LAKIREDDY BALIREDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

(Approved by AICTE, Affiliated to JNTUK, Accredited by NBA,
ISO 9001 : 2008 Certified & Accredited by **NAAC with "A" Grade)**

B.TECH. FOUR YEAR DEGREE COURSE
(Applicable for the batches admitted from 2011-12)

ELECTRONICS AND COMMUNICATION ENGINEERING

L.B.Reddy Nagar :: Mylavaram – 521 230 :: Krishna District
ANDHRA PRADESH STATE

COURSE STRUCTURE

I – SEMESTER

Code No.	Name of the Course	Scheme of Instruction			Scheme of Examination		Total	credits
		Periods per Week			Maximum Marks			
		Lectures	Tutorial	Lab.	Internal	External		
T118	Applied Mathematics-I	4	1	--	25	75	100	4
T131	C Programming	4	1	--	25	75	100	4
T197	English-I	4	--	--	25	75	100	3
T191	Engineering Chemistry	3	1	--	25	75	100	3
T195	Engineering Physics	3	1	---	25	75	100	3
P806	C Programming Lab		--	3	25	75	100	2
P830	Engineering Physics and Chemistry Lab.		--	3	25	75	100	2
P831	Engineering Workshop		--	3	25	75	100	2
P832	English Language Communication skills lab			3	25	75	100	2
	TOTAL	**18**	**04**	**12**	**225**	**675**	**900**	**25**

II – SEMESTER

Code No.	Name of the Course	Scheme of Instruction			Scheme of Examination		Total	credits
		Periods per Week			Maximum Marks			
		Lectures	Tutorial	Lab.	Internal	External		
T119	Applied Mathematics- II	4	1	-	25	75	100	4
T198	English -II	4	-	-	25	75	100	3
T264	Numerical Methods	4	1	-	25	75	100	4
T120	Applied Physics	3	1	-	25	75	100	3
T188	Electronic Devices and Circuits	4	1	-	25	75	100	4
T135	Circuit Theory	4	1		25	75	100	3
P829	Engineering Drawing with Auto CAD Lab	-	-	3	25	75	100	2
P827	Electronic Devices and Circuits using Lab View	-	-	3	25	75	100	2
P856	Mini Project - I	--	--	3	25	25	50	2
	TOTAL	**23**	**5**	**09**	**225**	**625**	**850**	**27**

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HEAD
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III – SEMESTER

Code No.	Name of the Course	Scheme of Instruction			Scheme of Examination		Total	credits
		Periods per Week			Maximum Marks			
		Lectures	Tutorial	Lab.	Internal	External		
T187	Electronic Circuits	4	1	-	25	75	100	5
T306	Signals And Systems	4	1	-	25	75	100	4
T320	Switching Theory And Digital Logic	4	1	-	25	75	100	4
T199	Environmental Studies	3	-	-	25	75	100	3
T266	Object Oriented Programming (C++)	4	1	-	25	75	100	4
T286	Probability Theory and Stochastic Processes	4	1	-	25	75	100	4
P826	Electronic Circuits Lab	-	-	3	25	75	100	2
P861	Objected Oriented Programming(C++) Lab	-	-	3	25	75	100	2
P870	Seminar - I	-	-	-	50	-	50	1
	TOTAL	**23**	**05**	**06**	**250**	**600**	**850**	**29**

IV – SEMESTER

Code No.	Name of the Course	Scheme of Instruction			Scheme of Examination		Total	credits
		Periods per Week			Maximum Marks			
		Lectures	Tutorial	Lab.	Internal	External		
T295	Pulse and Switching Techniques	4	1	-	25	75	100	4
T185	Electro Magnetic Fields and Waves	4	1	-	25	75	100	5
T114	Analog Communication Systems	4	1	-	25	75	100	4
T184	Electrical Technology	4	1	-	25	75	100	4
T236	Linear Control Systems	4	1	-	25	75	100	4
P825	Electrical Technology Lab	-	-	3	25	75	100	2
P872	Signal Analysis Lab Using MAT Lab	-	-	3	25	75	100	2
P869	Pulse and Digital Circuits Lab	-	-	3	25	75	100	2
P857	Mini Project - II	-	-	3	25	25	50	2
	TOTAL	**20**	**05**	**12**	**225**	**625**	**850**	**29**

LBRCE EXAMINATION SECTION

HEAD
Department of Electronics & Communication Engineering
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MYLAVARAM Krishna Dt., Andhra Pradesh.

