction, Wiener filter, Multi microphone Approach, Spectral restoration: MMSE-STSA, MMSE-LSA.

UNIT – V

SPEECH & SPEAKER RECOGNITION

Speech recognition

Basic pattern recognition approaches, parametric representation of speech, evaluating the similarity of speech patterns, Accommodating both spectral and temporal variability, Speech Recognition Systems: Isolated Digit Recognition System, Continuous digit Recognition System

Speaker recognition

Recognition techniques, features that distinguish speakers, Speaker Recognition Systems: Speaker Verification System, Speaker Identification System.

TEXT BOOKS:

1) Digital processing of speech signals - L.R Rabiner and S.W.Schafer. Pearson Education.
2) Speech Communications: Human & Machine - Douglas O'Shaughnessy, 2nd ed., IEEE Press.
3) Fundamental of speech recognition: L.R Rabinar, Biing-Hwang Jung, Pearson Education.

REFERENCES:

1) Discrete Time Speech Signal Processing: principles and Practice - Thomas F. Quateri 1 ed., PE.
2) Speech & Audio Signal Processing- Ben Gold & Nelson Morgan, 1 ed., Wiley.
3) Speech and Language Processing, Jurafsky, Pearson Education.
4) Voice and Speech Processing, Thomas Parsons, McGraw Hill Series
5) Signal Processing of Speech, Owens F.J., Macmillan New Electronics

COURSE OUTCOMES

1) Focus on the fundamentals of digital speech processing and their application to coding, synthesis and recognition.
2) Emphasize on how digital signal processing techniques can be applied inproblems related to speech communication.
3) Provide an overview of the way in which digital speech processing is being applied in present day applications.
4) Learn about Speech Enhancement
5) Learn about Speech and Speaker recognition.

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III Year B.Tech. ECE- II Sem **L/T/P/C**

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(R20A0487) MICROPROCESSORS AND MICROCONTROLLERS LAB

COURSE OBJECTIVES:

1) To study programming based on 8086 microprocessors and 8051 microcontrollers.
2) To study 8086 microprocessor based ALP using arithmetic, logical and shift operations.
3) To study to interface 8086 with I/O and other devices.
4) To study parallel and serial communication using 8051 microcontrollers.
5) Understand the operations of various study cards like 8257/37, stepper motor etc.

Note: - Minimum of 12 experiments has to be conducted

The Following programs/experiments are to be written for assembler and execute the same with 8086 and 8051 kits.

1) Programs for 16 bit arithmetic operations using 8086 (using Various Addressing Modes).
2) Program for sorting an array using 8086.
3) Program for searching a number or character in a string using 8086.
4) Program for string manipulations using 8086.
5) Program for digital clock design using 8086.
6) Interfacing ADC and DAC to 8086.
7) Parallel communication between two microprocessors using 8255.
8) Serial communication between two microprocessor kits using 8251.
9) Interfacing to 8086 and programming to control stepper motor.
10) Programming using arithmetic, logical and bit manipulation instructions of 8051.
11) Program and verify Timer/ Counter in 8051.
12) Program and verify Interrupt handling in 8051
13) UART Operation in 8051.
14) Communication between 8051 kit and PC.
15) Interfacing LCD to 8051.
16) Interfacing Matrix/ Keyboard to 8051.
17) Data Transfer from Peripheral to Memory through DMA controller 8237/8257.

COURSE OUTCOMES

1) Demonstrate ability to handle arithmetic operations using assembly language programming in MASM and training boards.
2) Work with standard microprocessor real time interfaces including serial ports, digital-to- analog converters and analog-to-digital converters.
3) Troubleshoot interactions between software and hardware.
4) Demonstrate ability to handle string instructions using assembly language programming in MASM.
5) Various applications of microcontrollers like LCD, KEYBOARD are learned.

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III Year B.Tech. ECE- II Sem **L/T/P/C**

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(R20A0) ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING LAB

COURSE OBJECTIVES:

1) Familiarity with the Prolog programming environment &Systematic introduction to Prolog programming constructs
2) Learning basic concepts of Prolog through illustrative examples and small exercises&Understanding list data structure in Prolog.
3) To introduce students to the basic concepts and techniques of Machine Learning.
4) To become familiar with regression methods, classification methods, clustering methods.
5) To become familiar with Dimensionality Reduction Techniques.

Study of PROLOG; Write the following programs using PROLOG

week-1. Implementation of DFS for water jug problem using LISP/PROLOG
week-2. Implementation of BFS for tic-tac-toe problem using LISP/PROLOG/Java
week-3. Solve 8-puzzle problem using best first search
week-4. Write a program to solve 8 queen's problem
week-5. Implementation of TSP using heuristic approach using Java/LISP/Prolog
week-6. Implementation of Simulated Annealing Algorithm using LISP/PROLOG
week-7. Implementation of Hill-climbing to solve 8- Puzzle Problem

Machine Learning Laboratory

Week-1

Data Extraction, Wrangling

1) Loading different types of dataset in Python
2) Arranging the data

Week-2

Data Visualization

1) **Handling missing values**
2) Plotting the graphs

Week-3

Supervised Learning

1) Implementation of Linear Regression
2) Implementation of Logistic regression

Week-4

Supervised Learning

1) Implementation of Decision tree classification
2) Implementation of K-nearest Neighbor

Week-5

Supervised Learning

1) Implementation of Naïve Bayes classifier algorithm
2) Implementation of SVM Classification

Week-6

Dimensionality Reduction

1) Implementation of PCA
2) Implementation of LDA

Week-7

Unsupervised Learning

1) Implementing K-means Clustering
2) Implementing Hierarchical Clustering

COURSE OUTCOMES

1) Apply various AI search algorithms (uninformed, informed, heuristic, constraint satisfaction,)
2) Understand the fundamentals of knowledge representation, inference and theorem proving using AI tools
3) Gain knowledge about basic concepts of Machine Learning
4) Identify machine learning techniques suitable for a given problem & Solve the problems using various machine learning techniques
5) Apply Dimensionality reduction techniques

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III Year B.Tech. ECE- I Sem **L/T/P/C**

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(R20A0492) APPLICATION DEVELOPMENT II

The topic should be selected / chosen to ensure a direct connectivity between theoretical fundamentals and applications and, thus reduce the gap between the world of work and the world of study.

The application should meet the following criteria

- Relevance to social needs of society
- Relevance to value addition to existing facilities in the institute
- Relevance to industry need
- Research and development in various domain

The student should complete the following:

- Literature survey related to Problem Definition
- Motivation for study and Objectives
- Preliminary design / feasibility / modular approaches
- Implementation and Verification
- Report and presentation

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MANDATORY COURSE – VI
(R20A0006) TECHNICAL COMMUNICATION AND SOFT SKILLS

INTRODUCTION:

'Technical Communication and Soft skills' focus on enhancing students' communication skills. Various technical writing styles and skills are developed. Students' placementneeds met by giving them an exposure to group discussions and mock interviews. Soft skills such as building positive relationships and teamwork are also emphasized.

The trainee hones these skills under the guidance ofthe instructor whose constant evaluation helps in the professional development of students. This course fulfils the need of the aspirants in acquiring and refining the skills required for placements and professional success.

COURSE OBJECTIVES:

1) To make the students recognize the role of technical English in their academic and professional fields
2) To improve language proficiency and to develop the required professional ethics
3) To equip students, organize, comprehend, write, and present, short and long forms of any technical work within the broad framework of the Scientific Method
4) To facilitate communication about projects and ideas throughout the industry and also to the non-technical people
5) To display professional behaviors and body language

UNIT I

Effective Presentations: Just-a-Minute sessions, Formal versus informal communication, Non-verbal communication; Concord: Subject-verb agreement.

UNIT II

Professional Communication: Role Plays, Persuasion techniques, Presentation aids, Body language, Importance of listening in effective communication; Email Writing, Business Letter Writing, Letters of complaint, enquiry, responses; Memo Writing; Transformation of Sentences.

UNIT III

Career Planning: Oral Presentations, Techniques of Listening Skills, types of Group discussions; Etiquette, Protocol; Resume Writing, cover letter, Writing a statement of purpose; Tenses.

UNIT IV

Technical Writing: Group Discussion, Principles of Effective Writing, Paragraph writing, Advanced Essay Writing, Expansion for or against the essay, Narrative essay, Descriptive essay; Technical Report Writing, Format &Style; Active & Passive Voice.