V – SEMESTER

Code No.	Name of the Course	Scheme of Instruction			Scheme of Examination		Total	credits
		Periods per Week			Maximum Marks			
		Lectures	Tutorial	Lab.	Internal	External		
T116	Antennas and Wave Propagation	4	1	-	25	75	100	4
T237	Linear Integrated Circuits and Applications	4	1	-	25	75	100	4
T165	Digital System Design	4	1	-	25	75	100	4
T146	Computer Organization	3	1	-	25	75	100	3
T321	Telecommunication Switching Systems and Networks	4	1	-	25	75	100	4
T158	Digital Communications	4	1	-	25	75	100	4
T290	Professional Ethics	3	-	-	25	75	100	3
P809	Communication Systems Lab	-	-	3	25	75	100	2
P837	IC and ECAD Lab	-	-	3	25	75	100	2
P871	Seminar - II	-	-	-	50	-	50	1
	TOTAL	**26**	**06**	**06**	**275**	**675**	**950**	**31**

LBRCE EXAMINATION SECTION

HEAD
Department of Electronics & Communication Engineering
Lakireddy Bali Reddy College of Engineering
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VI – SEMESTER

Code No.	Name of the Course	Scheme of Instruction			Scheme of Examination		Total	credits
		Periods per Week			Maximum Marks			
		Lectures	Tutorial	Lab.	Internal	External		
T254	Micro Processors and Interfacing	4	1	-	25	75	100	4
T256	Micro Wave Engineering	4	1	-	25	75	100	4
T163	Digital Signal Processing	4	1	-	25	75	100	4
T338	VLSI Design	4	1	-	25	75	100	4
T221	Industrial Management	3	1	-	25	75	100	3
T252 T151 T267 T147	**ELECTIVE – I** Micro Electro Mechanical Systems(MEMS) Data and Computer Communications Operating Systems Consumer and Entertainment Electronics	3	1	-	25	75	100	4
P851	Micro Processors and Interfacing Lab	-	-	3	25	75	100	2
P873	Signal Processing Lab	-	-	3	25	75	100	2
P810	Comprehensive Viva Voce – I	-	-	-	100	-	100	2
TOTAL		**22**	**06**	**06**	**300**	**600**	**900**	**29**

LBRCE EXAMINATION SECTION

HEAD
Department of Electronics & Communication Engineering
Lakireddy Bali Reddy College of Engineering
MYLAVARAM Krishna Dt., Andhra Pradesh.

VII – SEMESTER

Code No.	Name of the Course	Scheme of Instruction			Scheme of Examination		Total	credits
		Periods per Week			Maximum Marks			
		Lectures	Tutorial	Lab.	Internal	External		
T190	Embedded Systems Design	4	1	-	25	75	100	4
T302	Satellite Communications	4	1	-	25	75	100	4
T269	Optical Communications	4	1	-	25	75	100	4
T296	Radar and Navigational Aids	4	1	-	25	75	100	4
T189	Electronic Measurements and Instrumentation	4	-	-	25	75	100	3
T260 T308 T164 T161	**ELECTIVE – II** Nano Electronics Software Engineering Digital Signal Processors and Applications Digital Image Processing	3	1	-	25	75	100	3
P855	Micro Wave and Optical Communications Lab	-	-	3	25	75	100	2
P828	Embedded System Design Lab	-	-	3	25	75	100	2
P843	Internship	-	-	-	50	--	50	2
P878	Term Paper	-	-	-	25	25	50	2
	TOTAL	23	05	06	275	625	900	30

LBRCE EXAMINATION SECTION

HEAD
Department of Electronics & Communication Engineering
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VIII – SEMESTER

Code No.	Name of the Course	Scheme of Instruction			Scheme of Examination		Total	credits
		Periods per Week			Maximum Marks			
		Lectures	Tutorial	Lab.	Internal	External		
T134	Cellular And Mobile Communications	4	1	-	25	75	100	4
T299 T318 T160 T317	**ELECTIVE – III** RF Micro Electronics Spread Spectrum Communication Digital Design Through Verilog Speech Processing	3	1	-	25	75	100	3
T271 T342 T150 T128	**ELECTIVE – IV** Opto Electronics Wireless Sensor Networks Cryptography and Network Security Bio-Medical Instrumentation	3	1	-	25	75	100	3
P811	Comprehensive Viva Voce – II	-	-	-	100	-	100	2
P867	Project Work	-	-	6	60	140	200	8
	TOTAL	**10**	**3**	**6**	**235**	**365**	**600**	**20**
TOTAL CREDITS : 220								

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HEAD
Department of Electronics & Communication Engineering
Lakireddy Bali Reddy College of Engineering
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I-SEMESTER

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HEAD
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T118 – APPLIED MATHEMATICS – I

Lecture	**: 4 Periods/week**	**Internal Marks**	**: 25**
Tutorial	**: 1 Period/Week**	**External Marks**	**: 75**
Credits	**: 4**	**External Examination**	**: 3 Hrs**

UNIT - I

Differential equations of first order and first degree – exact, linear and Bernoulli. Applications to Newton's Law of cooling, Law of natural growth and decay, orthogonal trajectories.

UNIT - II

Linear differential equations of second and higher order with constant coefficients and with variable coefficients, method of variation of parameters and their simple applications to Simple Harmonic Motion and Electrical Circuits.

UNIT - III

Generalized Mean Value theorems (without proof), Functions of several variables, Maxima and Minima of functions of two variables with constraints and without constraints. Lagrangian Multiplier method.

UNIT - IV

Curve tracing – Cartesian curves. Applications of Integration to Lengths, Volumes and Surface areas of revolution in Cartesian Coordinates. Multiple integrals - double and triple integrals (Cartesian Coordinates only) – Changing of order of Integration. (Cartesian Coordinates only)

UNIT - V

Vector Differentiation: Gradient- Divergence - Curl and their related properties of sums-products - Laplacian and second order operators. Vector Integration - Line integral – work done – Potential function – area - surface and volume integrals Vector integral theorems: Greens, Stokes and Gauss Divergence Theorems (Without proof) and related problems.

TEXT BOOKS

1. Higher Engineering Mathematics by Dr. B.S. Grewal
2. Higher Engineering Mathematics by Dr. B. V. Ramana – TMGH

REFERENCES

1. Advanced Engineering Mathematics by M. D. Greenberg – TMGH
2. Advanced Engineering Mathematics by Erwin Krezig - John Wiley & sons
3. Elementary Differential equations by W. E. Boyce and R. C. Diprima - John Wiley & sons
4. Advanced Engineering Mathematics by Peter V. O. Neil - Thomson

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HEAD
Department of Electronics & Communication Engineering
Lakireddy Bali Reddy College of Engineering
MYLAVARAM Krishna Dt., Andhra Pradesh.

T131 – C - PROGRAMMING

Lecture	**: 4 Periods/week**	**Internal Marks**	**: 25**
Tutorial	**: 1 Period/Week**	**External Marks**	**: 75**
Credits	**: 4**	**External Examination**	**: 3 Hrs**

UNIT - I

Algorithm / pseudo code, flowchart, program development steps, structure of C program, A Simple C program, identifiers, basic data types and sizes, Constants, variables, arithmetic, relational and logical operators, increment and decrement operators, conditional operator, bit-wise operators, assignment operators, expressions, type conversions, conditional expressions, precedence and order of evaluation.
Input-output statements, statements and blocks, if and switch statements, loops- while, do-while and for statements, break, continue, goto and labels, programming examples.