UNIT V

Academic Writing: Mock Interview sessions, facing interviews; Correction of Sentences

REFERENCE BOOKS:

1) R.K. Narayan, The Guide, Viking Press, 1958
2) David F. Beer and David Mc Murrey, Guide to writing as an Engineer, John Willey. New York, 2004.
3) Diane Hacker, Pocket Style Manual, Bedford Publication, New York, 2003. (ISBN 0312406843)
4) Shiv Khera, You Can Win, Macmillan Books, New York, 2003.
5) Raman Sharma, Technical Communications, Oxford Publication, London, 2004.
6) Meenakshi Raman, Prakash Singh, Business communication, Oxford Publication, New Delhi 2012.
7) Dale Jung k, Applied Writing for Technicians, McGraw Hill, New York, 2004. (ISBN: 07828357-4)
8) Sharma, R. and Mohan, K. Business Correspondence and Report Writing, TMH New Delhi 2002.
9) Xebec, Presentation Book, TMH New Delhi, 2000. (ISBN 0402213)

COURSE OUTCOMES:

After completion of the course, the Students will be able to

1) Understand information which assists in completion of the assigned job tasks more successfully.
2) Communicate his ideas by writing projects, reports, instructions, diagrams and many other forms of professional writing.
3) Adhere to ethical norms of scientific communication.
4) Strengthen their individual and collaborative work strategies.
5) Successfully market themselves and sell themselves to the employer of their choice.

OPEN ELECTIVE – III

S.NO	SUBJECT CODE	TITLE OF THE SUBJECT
1	R20A0453	ROBOTICS & AUTOMATION
2	R20A1254	BIG DATA ARCHITECTURE
3	R20A0554	INFORMATION SECURITY
4	R20A0555	CLOUD COMPUTING FUNDAMENTALS
5	R20A0352	DESIGN THINKING
6	R20A0065	BUSINESS ANALYTICS

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B.Tech. ECE- II Sem **L/T/P/C**
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OPEN ELECTIVE - III
(R20A0453) ROBOTICS AND AUTOMATION

COURSE OBJECTIVES:

1) To study overview of Embedded Systems, Robots, Microprocessors &Microcontrollers.
2) To study in detail about Robotics and sensors.
3) To study about AVR RISC Microcontroller architecture in detail.
4) To study about ARM Processor in detail.
5) To study about Artificial Intelligence in Robotics.

UNIT -I

Introduction to Embedded System Design, Categories of ES, Overview of Embedded System Architecture, Recent Trends in Embedded Systems, Hardware Architecture of Embedded System, Real-time Embedded Systems and Robots, Robots and Robotics, Microprocessors and Microcontrollers, Microcontroller or Embedded Controller

UNIT - II

Robotics: Classification of Robots, Degree of freedom, Kinematics; Multidisciplinary approach: Motors-DC motors, Stepper Motors, Servo Motors; Power Transmission-Type of Gears, Gear Assembly, CAM follower, Sensors, Open loop and Closed-loop Controls, Artificial Intelligence.

UNIT- III

The AVR RISC microcontroller architecture: Introduction, AVR family architecture, register file, the ALU, memory access and instruction execution, I/O memory, EEPROM, I/O ports, timers, UART, Interrupt structure.

UNIT-IV

ARM Processor: Fundamentals, Registers, current program status register, pipeline concept, Interrupt and the vector table.

UNIT V

AI IN ROBOTICS: Robotic perception, localization, mapping- configuring space, planning uncertain movements, dynamics and control of movement, Ethics and risks of artificial intelligence in robotics.

TEXT BOOKS:

1) Subrata Ghoshal, "Embedded Systems & Robots", Cengage Learning
2) Stuart Russell, Peter Norvig, “Artificial Intelligence: A modern approch”, Pearson Education, India2003.
3) ARM System Developer’s Guide: Designing and Optimizing System Software- Andrew N. Sloss, Dominic Symes, Chris Wright, Elsevier Inc., 2007

REFERENCE BOOKS:

1) M.A. Mazidi, J.G. Mazidi, R.D. Mckinlay, "8051 Microcontroller and Embedded Systems", Pearson.
2) Dr. K.V.K. Prasad, "Embedded/Real-Time Systems: Concepts Design & Programming", Dreamtech.
3) Microcontrollers and applications, Ajay V Deshmukh , TMGH,2005

COURSE OUTCOMES:

At the end of the course, the students will be able to

1) Understand the overview of Embedded Systems, Robots, Microprocessors & Microcontrollers.
2) Understand in detail about Robotics and sensors.
3) Understand AVR RISC Microcontroller architecture in detail.
4) Understand about ARM Processor in detail.
5) Understand about Artificial Intelligence in Robotics.

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III Year B.Tech. ECE- II Sem **L/T/P/C**
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OPEN ELECTIVE - III
(R20A1254) BIG DATA ARCHITECTURE

COURSE OBJECTIVES:

1) To introduce the terminology, technology and its applications
2) To introduce the concept of Analytics and Visualization
3) To demonstrate the Big Data Architecture and its components, tools
4) To introduce Apache Spark
5) To introduce Technology Landscape using NoSQL.

UNIT I

Big Data Introduction: Classification of Digital Data, Structured and Unstructured Data, Introduction to Big Data: Characteristics – Evolution – Definition - Challenges with Big Data - Other Characteristics of Data , Why Big Data - Traditional Business Intelligence versus Big Data, Importance of Big Data.

UNIT II:

Big Data Architecture Introduction: Big Data Architecture- Definition, Why Big Data Architecture. Evolution of Big Data Architecture, Market Trends, Big Data Architecture and Its Sources, Big Data Architecture Use Cases.

UNIT-III

Big Data architecture components: Data ingestion, Data storage, Data Computing, Data Analysis, Data Visualization. Understanding the Lambda architecture, HBase, Spark Libraries, Spark Streaming.

UNIT IV

Introducing Apache Spark : Introduction to Spark, Spark Architecture and its components, Features of Spark, Spark vs Hadoop, Challenges of Spark.

UNIT V

Introduction to Technology Landscape: NoSQL, Comparison of SQL and NoSQL, Hadoop -RDBMS Versus Hadoop - Distributed Computing Challenges – Hadoop Overview - Hadoop Distributed File System - Processing Data with Hadoop - Managing Resources and Applications with Hadoop YARN - Interacting with Hadoop Ecosystem

TEXT BOOKS:

1) Tom White — Hadoop: The Definitive Guide‖ Third Edit on, O‘reily Media,2012.
2) Seema Acharya, Subhasini Chellappan, "Big Data Analytics" Wiley 2015.

REFERENCE BOOKS:

1) Michael Berthold, David J. Hand, "Intelligent Data Analysis‖, Springer, 2007.
2) Jay Liebowitz, -Big Data and Business Analytics**||** Auerbach Publications, CRC press (2013)
3) Tom Plunkett, Mark Hornick, -Using R to Unlock the Value of Big Data: Big Data Analytics with Oracle R Enterprise and Oracle R Connector for Hadoop‖, McGraw-Hill/Osborne Media (2013), Oracle press.
4) Glen J. Myat, -Making Sense of Data**||**, John Wiley & Sons, 2007.
5) Pete Warden, -Big Data Glossary**||**, O'Reily, 2011.
6) Michael Mineli, Michele Chambers, Ambiga Dhiraj, "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses", Wiley Publications, 2013.
7) ArvindSathi, -BigDataAnalytics: Disruptive Technologies for Changing the Game**||**, MC Press, 2012
8) Paul Zikopoulos ,Dirk DeRoos , Krishnan Parasuraman , Thomas Deutsch , James Giles , David Corigan , "Harness the Power of Big Data The IBM Big Data Platform ", Tata McGraw Hill Publications

COURSE OUTCOMES:

Upon successful completion of the course, the student is able to

1. Identify Big Data and its Business Implications.
2. Categorize and summarize Big Data and its importance.
3. Acquire fundamental enabling techniques and scalable algorithms like Hadoop, Map Reduce in big data analytics
4. Compare various file systems and use an appropriate file system for storing different types of data.
5. Connect to web data sources for data gathering, Integrate data sources with Hadoop components to process streaming data.

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III Year B.Tech. ECE- II Sem **L/T/P/C**
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OPEN ELECTIVE - III
(R20A0554) INFORMATION SECURITY

COURSE OBJECTIVES:

1) To understand the basic concepts of cyber crimes.
2) To study different attacks in cyber crimes.
3) To understand different tools and methods used in cyber crime.
4) To study cyber security challenges and implications.
5) To know about Cyber Security.