UNIT - II

Designing structured programs, Functions, basics, parameter passing, storage classes-extern, auto, register, static, scope rules, block structure, user defined functions, standard library functions, recursive functions, header files, C preprocessor, example c programs.

UNIT - III

Arrays- concepts, declaration, definition, accessing elements, storing elements, arrays and functions, two dimensional and multi-dimensional arrays, applications of arrays. pointers-concepts, initialization of pointer variables, pointers and function arguments, address arithmetic, Character pointers and functions, pointers to pointers, pointers and multidimensional arrays, dynamic memory managements functions, command line arguments, c program examples.

UNIT - IV

Derived types- structures- declaration, definition and initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self referential structures, unions, typedef, bitfields, C program examples.

UNIT - V

Input and output – concept of a file, text files and binary files, streams, standard I/o, Formatted I/o, file I/o operations, error handling, C program examples.

TEXT BOOKS

1. Computer science, A structured programming approach using C, B.A. Forouzan and R.F. Gilberg, Third edition, Thomson.
2. The C Programming Language, B.W. Kernighan, Dennis M.Ritchie, PHI/Pearson Education

REFERENCES

1. C Programming with problem solving, J.A. Jones & K. Harrow, Dreamtech Press
2. Programming in C – Stephen G. Kochan, III Edition, Pearson Eductaion
3. C and Data Structures:A Snap Shot Oriented Treatise Using Live Engineering Examples by Prof. N.B.Venkateswarlu and, Prof.E.V.Prasad, S Chand & Co, New Delhi
4. C/C++ for Engineers and Scientists, Harry H.Cheng ,McGrawHill,

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HEAD
Department of Electronics & Communication Engineering
Lakireddy Bali Reddy College of Engineering
MYLAVARAM

T197 - ENGLISH - I

Lecture	**: 4 Periods/week**	**Internal Marks**	**: 25**
		External Marks	**: 75**
Credits	**: 3**	**External Examination**	**: 3 Hrs**

English Language continues to be regarded as an important tool for global communication and employability. Hence, it is imperative that students need to acquire communicative competence besides their core skills. The syllabus has been designed to develop linguistic and communicative competence of Engineering students with special emphasis on professional and functional aspects of English language i.e., on Listening, Speaking, Reading and Writing (LSRW Skills).

OBJECTIVES

- To improve the language proficiency of the students in English with emphasis on LSRW skills.
- To develop the study skills and Communication skills of the students in both formal and informal situations.
- To enable the students to face the academic and professional challenges of the present day scenario.
- To help students acquire the ability to speak effectively in English in the real life situations.
- To inculcate reading as a habit and to develop reading skills among students.
- To train students to improve their active and passive vocabulary.
- To familiarize the students with different rhetorical functions of Technical English.
- To enable the students write letters and reports effectively in formal and professional situations.

UNIT - I

Chapter – 1: "Read & Proceed" from Step by Step (*Pearson*)
Extensive Reading - Masterminds– The Trailblazers – **Jagadis Chandra Bose***(Orient Longman)*

UNIT - II

Chapter – 2: "Travel" from Step by Step (*Pearson*)
Extensive Reading - Masterminds– The World of Figures and Physics – **Chandra SekharaVenkata Raman** *(Orient Longman)*

UNIT - III

Chapter – 3: "Gender" from Step by Step (*Pearson*)
Extensive Reading - Masterminds–The Institution Builders– **Shanti SwarupBhatnagar** (*Orient Longman*)

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HEAD
Department of Electronics & Communication Engineering
Lakireddy Bali Reddy College of Engineer
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UNIT - IV

Vocabulary – Synonyms, Antonyms, Words often Confused, Gerunds & Infinitives, Prefixes & Suffixes, Word plurals, Analogy
Grammar – Parts of Speech, Sentence Completion, Question Tags, Tense and Aspect

UNIT - V

Analytical Writing – Sentence Construction – Types of sentences, Exercises with scrambled words & Jumbled sentences, Paragraph writing, Dialogue writing (Formal & Informal), Letter Writing (Formal & Informal), Resume writing, Expansion (of a given topic), Abstract Writing (Summarizing / Synopsis), Decision-making, Drafting E-Mails & Memo writing, Essay writing.