UNIT I

Introduction to Cybercrime: Introduction, Cybercrime, and Information Security, Who are Cybercriminals, Classifications of Cybercrimes, And Cybercrime: The legal Perspectives and Indian Perspective, Cybercrime and the Indian ITA 2000, A Global Perspective on Cybercrimes.

UNIT II

Cyber Offenses: How Criminals Plan Them: Introduction, How Criminals plan the Attacks, Social Engineering, Cyber stalking, Cyber cafe and Cybercrimes, Botnets: The Fuel for Cybercrime, Attack Vector, Cloud Computing.

UNIT III

Cybercrime: Mobile and Wireless Devices: Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication service Security, Attacks on Mobile/Cell Phones, Mobile Devices: Security Implications for Organizations, Organizational Measures for Handling Mobile, Organizational Security Policies an Measures in Mobile Computing Era, Laptops.

UNIT IV

Tools and Methods Used in Cybercrime: Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Keyloggers and Spywares, Virus and Worms, Trojan Horse and Backdoors, Steganography, DoS and DDoS attacks, SQL Injection, Buffer Overflow.

UNIT V

Cyber Security: Organizational Implications. Introduction, Cost of Cybercrimes and IPR issues, Web threats for Organizations, Security and Privacy Implications, Social media marketing: Security Risks and Perils for Organizations, Social Computing and the associated challenges for Organizations.

TEXT BOOKS:

1) **Cyber Security:** *Understanding Cyber Crimes, Computer Forensics and Legal Perspectives*, Nina Godbole and Sunil Belapure, Wiley INDIA.

REFERENCE BOOKS:

1) Cyber Security Essentials, James Graham, Richard Howard and Ryan Otson, CRC Press.
2) Introduction to Cyber Security , Chwan-Hwa(john) Wu,J.David Irwin.CRC Press T&F Group

COURSE OUTCOMES:

1) Understand basic concepts of Cyber Crimes.
2) Ability to identify the attacks in Cyber Crimes
3) Able to specify the suitable methods used in CyberCrime
4) Ability to face cybersecurity challenges
5) Understand Cyber Security

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OPEN ELECTIVE - III
(R20A0555) CLOUD COMPUTING FUNDAMENTALS

COURSE OBJECTIVES:

1) To learn various system models for Distributed and Cloud Computing.
2) To understand about Virtual machines, Its Structure and mechanisms.
3) To learn Cloud Computing Paradigm.
4) To introduce the various levels of services that can be achieved by cloud.
5) To describe the security aspects in cloud.

UNIT- I

Systems Modeling: System Models for Distributed and Cloud Computing- Cloud Computing in a Nutshell, Layers and Types of Clouds , Desired Features of a Cloud , Infrastructure as a Service Providers ,Platform as a Service Providers , Challenges and Risks.

UNIT- II

Virtualization: Virtual machines, Implementation Levels of Virtualization -Virtualization Structures/Tools and Mechanisms-Virtualization of CPU, Memory, and I/O Devices

UNIT- III

Foundations: Introduction to Cloud Computing- Migrating into a Cloud-The Enterprise Cloud Computing Paradigm.

UNIT- IV

Infrastructure as a Service (IAAS) & Platform (PAAS): Virtual machines provisioning and Migration services-On the Management of Virtual machines for Cloud Infrastructures- Aneka—Integration of Private and Public Clouds.

UNIT- V

Software as a Service (SAAS) &Data Security in the Cloud: Google App Engine , An Introduction to the idea of Data Security- The Current State of Data Security in the Cloud- Cloud Computing and Data Security Risk- Cloud Computing and Identity.

TEXT BOOKS:

1) Distributed and Cloud Computing, Kaittwang Geoffrey C.Fox and Jack J Dongrra, Elsevier India 2012.
2) Mastering Cloud Computing- Raj Kumar Buyya, Christian Vecchiola and S.TanuraiSelvi, TMH, 2012.
3) Michael Miller, Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, Que Publishing, August 2008.

COURSE OUTCOMES:

1) Understanding various system models for Distributed and Cloud Computing.
2) Understanding about Virtual machines, Its Structure and mechanisms.
3) Learning Cloud Computing Paradigm.
4) Understanding the various levels of services that can be achieved by cloud.
5) Learning about security aspects in cloud.

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OPEN ELECTIVE - III
(R20A0352) DESIGN THINKING

COURSE OBJECTIVES:

1. **To understand the engineering design process and identification of customer need.**
2. **To understand innovative problem solving concepts.**
3. **To understand the principles of Design for Manufacturing and FMEA.**
4. **To know about the design for assembly principles.**
5. **To know about the concepts of design for environment and design for recycling.**

UNIT-I

Introduction: Innovations in Design, Engineering Design Process, Prescriptive and integrative models of design, Design Review and societal considerations.
Identification of Customer Need: Evaluating Customer requirements and survey on customer needs, Conversion of customer needs into technical Specifications, Information sources.

UNIT-II

Theory of Inventive Problem solving (TRIZ), Creativity and Problem solving, Functional Decomposition of the problem for innovative concept development, Introduction to Axiomatic Design, Concept evaluation and decision making.

UNIT-III

Design for Manufacturing: Technical estimating, design of experiments, design for manufacturability, statistical process control, Introduction to FMEA (failure modes and effects analysis), and Case study of design for manufacturing: Manufacturing System Design Based on Axiomatic Design: Case of Assembly Line

UNIT-IV

Design for Assembly: Assembly Principles, Process, Worksheet, Assumptions. Case study of design for Assembly: Manufacturing System Design Based on Axiomatic Design: Case of Assembly Line

UNIT-V

Design for Environment: Design for recycling; Design for disassembly, Design for energy Efficiency, Design for remanufacture, Design for disposability, Hazardous material minimization. Case study of design for Environment.

TEXT BOOKS:

1. **Nigel Cross, Engineering Design Methods, John Wiley, 2009.**
2. **George E. Dieter, Engineering Design, McGraw-Hill, 2009.**
3. **GenrichAltshuller, The Innovation Algorithm, Technical Innovation Centre, 2011.**

REFERENCE BOOKS

1. **The Art of Innovation, by Tom Kelley.**
2. **Design Thinking, by Nigel Cross.**
3. **The Design of Business: by Roger Martin.**

COURSE OUTCOMES:

- The importance of design in innovation.
- Design tools and processes can generate innovative new ideas.
- Design and design thinking to innovative in areas such as engineering, software development and business operations.
- Strengthen students' individual and collaborative capabilities to identify customer needs, create sound concept hypotheses, collect appropriate data, and develop a prototype that allows for meaningful feedback in a real-world environment.
- To describe the various case studies for design for environment.

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OPEN ELECTIVE - III
(R20A0065) BUSINESS ANALYTICS

COURSE OBJECTIVES:

- To help students in understanding how the managers use business analytics for managerial decision making.

Unit-I: Understanding Business Analytics

Introduction: Meaning of Analytics - Evolution of Analytics - Need of Analytics - Business Analysis vs. Business Analytics - Categorization of Analytical Models - Data Scientist vs. Data Engineer vs. Business Analyst - Business Analytics in Practice - Types of Data - Role of Business Analyst.

Unit-II: Dealing with Data and Data Science

Data: Data Collection - Data Management - Big Data Management - Organization/Sources of Data - Importance of Data Quality - Dealing with Missing or Incomplete Data - Data Visualization - Data Classification.
Data Science Project Life Cycle: Business Requirement - Data Acquisition - Data Preparation - Hypothesis and Modeling - Evaluation and Interpretation - Deployment - Operations - Optimization - Applications for Data Science

Unit-III: Data Mining and Machine Learning

Data Mining: The Origins of Data Mining - Data Mining Tasks - OLAP and Multidimensional Data Analysis - Basic Concept of Association Analysis and Cluster Analysis.
Machine Learning: History and Evolution - AI Evolution - Statistics vs. Data Mining vs. Data Analytics vs. Data Science - Supervised Learning - Unsupervised Learning - Reinforcement Learning - Frameworks for Building Machine Learning Systems.

Unit-IV: Applications of Business Analytics
Overview of Business Analytics Applications: Financial Analytics - Marketing Analytics - HR Analytics - Supply Chain Analytics - Retail Industry - Sales Analytics - Web & Social Media Analytics - Healthcare Analytics - Energy Analytics - Transportation Analytics - Lending Analytics - Sports Analytics - Future of Business Analytics.