TEXT BOOKS

- Step by Step (*Pearson*)
- Masterminds by EnakshiChatterjee (*Orient Longman*)

REFERENCES

1. Andrea J Rutherford. *Basic Communication Skills for Technology*: Pearson Education, New Delhi, 2009.
2. Murphy. *English Grammar with CD*: Cambridge University Press, New Delhi, 2004
3. Rizvi, M Ashraf. *Effective Technical Communication*: Tata McGraw Hill, New Delhi, 2008.
4. Blum Rosen. *Word Power*: Cambridge University Press, New Delhi, 2009.

LBRCE EXAMINATION SECTION

HEAD
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T191 - ENGINEERING CHEMISTRY

Lecture	: 3 Periods/week	Internal Marks	: 25
		External Marks	: 75
Credits	: 3	External Examination	: 3 Hrs

UNIT - I

WATER TECHNOLOGY: Introduction, Hardness of Water - Temporary and Permanent hardness. Units and inter conversions of Units. Problems on Temporary and Permanent hardness. Boiler troubles – scale & sludge formation, Caustic embrittlement, Corrosion, priming & foaming, softening of water Methods of Treatment of Water for Domestic Purposes - Sedimentation, Coagulation, Filtration, Disinfection – Sterilization, Chlorination, Break point chlorination, Ozonization.
Water Treatment: Internal Treatment - Colloidal, Phosphate, Calgon, Carbonate, Sodium aluminates Conditioning of Water. External Treatment - Lime-Soda Process, Zeolite Process, Ion- Exchange Process.

UNIT - II

FUELS AND COMBUSTION: Definition and classification of Fuels- conventional fuels (solid, liquid, gaseous), Solid fuels- coal - analysis, Proximate and ultimate analyses of coal – significances, Liquid Fuels – primary- petroleum- refining of petroleum- cracking, knocking, synthetic petrol – Bergius and Fischer Tropsech's process; Gaseous fuels- octane number – cetane number,– water gas, producer gas CNG, and biogas - gross and net calorific values – (definition only) – flue gas analysis – Orsat's apparatus.

UNIT - III

CORROSION: Definition, Examples, Types of Corrosion: Theories of Corrosion and Mechanism - Dry Corrosion (Direct Chemical corrosion), Wet Corrosion (Electro Chemical corrosion) Principles of Corrosion, Galvanic Series, Galvanic Corrosion, Concentration Cell Corrosion, Mechanism of Wet and Chemical Corrosion - Hydrogen evolution type, Oxygen absorption type. Factors Influencing Corrosion. Control of Corrosion - Proper Design, Use of pure metal and metal alloys, Passivity, Cathodic Protection - Sacrificial anode and Impressed Current, Modifying the Environment and use of Inhibitors.

UNIT - IV

Polymer Science and Technology: Types of polymerization, Mechanism (Chain growth & step growth), Plastics –Thermosetting and Thermoplastic resins – preparation, properties and engineering applications of Polyethylene, PVC, Polystyrene, Teflon, Bakelite, Nylon, Conducting polymers: polyacetylene, polyaniline, conduction, doping, application. Characteristics and uses Rubber - Natural Rubber, Vulcanization and significance, Elastomers – Buna S, Buna N, Thiokol, Fibers- Polyester, fiber reinforced plastics (FRP), applications.

LBRCE EXAMINATION SECTION

HEAD
Department of Electronics & Communication Engineering
Lakireddy Bali Reddy College of Engineering
MYLAVARAM Krishna Dt., Andhrapradesh.