Unit-V: Ethical, Legal and Organizational Issues
Issues & Challenges: Business Analytics Implementation Challenges - Privacy and Anonymizaiton - Hacking and Insider Threats - Making Customer Comfortable.

REFERENCES:

1. James R Evans, Business Analytics, Global Edition, Pearson Education
2. U Dinesh Kumar, Business Analytics, Wiley India Pvt. Ltd., New Delhi
3. Ger Koole, An Introduction to Business Analytics, Lulu.com, 2019
4. J.D. Camm, J.J. Cochran, M. J. Fry, J.W. Ohlmann, D.R. Anderson, D.J. Sweeney, T. A. Williams - *Essentials of Business Analytics*, 2e; Cengage Learning.
5. Vipin Kumar, Introduction to Data Mining, Pang-Ning Tan, Michael Steinbach, Pearson Education India
6. Bhimasankaram Pochiraju, Sridhar Seshadri, Essentials of Business Analytics: An Introduction to the Methodology and its Application, Springer

Course Outcomes:

- The students will be familiar with the practices of analyzing and reporting the business data useful for the insights of business growth and development.

IV YEAR B.TECH I SEMESTER SYLLABUS

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IV Year B.Tech. ECE- I Sem **L/T/P/C**
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(R20A0419) VLSI DESIGN

COURSE OBJECTIVES:

1) To understand MOS transistor fabrication processes.
2) To understand basic circuit concepts
3) To have an exposure to the design rules to be followed for drawing the layout of circuits
4) Design of building blocks using different approaches.
5) To have a knowledge of the testing processes of CMOS circuits.

UNIT I

Introduction: Brief Introduction to IC technology- Moore's Law, Microelectronic Evolution, Fabrication: NMOS, CMOS (n-well, p-well, Twin-tub)

Basic Electrical Properties of MOS Transistor: I_{DS} - V_{DS} relationships, MOS transistor Threshold Voltage-V_T, figure of merit-ω_0, Transconductance- g_m, g_{ds}; Pass transistor, NMOS Inverter, Pull-up to pull-down ratio of NMOS Inverter driven by another NMOS inverter (Z=4:1), Various pull ups, CMOS Inverter analysis and design.

UNIT II

VLSI Circuit Design Processes: VLSI Design Flow (Y-Chart), MOS Layers, Stick Diagrams, Design Rules and Layout, Lambda(λ)-based design rules for wires, contacts and Transistors, Layout Diagrams for NMOS and CMOS Inverters and Gates

Scaling

Scaling of MOS circuits, Limitations of Scaling

UNIT III

Gate level Design: Logic gates (AOI, OAI), Switch logic (TG), Alternate gate circuits (Pseudo NMOS, Dynamic Logic Circuits, Domino logic circuits, Clocked-CMOS, NP Logic).

Concepts: Sheet Resistance Rs and its concepts to MOS, Area Capacitances calculations, Inverter Delays, Driving large Capacitive Loads, Wiring Capacitances, Fan-in and fan-out.

UNIT IV

Subsystem Design: Adders, Multipliers

VLSI Design styles: Full-custom, Semi-custom, Standard Cells, Gate-arrays, FPGAs, CPLDs, Parameters influencing low power design.

UNIT V

CMOS Testing: Need for Testing, Test Principles- Fault models, observability, controllability, ATPG, Design for testability: Ad-hoc based testing, Scan-based Design, BIST.

TEXT BOOKS:

1) Essentials of VLSI Circuits and Systems, Kamran Eshraghian, Eshraghian Dougles, A. Pucknell, 2005, PHI.
2) Modern VLSI Design – Wayne Wolf, 3 Ed., 1997, Pearson Education.
3) CMOS VLSI Design-A Circuits and Systems Perspective, Neil H.E Weste, David Harris, Ayan Banerjee, 3rd Edn, Pearson, 2009.

REFERENCE BOOKS:

1) Introduction to VLSI Systems: A Logic, Circuit and System Perspective – Ming-BO Lin, CRC Press, 2011.
2) Principals of CMOS VLSI Design – N.H.E Weste, K. Eshraghian, 2 Ed., AddisonWesley.
3) VLSI Design-K.Lal Kishore,V.S.V.Prabhakar,I.K.International,1997.
4) Introduction to VLSI Design-Mead & Convey,BS Publications,2010.
5) CMOS Logic Circuit Design-John P.Uyemura, Springer, 2007.

COURSE OUTCOMES

1) Acquire quality knowledge about the fabrication process of IC using MOSTransistor
2) Draw the layout of any logic circuits which helps to understand and estimate parasitic of any logic circuit
3) Provide design concepts required to design building blocks of data path usinggates.
4) Design simple logic circuits using PLA, PAL, FPGA and CPLD
5) Understand different types of faults that can occur in a system and learn the concept of testing and adding extra hardware to improve the testability of the system.

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(R20A0420) MICROWAVE ENGINEERING

COURSE OBJECTIVES:

1. To analyze Waveguides in Rectangular Coordinate Systems.
2. To Use S-parameter terminology to describe circuits.
3. To explain how microwave devices and circuits are characterized in terms of their "S" Parameters.
4. To Use microwave components such as isolators, Couplers, Circulators, Tees, Gyrators etc..
5. To give students an understanding of basic microwave devices (both amplifiers and oscillators).
6. To expose the students to the basic methods of microwave measurements.

UNIT I

Waveguides: Introduction, Microwave spectrum and bands, applications of Microwaves, Rectangular Waveguides-Solution of Wave Equation in Rectangular Coordinates, TE/TM mode analysis, Expressions for fields, Cutoff frequencies, dominant and degenerate modes, Mode characteristics - Phase and Group velocities, wavelengths and impedance relations, Impossibility of TEM Modes, Illustrative Problems.

UNIT II

Waveguide Components: Scattering Matrix - Significance, Formulation and properties, Wave guide multiport junctions - E plane and H plane Tees, Magic Tee, 2-hole Directional coupler, S Matrix calculations for E plane and H plane Tees, Magic Tee, Directional coupler, Ferrite components - Gyrator, Isolator, Circulator, Illustrative Problems.

UNIT III

Linear beam Tubes: Limitations and losses of conventional tubes at microwave frequencies, Classification of Microwave tubes, **O type tubes** - 2 cavity klystrons-structure, velocity modulation process and Applegate diagram, bunching process and small signal theory Expressions for o/p power and efficiency, Reflex Klystrons-structure, Velocity Modulation, Applegate diagram, power output, efficiency.

UNIT IV

Cross-field Tubes: Introduction, Magnetrons-different types, cylindrical travelling wave magnetron-Hull cutoff and Hartree conditions.

Microwave Semiconductor Devices: Introduction to Microwave semiconductor devices, classification, Transfer Electronic Devices, Gunn diode - principles, RWH theory, Characteristics, Basic modes of operation - Gunn oscillation modes,Introduction to Avalanche Transit time devices (brief treatment only), Illustrative Problems.

UNIT V

Microwave Measurements: Description of Microwave Bench – Different Blocks and their Features, Waveguide Attenuators – Resistive Card, Rotary Vane types; Microwave Power Measurement – Bolometer Method. Measurement of Attenuation, Frequency, VSWR, Impedance Measurements.

TEXT BOOKS:

1) Microwave Devices and Circuits – Samuel Y. Liao, PHI, 3rd Edition,1994.
2) Microwave and Radar Engineering- M.Kulkarni, Umesh Publications,1998.

REFERENCES:

1) Foundations for Microwave Engineering – R.E. Collin, IEEE Press, John Wiley, 2nd Edition, 2002.
2) Microwave Circuits and Passive Devices – M.L. Sisodia and G.S.Raghuvanshi, Wiley Eastern Ltd., New Age International Publishers Ltd., 1995.
3) Microwave Engineering Passive Circuits – Peter A. Rizzi, PHI, 1999.
4) Electronic and Radio Engineering – F.E. Terman, McGraw-Hill, 4th ed., 1955.
5) Elements of Microwave Engineering – R. Chatterjee, Affiliated East-West Press Pvt. Ltd., New Delhi,1988.

COURSE OUTCOMES

1) Understand the significance of microwaves and microwave transmission lines
2) Analyze the characteristics of microwave tubes and compare them
3) Be able to list and explain the various microwave solid state devices
4) Can set up a microwave bench for measuring microwave parameters
5) Expose to the basic methods of microwave measurements.

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(R20A0421) EMBEDDED SYSTEM DESIGN

COURSE OBJECTIVES:

1) Understand the basics of an embedded system.
2) Program an embedded system.
3) To learn the design process of embedded system applications.
4) To understands the RTOS and inter-process communication.
5) To understand different communication interfaces.

UNIT –I

INTRODUCTION TO EMBEDDED SYSTEMS:

Complex systems and microprocessors-embedding computers, characteristics of embedded computing applications, challenges in embedded computing system design, performance in embedded computing; The embedded system design process-requirements, specification, architecture design, designing hardware and software, components, system integration.

UNIT –II

TYPICAL EMBEDDED SYSTEM:

Core of the embedded system-general purpose and domain specific processors, ASICs, PLDs, COTs; Memory-ROM, RAM, memory according to the type of interface, memory selection for embedded systems; Sensors, actuators and other components, seven segment LED, relay, piezo buzzer, push button switch, reset circuit, brownout protection circuit, oscillator circuit real time clock, watch dog timer.

UNIT –III

EMBEDDED FIRMWARE DESIGN AND DEVELOPMENT:

Embedded firmware design approaches-super loop based approach, operating system based approach; Embedded firmware development languages-assembly language based development, high level language based development; Programming in embedded c.

UNIT –IV

RTOS BASED EMBEDDED SYSTEM DESIGN:

Operating system basics, types of operating systems, tasks, process and threads, multiprocessing and multitasking, task scheduling: non-preemptive and pre-emptive scheduling; task communication-shared memory, message passing.

UNIT –V

COMMUNICATION INTERFACE:

Onboard communication interfaces-I2C, SPI, UART,1-wire interface, parallel interface; External communication interfaces-RS232 and RS485, USB, infrared, Bluetooth, wi-Fi, Zigbee, GPRS;

TEXT BOOKS:

1) Computers as Components –Wayne Wolf, Morgan Kaufmann (second edition).
2) Introduction to Embedded Systems - shibu k v, Mc Graw Hill Education.

REFERENCE BOOKS:

1) Embedded System Design -frank vahid, tony grivargis, john Wiley.
2) Embedded Systems- An integrated approach - Lyla b das, Pearson education 2012.
3) Embedded Systems – Raj kamal, TMH
4) An embedded Software Primer, David e Simon, Pearson education

COURSE OUTCOMES

1) Understand and design the embedded systems
2) Learn the basics of OS and RTOS
3) Understand types of memory and interfacing to external world
4) Understand embedded firmware design approaches
5) Understand different communication interfaces.

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CORE ELECTIVE - III
(R20A0422) RADAR SYSTEMS

COURSE OBJECTIVES:

1) To learn Radar Fundamentals like Radar Equation, Operating frequencies& Applications.
2) To understand the basic concepts of different types of Radars for surveillance & Tracking.
3) To know the various types of tracking techniques involved.
4) To understand Radar Receivers, MTI filters, displays and antennas.
5) To learn about Electronic warfare.

UNIT I

Basics of Radar: Introduction, Maximum Unambiguous Range, Radar Waveforms, Simple form of Radar Equation, Radar Block Diagram and Operation, Radar Frequencies and Applications, Prediction of Range Performance, Minimum Detectable Signal, Receiver Noise, Modified Radar Range Equation, Related Problems.

Radar Equation: SNR, Envelope Detector-False Alarm Time and Probability, Integration of Radar Pulses, Radar Cross Section of Targets (simple targets - sphere, cone-sphere), Transmitter Power, PRF and Range Ambiguities, System Losses (qualitative treatment), Related Problems.

UNIT-II

CW and Frequency Modulated Radar: Doppler Effect, CW Radar – Block Diagram, Isolation between Transmitter and Receiver, Non-zero IF Receiver, Receiver Bandwidth Requirements, Applications of CW radar, Related Problems.

FM-CW Radar: FM-CW Radar, Range and Doppler Measurement, Block Diagram and Characteristics (Approaching/ Receding Targets), FM-CW altimeter, Multiple Frequency CW Radar.

UNIT-III

MTI and Pulse Doppler Radar: Introduction, Principle, MTI Radar with - Power Amplifier Transmitter and Power Oscillator Transmitter, Delay Line Cancellers – Filter Characteristics, Blind Speeds, Double Cancellation, Staggered PRFs. Range Gated Doppler Filters. MTI Radar Parameters, Limitations to MTI Performance, MTI versus Pulse Doppler Radar.

Tracking Radar: Tracking with Radar, Sequential Lobing, Conical Scan, Monopulse Tracking Radar – Amplitude Comparison Monopulse (one- and two- coordinates), Angular Accuracy, Tracking in Range, Acquisition and Scanning Patterns, Comparison of Trackers.

Detection of Radar Signals in Noise: Introduction, Matched Filter Receiver – Response Characteristics and Derivation, Correlation Function and Cross-correlation Receiver, Efficiency of Non-matched Filters, Matched Filter with Non-white Noise.

UNIT-IV

Detection of Radar Signals in Noise: Introduction, Matched Filter Receiver – Response, Characteristics and Derivation, Correlation Function and Cross-correlation Receiver, Efficiency of Non-matched Filters, Matched Filter with Non-white Noise.

UNIT-V

Radar Receivers: Noise Figure and Noise Temperature, Displays – types, Duplexers-Branch and Balanced Types, Introduction to Phased Arrays Antennas –Basic Concepts, Radiation Pattern, Beam Steering and Beam Width changes, Applications, Advantages and Limitations.

TEXT BOOK:

1) Introduction to Radar Systems – Merrill I. Skolnik, TMH Special Indian Edition, 2nd Edition, Tata McGraw-Hill, 2007.

REFERENCES:

1) Introduction to Radar Systems – Merrill I. Skolnik, 3rd Edition Tata McGraw-Hill,2001.
2) Radar: Principles, Technology, Applications-Byron Edde, Pearson Education, 2004.
3) Principles of Modern Radar: Basic Principles-Mark A. Richards, James A. Scheer, William A. Holm, Yesdee,2013.
4) 'Radar Hand Book ' Ed. By M.I Skolnik, 2nd Edition, Tata McGraw Hill.
5) 'Understanding Radar Systems' by Simon Kinsley and Shaun Quegan, Scitech Publishing, McGraw-Hill.

COURSE OUTCOMES

1) Demonstrate an understanding of the factors affecting the radar performance using Radar Range Equation.
2) Analyze the principle of FM-CW radar and apply it in FM-CW Altimeter.
3) Differentiate between a MTI Radar and a Pulse Doppler Radar based on their working principle.
4) Demonstrate an understanding of the importance of Matched Filter Receivers in Radars.
5) Familiarize with the different types of Radar Displays and their application in real time scenario

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CORE ELECTIVE - III
(R20A0423) DIGITAL SIGNAL PROCESSORS AND ARCHITECTURES

COURSE OBJECTIVES:

1) To introduce architectural features of programmable DSP Processors of TI and Analog Devices.
2) To recall digital transform techniques.
3) To give practical examples of DSP Processor architectures for betterunderstanding.
4) To develop the programming knowledge using Instruction set of DSP Processors.
5) To understand interfacing techniques to memory and I/O devices.

UNIT I

Introduction to Digital Signal Processing: Introduction, A Digital signal-processing system, The sampling process, Discrete time sequences. Discrete Fourier Transform (DFT) and Fast Fourier Transform (FFT), Linear time- invariant systems, Digital filters, Decimation and interpolation.

Computational Accuracy in DSP Implementations: Number formats for signals and coefficients in DSP systems, Dynamic Range and Precision, Sources of error in DSP implementations, A/D Conversion errors, DSP Computational errors, D/A Conversion Errors, Compensating filter.

UNIT –II

Architectures for Programmable DSP Devices: Basic Architectural features, DSP Computational Building Blocks, Bus Architecture and Memory, Data Addressing Capabilities, Address Generation UNIT, Programmability and Program Execution, Speed Issues, Features for External interfacing.

UNIT -III

Programmable Digital Signal Processors: Commercial Digital signal-processing Devices, Data Addressing modes of TMS320C54XX DSPs, Data Addressing modes of TMS320C54XX Processors, Memory space of TMS320C54XX Processors, Program Control, TMS320C54XX instructions and Programming, On-Chip Peripherals, Interrupts of TMS320C54XX processors, Pipeline operation of TMS320C54XX Processors.

UNIT –IV

Analog Devices Family of DSP Devices: Analog Devices Family of DSP Devices – ALU and MAC block diagram, Shifter Instruction, Base Architecture of ADSP 2100, ADSP-2181 high performance Processor.