UNIT - V

1. REFRACTORIES & INSULATORS: Definition, Classification with Examples, Criteria of a Good Refractory Material, Causes for the failure of a Refractory Material, Insulators – Definition and Classification with Examples. Characteristics of Insulating Materials, Thermal Insulators, Electrical Insulators - Their Characteristics and Engineering Applications.

2. LUBRICANTS: Introduction to Lubricants, Principles and function of lubricants - Types of Lubrication and Mechanism - Thick Film or Hydrodynamic Lubrication, Thin Film or Boundary Lubrication, Extreme Pressure Lubrication. Classification and properties of lubricants-Viscosity, flash and fire point, cloud and pour point, aniline point, Neutralization Number and mechanical strength, Selection of lubricants.

TEXT BOOKS

1. A text book of Engineering Chemistry by Jain & Jain, Dhanpat Rai Publishing Company, New Delhi (15th Edition) (2006).
2. A Text book of Engineering Chemistry by Dr. Y. Bharathi Kumari and Dr. Jyotsna Cherukuri, VGS Publications, First Edition, 2009.

REFERENCES

1. A Text book of Engineering Chemistry by Shashi Chawla, Dhanpat Rai Publishing Company, First Edition, 2002.
2. Advanced Engineering Chemistry by Dr. M. R. Senapati, University Science Press (Impart from Laxmi Publications), 3rd Edition 2009.
3. N. Krishnamurthy, P. Vallinayagam and D. Madhavan, Engineering Chemistry, 2nd Edition. PHI Learning PVT., LTD, New Delhi, 2008.
4. A Text book of Engineering Chemistry by S. S. Dara, S CHAND Publications.

LBRCE EXAMINATION SECTION

HEAD
Department of Electronics & Communication Engineering
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T195 - ENGINEERING PHYSICS

Lecture	: 4 Periods/week	Internal Marks	: 25
Tutorial	: 1 Period/Week	External Marks	: 75
Credits	: 3	External Examination	: 3 Hrs

UNIT - I

INTERFERENCE: Superposition of waves-double slit interference- Young's double slit experiment- Coherence – Interference from thin films- Newton's rings.
DIFFRACTION: Diffraction and wave theory of light (Fresnel and Fraunhofer diffractions) - single slit Diffraction, Intensity in single- slit diffraction, Calculating the intensity– Double slit interference and diffraction combined.
GRATINGS AND SPECTRA - Multiple slits-width of the maxima, Diffraction gratings, Grating spectrum – Dispersion and Resolving power.
POLARIZATION: Polarization by reflection Brewster's law - Double refraction -Polarization by scattering - Retarders -Optical Activity.

UNIT - II

CRYSTAL STRUCTURES: Introduction –periodic arrays of atoms-Lattice translation vectors, Basis and crystal structure, Primitive cell, fundamental types of lattices-three dimension lattice types, Crystal systems- Structure and packing fractions of Simple cubic-Body centered cubic- Face centered cubic crystals.
X-RAY DIFFRACTION: Directions and planes in crystals – Miller indices – separation between successive (h k l) planes- Diffraction of X- rays by crystal planes – Braggs law-Laue method- powder method.

UNIT - III

LASERS: Introduction – Characteristics of Lasers- Principle of laser (Absorption, Spontaneous and stimulated emission of Radiation), Einstein Coefficients- Population Inversion - Helium Neon Laser, Semiconductor laser, Applications of Lasers.
FIBER OPTICS: Introduction- Principle of optical Fiber- Acceptance angle and Acceptance cone- Numerical aperture - refractive index profile-Application of optical fibers.

UNIT - IV

SUPER CONDUCTIVITY : Phenomenon, Meissner effect, critical parameters, Type I, Type II Super conductors, BCS theory of super conductivity, Applications of Super conductors.