Introduction to Blackfin Processor - The Blackfin Processor, Introduction to Micro Signal Architecture, Overview of Hardware Processing Units and Register files, Address Arithmetic Unit, Control Unit, Bus Architecture and Memory, Basic Peripherals.

UNIT –V

Interfacing Memory and I/O Peripherals to Programmable DSP Devices: Memory space organization, External bus interfacing signals, Memory interface, Parallel I/O interface, Programmed I/O, Interrupts and I/O, Direct memory access (DMA).

TEXT BOOKS:

1) Digital Signal Processing – Avtar Singh and S. Srinivasan, Thomson Publications,2004.
2) A Practical Approach to Digital Signal Processing - K Padmanabhan, R. Vijayarajeswaran, Ananthi. S, New Age International, 2006/2009
3) Embedded Signal Processing with the Micro Signal Architecture Publisher: Woon-Seng Gan, Sen M. Kuo, Wiley-IEEE Press, 2007

REFERENCE BOOKS:

1) Digital Signal Processors, Architecture, Programming and Applications – B. Venkataramani and M. Bhaskar, 2002, TMH.
2) Digital Signal Processing – Jonatham Stein, 2005, John Wiley.
3) DSP Processor Fundamentals, Architectures & Features – Lapsley et al. 2000, S. Chand & Co. 4.Digital Signal Processing Applications Using the ADSP-2100 Family by The Applications Engineering Staff of Analog Devices, DSP Division, Edited by Amy Mar, PHI
4) The Scientist and Engineer's Guide to Digital Signal Processing by Steven W. Smith, Ph.D., California Technical Publishing, ISBN 0-9660176-3-3, 1997 6.Embedded Media Processing by David J. Katz and Rick Gentile of Analog Devices, Newnes, ISBN 0750679123, 2005

COURSE OUTCOMES

1) Understand architectural features of programmable DSP Processors of TI and Analog Devices.
2) Understand digital transform techniques.
3) Understand practical examples of DSP Processor architectures for betterunderstanding.
4) Develop the programming knowledge using Instruction set of DSP Processors.
5) Understand interfacing techniques to memory and I/O devices.

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IV Year B.Tech. ECE- I Sem **L/T/P/C**
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CORE ELECTIVE - III
(R20A0424) MULTIMEDIA SIGNAL CODING

COURSE OBJECTIVES:

1) To provide an introduction to the fundamental principles and techniques in Multimedia Signal coding and compression.
2) To give an overview of current multimedia standards and technologies.
3) To provide techniques related to computer and multimedia networks.
4) To provide knowledge related to Multimedia Network Communications and Applications
5) To learn Audio Compression Techniques.

UNIT-I

Introduction to Multimedia: Multimedia, World Wide Web, Overview of Multimedia Tools, Multimedia Authoring, Graphics/ Image Data Types, and File Formats.

Color in Image and Video: Color Science – Image Formation, Camera Systems, Gamma Correction, Color Matching Functions, CIE Chromaticity Diagram, Color Monitor Specifications, Out-of-Gamut Colors, White Point Correction, XYZ to RGB Transform, Transform with Gamma Correction, L*A*B* Color Model. Color Models in Images – RGB Color Model for CRT Displays, Subtractive Color: CMY Color Model, Transformation from RGB to CMY, Under Color Removal: CMYK System, Printer Gamuts, Color Models in Video – Video Color Transforms, YUV Color Model, YIQ Color Model, Ycbcr Color Model.

UNIT-II

Video Concepts: Types of Video Signals, Analog Video, Digital Video.

Audio Concepts: Digitization of Sound, Quantization and Transmission of Audio.

UNIT-III

Compression Algorithms:

Lossless Compression Algorithms: Run Length Coding, Variable Length Coding, Arithmetic Coding, Lossless JPEG, Image Compression. **Lossy Image Compression Algorithms:** Transform Coding: KLT And DCT Coding, Wavelet Based Coding. **Image Compression Standards:** JPEG and JPEG2000.

UNIT-IV

Video Compression Techniques: Introduction to Video Compression, Video Compression Based on Motion Compensation, Search for Motion Vectors, H.261- Intra-Frame and InterFrame Coding, Quantization, Encoder and Decoder, Overview of MPEG1 and MPEG2.

UNIT-V

Audio Compression Techniques: ADPCM in Speech Coding, G.726 ADPCM, Vocoders – Phase Insensitivity, Channel Vocoder, Formant Vocoder, Linear Predictive Coding, CELP, Hybrid Excitation Vocoders, MPEG Audio – MPEG Layers, MPEG Audio Strategy, MPEG Audio Compression Algorithms, MPEG-2 AAC, MPEG-4 Audio.

TEXT BOOKS:

1) Fundamentals of Multimedia – Ze- Nian Li, Mark S. Drew, PHI, 2010.
2) Multimedia Signals & Systems – Mrinal Kr. Mandal Springer International Edition 1st Edition, 2009.

REFERENCE BOOKS:

1) Multimedia Communication Systems – Techniques, Stds & Netwroks K.R. Rao, Zorans. Bojkoric, Dragorad A. Milovanovic, 1st Edition, 2002.
2) Fundamentals of Multimedia Ze- Nian Li, Mark S.Drew, Pearson Education (LPE), 1st Edition, 2009.
3) Multimedia Systems John F. Koegel Bufond Pearson Education (LPE), 1st Edition,2003.
4) Digital Video Processing – A. Murat Tekalp, PHI, 1996.
5) Video Processing and Communications – Yaowang, Jorn Ostermann, Ya-QinZhang, Pearson, 2002.

COURSE OUTCOMES

1) Upon successfully completion of the course, the student should:
2) Understand the fundamentals behind the multimedia signal processing
3) Understand the fundamentals behind the multimedia compression
4) Understand the basic principles behind the existing multimedia compression and communication standards
5) Understand future multimedia technologies and apply the acquired knowledge to specific multimedia related problems and projects at work

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV Year B.Tech. ECE- I Sem **L/T/P/C**
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CORE ELECTIVE - IV
(R20A0425) IMAGE AND VIDEO PROCESSING

COURSE OBJECTIVES:

1) To understand the basic fundamentals of digital image processing and Image Transforms.
2) To Master the Image Processing Techniques in Spatial Domain and Frequency Domain.
3) To learn the fundamentals of various Image compression models.
4) To understand the Basic Steps of Video Processing
5) To learn the Mathematical and computational skills needed to understand the principal of 2-D Motion Estimation

UNIT I

Fundamentals of Image processing and Image Transforms: Digital Image fundamentals, sampling and quantization of an Image, Relationship between pixels.
Image Transforms: 2 – D Discrete Fourier Transform, Properties, Discrete Cosine Transform (DCT), Hadamard Transform.

UNIT II

Image Processing Techniques: Image Enhancement: Spatial Domain methods: Histogram Processing, Fundamentals of Spatial Filtering, Smoothing Spatial filters, Sharpening Spatial filters Frequency Domain methods: Basics of filtering in frequency domain, image smoothing, image sharpening, **Image Restoration:** Degradation Model, Inverse Filtering, Least Mean Square Filters, Constrained Least Square Restoration.

UNIT III

Image Compression: Image compression fundamentals – coding Redundancy, spatial and temporal redundancy. Compression models : Lossy and Lossless, Huffmann coding, Arithmetic coding, run length coding, transform coding, predictive coding , JPEG standards.

UNIT IV

Basic Steps of Video Processing: Analog video, Digital Video, Time varying Image Formation model, Geometric Image formation, sampling of video signal.

UNIT V

2-D Motion Estimation: Optical flow, pixel based motion estimation, Region based motion estimation, multi resolution motion estimation, Application of motion estimation in video coding.

TEXT BOOKS

1) Gonzaleze and Woods ,"Digital Image Processing ", 3rd edition , Pearson
2) Yao wang, Joem Ostarmann and Ya – quin Zhang, "Video processing and communication ",1st edition , PHI

REFERENCE BOOKS

1) M. Tekalp ,"Digital video Processing", Prentice Hall International

COURSE OUTCOMES

1) Understand the basic fundamentals of digital image processing and Image Transforms.
2) Master the Image Processing Techniques in Spatial Domain and Frequency Domain.
3) Learn the fundamentals of various Image compression models.
4) Understand the Basic Steps of Video Processing.
5) Learn the Mathematical and computational skills needed to understand the principle of 2-D Motion Estimation

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IV Year B.Tech. ECE- I Sem **L/T/P/C**
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CORE ELECTIVE - IV
(R20A0523) BIG DATA ANALYTICS

COURSE OBJECTIVES:

1) To provide an overview of an exciting growing field of big data analytics.
2) To introduce the tools required to manage and analyze big data like Hadoop, NoSql MapReduce.
3) To demonstrate the Big Data Architecture and its components, tools.
4) To teach the fundamental techniques and principles in achieving big data analytics with scalability and streaming capability.
5) To enable students to have skills that will help them to solve complex real-world problems in for decision support.

UNIT I

INTRODUCTION TO BIG DATA AND ANALYTICS: Classification of Digital Data, Structured and Unstructured Data - Introduction to Big Data: Characteristics – Evolution – Definition - Challenges with Big Data - Other Characteristics of Data - Why Big Data - Traditional Business Intelligence versus Big Data - Data Warehouse and Hadoop Environment Big Data Analytics: Classification of Analytics – Challenges - Big Data Analytics important - Data Science - Data Scientist - Terminologies used in Big Data Environments - Basically Available Soft State Eventual Consistency - Top AnalyticsTools

UNIT II

INTRODUCTION TO TECHNOLOGY LANDSCAPE NoSQL, Comparison of SQL and NoSQL,Hadoop - RDBMS Versus Hadoop - Distributed Computing Challenges – Hadoop Overview - Hadoop Distributed File System - Processing Data with Hadoop - Managing Resources and Applications with Hadoop YARN - Interacting with Hadoop Ecosystem

UNIT III

INTRODUCTION TO MONGODB AND CASSANDRA MongoDB: Why Mongo DB - Terms used in RDBMS and Mongo DB - Data Types - MongoDB Query Language Cassandra: Features - CQL Data Types – CQLSH – Keyspaces - CRUD Operations – Collections - Using a Counter - Time to Live - Alter Commands - Import and Export - Querying System Tables

UNIT IV

INTRODUCTION TO MAPREDUCE PROGRAMMING AND HIVE MapReduce: Mapper – Reducer – Combiner – Partitioner – Searching – Sorting – Compression Hive: Introduction – Architecture - Data Types - File Formats - Hive Query Language Statements – Partitions – Bucketing – Views - Sub- Query – Joins – Aggregations – Group by and Having - RCFile Implementation - Hive User Defined Function - Serialization and Deserialization - Hive Analytic Functions

UNIT V

INTRODUCTION TO PIG & JASPERREPORTS Pig: Introduction - Anatomy – Features – Philosophy - Use Case for Pig - Pig Latin Overview - Pig Primitive Data Types - Running Pig - Execution Modes of Pig – HDFS Commands - Relational Operators – Eval Function – Complex Data Types - Piggy Bank - User-Defined Functions – Parameter Substitution - Diagnostic Operator - Word Count Example using Pig - Pig at Yahoo! – Pig Versus Hive – Jasper Reportusing Jasper soft.

TEXT BOOKS

1) Seema Acharya, SubhashiniChellappan, “Big Data and Analytics”, Wiley Publications, First Edition,2015

REFERENCE BOOKS

1) Judith Huruwitz, Alan Nugent, Fern Halper, Marcia Kaufman, “Big data for dummies”, John Wiley & Sons, Inc.(2013)
2) Tom White, “Hadoop The Definitive Guide”, O’Reilly Publications, Fourth Edition, 2015
3) Dirk Deroos, Paul C.Zikopoulos, Roman B.Melnky, Bruce Brown, Rafael Coss, “Hadoop For Dummies”, Wiley Publications,2014
4) Robert D.Schneider, “Hadoop For Dummies”, John Wiley & Sons, Inc.(2012)
5) Paul Zikopoulos, “Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data, McGraw Hill, 2012
6) Chuck Lam, “Hadoop In Action”, Dreamtech Publications,2010

COURSE OUTCOMES:

1) Understand the key issues in big data management and its associated applications in intelligent business and scientific computing.
2) Acquirefundamental enablingtechniques and scalable algorithms like Hadoop, Map Reduce and NO SQL in big dataanalytics.
3) Categorize and summarize Big Data and its importance.
4) Interpret business models and scientific computing paradigms, and apply software tools for big data analytics.
5) Achieve adequate perspectives of big data analytics in various applications like recommender systems, social media applications etc.

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IV Year B.Tech. ECE- I Sem **L/T/P/C**
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CORE ELECTIVE - IV
(R20A0426) RF CIRCUIT DESIGN

COURSE OBJECTIVES:

1) To educate students fundamental RF circuit and system design skills.
2) To introduce students the basic transmission line theory, single and multiport networks, RF component modeling.
3) To offer students experience on designing matching and biasing networks & RF transistor amplifier design.
4) To study Matching and Biasing Networks
5) To study RF Transistor Amplifier design, RF Oscillators and Mixers

UNIT-I

Introduction: Importance of RF Design-Dimensions and Units-Frequency Spectrum-RF Behavior of Passive Components: High Frequency Resistors, High Frequency Capacitors, High Frequency Inductors.-Chip Components and Circuit Board Considerations: Chip Resistors, Chip Capacitors, and Surface Mount Inductors

Review of Transmission Lines: Types of Transmission Lines-Equivalent Circuit representation-R, L, C, G parameters of Different Line configurations-Terminated Lossless Transmission Lines-Special Terminations: Short Circuit, Open Circuit and Quarter Wave Transmission Lines-Sourced and Loaded Transmission Lines: Power Considerations, Input Impedance Matching, Return Loss and Insertion Loss.

UNIT-II

Single and Multi-Port Networks: The Smith Chart: Reflection Coefficient, Normalized Impedance- Impedance Transformation: Standing wave Ratio, Special Transformation Conditions- Admittance Transformation-Parallel and Series RL & RC Connections-Basic Definitions of Single and Multi-Port Networks-Interconnecting Networks.

RF Filter Design: Scattering Parameters: Definition, Meaning, Chain Scattering Matrix, Conversion Between S-and Z-parameters, Signal Flow Chart Modeling, Generalization-Basic Resonator and Filter Configurations: Low Pass, High Pass, Band Pass and Band Stop type Filters-Filter Implementation using Unit Element and Kuroda's Identities Transformations- Coupled Filters.

UNIT-III

Active RF Component Modeling: RF Diode Models: Nonlinear and Linear Models-Transistor Models: Large Signal and Small Signal BJT Models, Large Signal and Small Signal FET Models-Scattering Parameter, Device Characterization.

UNIT-IV

Matching and Biasing Networks: Impedance Matching Using Discrete Components: Two Component Matching Networks, Forbidden Regions, Frequency Response and Quality Factor, T and Pi Matching Networks-

Amplifier Classes of Operation and Biasing Networks: Classes of Operation and Efficiency of Amplifiers, Biasing Networks for BJT, Biasing Networks for FET.

UNIT-V

RF Transistor Amplifier Design: Characteristics of Amplifiers-Amplifier Power Relations: RF Source, Transducer Power Gain, Additional Power Relations-Stability Considerations: Stability Circles, Unconditional Stability, And Stabilization Methods-Unilateral and Bilateral Design for Constant Gain-Noise Figure Circles-Constant VSWR Circles.

RF Oscillators and Mixers: Basic Oscillator Model: Negative Resistance Oscillator, Feedback Oscillator Design, Design steps, Quartz Oscillators-Fixed Frequency High Frequency Oscillator -Basic Characteristics of Mixers: Concepts, Frequency Domain Considerations, Single Ended Mixer Design, Single and Double Balanced Mixers.

TEXT BOOKS:

1) RF Circuit Design –Theory and Applications -Reinhold Ludwig, Pavel Bsetchko –Pearson Education India, 2000.
2) Radio Frequency and Microwave Communication Circuits –Analysis and Design - Devendra K.Misra –Wiley Student Edition –John Wiley & Sons, Inc.

REFERENCE BOOKS:

1) Radio Frequency and Microwave Electronics –Matthew M. Radmanesh –PEI.
2) RF Circuit Design –Christopher Bowick, Cheryl Aljuni and John Biyler,Elsevier Science, 2008.
3) Secrets of RF Circuit Design -Joseph J.Carr, TMH, 2000.
4) Design of RF and Microwave Amplifiersand Oscillators Peter L.D. Abrif, Artech House, 2000.
5) The Design of CMOS Radio Frequency Integrated Circuits -Thomas H.Lee, 2/e - Cambridge University Press, 2004.