UNIT - V

NON-DESTRUCTIVE TESTING USING ULTRASONICS: Characteristics Production and detection of ultrasonics-Piezoelectric and magnetostirictionmethods,Ultrasonic Testing - Basic Principle –Transducer – Couplant and inspection Standards – Inspection Methods – Pulse echo Testing Technique – Flaw detector- Different Types of Scans – Applications.

TEXT BOOKS

1. Fundamentals of physics Resinic, Halliday and Krane, John Wiley 2003
2. Engineering Physics by V RAJENDRAN TataMcGrahill

REFERENCES

1. Introduction to solid state physics, C. Kittel, John wiley, 1999.
2. Engineering physics by H K MALIK AK SINGH TATA McGRAHILL

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P806 – C - PROGRAMMING LAB

		Internal Marks	**: 25**
Lab/Practical	**: 3 Period/Week**	**External Marks**	**: 75**
Credits	**: 2**	**External Examination**	**: 3 Hrs**

I) Write a programme in 'C' language to cover the following problems.
a) Roots of Quadratic Equation.

b) Example program which shows the usage of various Operators available in C Language.

c) Example program which shows the usage of various preliminary Data types available in C Language.

d) Example programs to illustrate the *order of evaluation*.

II) WRITE EXAMPLE PROGRAMS:

a) To check whether the given year is leap year (or) not

b) Converting given two digit number into words using switch statement

c) To illustrate the usage of 'goto' statement.

d) Finding smallest& biggest number from the given set of 4 numbers using 'if' statement.

e) Calculate the student grade in the examination – assume suitable constraints.

f) Prepare electricity bill for the consumed units – assume suitable constraints.

III) EXAMPLE PROGRAMS:

a) To Display first N natural numbers
b) To find whether the given number is Armstrong (or) not
c) To find reverse of the given number and to check whether it is palindrome (or) not.
d) To find whether given number is strong number (or) not.
e) To check whether given number is Prime (or) not
f) To display prime numbers with in the given range(Nesting of Loops).
g) To display the following structure(Nesting of Loops)

i)
```
        1
      1   2
    1   2   3
  1   2   3   4
1   2   3   4   5
```

ii)
```
5   4   3   2
    4   3   2   1
      3   2   1
        2   1
          1
```

HEAD
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IV) Write example programs in C Language:
a) To find factorial of a given number using functions.
b) Swap two numbers using functions.
c) To find GCD of two numbers using recursion
d) Write a recursive function to solve Towers of Honai problem.
e) Write an example program to illustrate use of external & static storage classes.

V) Write example programs in C Language to perform following operations:
a) Finding the sum and average of given numbers using Arrays.
b) To display elements of array in reverse order
c) To search whether the given element is in the array (or) not using linear search & binary search.
d) Write a C program to perform the following operations
i) Addition, subtraction and multiplication of Matrices
ii) Transpose of given matrix
(The above operations are to be exercised using functions also by passing arguments)
e) Write a C program to find whether the given string is palindrome (or) not.
f) To accept line of text and find the number of characters, number of vowels and number of blank spaces in it.
g) Write an example program to illustrate the use of any 5 string handling functions.

VI) a) Example program to bring clarity on pointer declaration & initialization and Pointer arithmetic.
b) Write an example program to describe the usage of *call by reference*.
c) Write a program to find sum of the elements of the array using functions.
d) Write an example program to illustrate the usage of command line arguments.
e) Program to illustrate the usage of dynamic memory management functions.

VII) a) Write an example program using structures to process the student record. Assume suitable fields for student structures (Different kinds of initialization of structure variables are to be exercised)
b) Write a program to read records of 10 employees and find their average salary (exercise array of structures & Nested structures concepts through this program).
c) Write a program to handle a structure variable using pointers and implement self referential structure(i.e. A structure variable having a pointer to itself)

VIII) Write an example program on file to perform following operations:
a) Accessing content from files and writing content in to it.
(Exercise different file operation modes)
b) Copy the contents of one file into another (Exercise different file operation modes)

LBRCE EXAMINATION SECTION

HEAD
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Lakireddy Bali Reddy College of Engineering
MYLAVARAM Krishna Dt., Andhra Pradesh.