COURSE OUTCOMES:

1) Understand the fundamental RF circuit and system design skills.
2) Understand the basic transmission line theory, single and multiport networks, RF component modeling.
3) Experience on designing matching and biasing networks & RF transistor amplifier design.
4) Learn Matching and Biasing Networks
5) Learn RF Transistor Amplifier design, RF Oscillators and Mixers

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IV Year B.Tech. ECE- I Sem **L/T/P/C**
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(R20A0488) VLSI LAB

COURSE OBJECTIVES:

1) To understand the EDA tools
2) To model the sequential and combinational circuits in Verilog HDL.
3) Perform simulation of sequential and combinational circuits using proper EDA tools.
4) To design and analyze digital and analog CMOS circuits.
5) To understand the design rules and draw the layout for various schematics.

Note: Minimum of 10 programs from Part –I and 4 programs from Part -II are to be conducted. Design and implementation of the following CMOS digital/analog circuits using Cadence / Mentor Graphics / Synopsys / Equivalent CAD tools. The design shall include Gate-level design, Transistor-level design, Hierarchical design, Verilog HDL/VHDL design, Logic synthesis, Simulation and verification.
Programming can be done using any complier. Download the programs on FPGA/CPLD boards and performance testing may be done using pattern generator (32 channels) and logic analyzer apart from verification by simulation with any of the front end tools.

1) HDL code to realize all the logic gates
2) Design of Full adder using 3 modeling styles
3) Design and Simulation of carry propagation adder.
4) Design and Simulation of 2-to-4 decoder
5) Design and Simulation of 8-to-3 encoder (without and with parity)
6) Design and Simulation of 8-to-1 multiplexer
7) Design and Simulation of 4 bit binary to gray converter
8) Design and Simulation of Multiplexer/ Demultiplexer
9) Design and Simulation of flip flops: SR, D, JK, T
10) Design and Simulation of 4-bit binary, BCD counters (synchronous/ asynchronous reset) or any Sequence Counter

Part –II: VLSI Back End Design programs:

Design and implementation of the following CMOS digital/analog circuits using Cadence / Mentor Graphics / Synopsys / Equivalent CAD tools. The design shall include Gate-level design/Transistor-level design/Hierarchical design/ Verilog HDL or VHDL design, Logic synthesis, Simulation and verification, Scaling of CMOS Inverter for different technologies, study of secondary effects (temperature, power supply and process corners), Circuit optimization with respect to area, performance and/or power, Layout, Extraction of parasitics and back annotation, modifications in circuit parameters and layout consumption, DC/transient analysis, Verification of layouts (DRC, LVS).

1) Introduction to layout design rules
2) Layout, physical verification, placement & route for complex design, statictiming analysis, IR drop analysis and crosstalk analysis of the following:
    a. Basic logic gates
    b. CMOS inverter
    c. CMOS NOR/ NAND gates
    d. CMOS XOR and MUX gates
    e. CMOS 1-bit full adder
    f. Static / Dynamic logic circuit (register cell)
    g. Latch
    h. Pass transistor
3) Introduction to SPICE simulation of NMOS/CMOS circuit
4) SPICE Simulation of basic analog circuits: Inverter/Differential Amplifier
5) Analog Circuit simulation (AC analysis) of CS & CD Amplifier

COURSE OUTCOMES

1) To gain hands-on experience on the VLSI Physical Design Tools.
2) Design entry using Verilog for Circuit Descriptions using sequential andconcurrent statements.
3) Design synthesizable Verilog code.
4) Model Analog and Mixed signal blocks using Verilog.

Interpret and evaluate the special features of VLSI back end and front end CADtools

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IV Year B.Tech. ECE- I Sem **L/T/P/C**
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(R20A0489) ELECTRO MAGNETICS AND MICROWAVE LAB

COURSE OBJECTIVES:

1) To analyze wave characteristics and antenna parameters
2) To understand array antenna significance
3) To define the range of frequencies for operation in microwave engineering
4) To discover the functioning of microwave components
5) To analyze the characteristics and parameters of various microwave components

Part – A: Electromagnetics Lab (Any Five experiments using any simulation software)

1) Generation of EM-Wave
2) Propagation of wave in Rectangular Waveguide
3) Impedance Matching using Smith Chart
4) Calculation of phase and group velocity calculation at 9GHz
5) Plot of Radiation pattern of dipole antenna
6) Plot of Radiation pattern of monopole antenna
7) Plot of Radiation pattern of Uniform Linear Array

Part – B: Microwave Lab (Any six experiments)

1. Characteristics of Gunn diode
2. Characteristics of the reflex klystron tube
3. Attenuation measurement
4. Impedance measurement
5. Frequency measurement
6. Characteristics of Multihole directional coupler
7. Determination of standing wave ratio and reflection coefficient
8. Study of magic tee

Equipment required for Microwave Laboratory:

1) Regulated Klystron Power Supply
2) VSWR Meter
3) Micro Ammeter - 0 – 500 μA
4) Multimeter
5) CRO
6) GUNN Power Supply, Pin Modulator
7) Reflex Klystron Tube
8) Crystal Diodes
9) Micro wave components (Attenuation)
10) Frequency Meter
11) Slotted line carriage
12) Probe detector

13) wave guide shorts
14)Directional Couple
15).E, H, Magic Tee 16)Circulators,
Isolator

COURSE OUTCOMES

1) Describe various parameters and outline radiation equations.
2) Design various types of radiators for wireless communications.
3) Understand various parameters of waveguide and use of component as per applications.
4) Able to design impedance matching network for any transmission line or system.
5) Able to analyze and find applications and limitations of microwave tube Generators andAmplifiers

IV YEAR B.TECH II SEMESTER SYLLABUS

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

IV Year B.Tech.ME- II Sem **L/T/P/C**
3/1/0/4

(R20A0337) INNOVATION, STARTUPS AND ENTERPRENEURSHIP

UNIT-I

Introduction: Meaning and Concept of Innovation, Levels of Innovation- Incremental Vs Radical Innovation-Inbound and Outbound Ideation- Open and Other Innovative Ideation Methods.

Entrepreneurship- Role-models of Entrepreneurship- Common Entrepreneurial characteristics, Role of Entrepreneurship in economic development- Entrepreneurship in the new millennium.

UNIT-II

The Entrepreneur and Mindset: Meaning – The skills required being an Entrepreneur and entrepreneurial decision process- Entrepreneurial stress - Challenges of start-ups- Entrepreneurial Motivation, Innovation, Imagination & Creativity.

UNIT-III

Business Planning and Fund Raising: Identifying, assessing and validation of the idea, Identifying the target segment and market share, creating an effective B-Plan, Market research, Financial, Market and Technical feasibility, Fund raising and valuation, Idea pitching.

UNIT-IV

Legal and Financial Aspects: Legal aspects: Permits, Registrations and compliances, Intellectual Property Rights, Contracts.

Financial aspects: Working capital management- Financial management and long-term investments, Capital structure and taxation, Brake even analysis.

UNIT-V

Contemporary Issues: Legal forms of entrepreneurial organizations- Debt, Equity, Angle and Venture Capital markets for Start-ups, Growth and Development stages- new venture finance- Initial Public Offer (IPO) Governmental initiatives to encourage startups - Business Incubations and its benefits- Protection of Intellectual Property.

TEXT BOOKS:

1. Kathleen R Allen, Launching New Ventures, An Entrepreneurial Approach, Cengage Learning, 2016 Anjan Raichaudhuri, Managing New Ventures Concepts and Cases, Prentice Hall International, 2010.
2. Innovation Management, C.S.G. Krishnamacharyulu, R. Lalitha, Himalaya Publishing House, 2010.
3. S. R. Bhowmik & M. Bhowmik, Entrepreneurship, New Age International, 2007.

REFERENCE BOOKS

1. Stuart Read, Effectual Entrepreneurship, Routledge, 2013
2. Rajeev Roy, Entrepreneurship, 2e, Oxford publications, 2012.
3. Nandan .H, Fundamentals of Entrepreneurship, PHI, 2013

COURSE OUTCOMES:

1. Students will be able to understand a) Startup opportunities b) Legal and other requirements for new ventures c) Financial Issues of startups d) Sustainability and growth of startups e) Exit strategies
2. Students will be able to understand a) mindset of the entrepreneurs, b) identify ventures for launching, c) develop an idea on the legal framework and d) strategic perspectives in entrepreneurship.