P830 - ENGINEERING PHYSICS AND CHEMISTRY LAB

		Internal Marks	**: 25**
Lab/Practicals:	**3 Period/Week**	**External Marks**	**: 75**
Credits	**: 2**	**External Examination**	**: 3 Hrs**

ENGINEERING PHYSICS LABORATORY
(Any 5 experiments)

LIST OF EXPERIMENTS

1. LCR Resonance circuit
2. Newton's Rings – Determination of Radius of curvature of plano convex lens
3. Verification of laws by using sonometer
4. Meldy's experiment
5. Wedge shaped film
6. Volume Resonator
7. Refractive index of light
8. Diffraction Grating – Normal incidence method
9. Rigidity modulus of a given wire
10. Frequency of AC supply – Sonometer

ENGINEERING CHEMISTRY LABORATORY
(Any 5 experiments)

1. Estimation of total Hardness of water by EDTA method
2. Determination of Temporary and permanent hardness of water.
3. Iodometric Titration of $K_2Cr_2O_7$ v/s $Na_2S_2O_3$ to determine the percentage purity of $K_2Cr_2O_7$ sample.
4. Preparation of Stanard Potassium Dichromate and Estimation of Copper by Iodometry.
5. Determine the amount of Oxalic acid and Sulphuric acid in 1 liter solution by using given standard Sodium Hydroxide and Potassium Permanganate solution
6. Determination of alkalinity of water sample.
7. Determination of Dissolved Oxygen (DO) content by Winkler's method.
8. Preparation of Urea formaldehyde resin.

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P831 - ENGINEERING WORKSHOP

		Internal Marks	**: 25**
Lab/Practicals:	**3 Period/Week**	**External Marks**	**: 75**
Credits	**: 2**	**External Examination**	**: 3 Hrs**

TRADES FOR EXERCISES: (Common to EEE, ECE, CSE, EIE & IT)

At least three exercise from each trade :

1. Carpentry
2. Fitting
3. House – Wiring
4. Plumbing

TRADES FOR EXERCISES : (MECHCHANICAL ENGINEERING)

At least two exercise from each trade :

1. Carpentry
2. Fitting
3. Tin - Smithy
4. Black - Smithy
5. House - Wiring
6. Plumbing

TEXT BOOK :

Workshop manual / P. Kannaiah / K.L. Narayana Scitech Publications, India Pvt Ltd, Chennai.

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P832 - ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

		Internal Marks	**: 25**
Lab/ Practicals	**: 3 Period/Week**	**External Marks**	**: 75**
Credits	**: 2**	**External Examination**	**: 3 Hrs**

The English Language Communications Skills Lab focuses on practice of sounds of language and familiarizes the students with the use of English in everyday situations and contexts. It aims at improving the communicative competence of students and to enrich their power of expression, articulation and persuasiveness. The thrust is on developing competences, both linguistic as well as communicative, in order to improve employability potential.

OBJECTIVES

1. To expose the students to a variety of self-instructional, learner-friendly modes of English language learning and stimulate intellectual and attitudinal exercise.

2. To provide students with the required facility and practice to face computer-based competitive exams such GRE, TOEFL, IELTS etc.

3. To enable them to learn better pronunciation through emphasis on word accent, intonation, and rhythm.

4. To train them to use language effectively to face interviews, group discussions, public speaking.

5. To develop necessary attitudes and behaviors so as to improve their employability quotient.

SYLLABUS

The following course content is prescribed for the English Language Communication Skills Laboratory sessions:

1. Dimensions of Phonetics: Phonetic Transcription, Sounds, Stress, Intonation, Rhythm, Varieties of Spoken English: Indian, British and American
2. Oral Presentations -- Prepared and Extempore -- JAM
3. Role Play
4. Describing Objects / Situations / People
5. Information Transfer
6. Debates
7. Group Discussions

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SUGGESTED SOFTWARE/BOOKS:

* *Digital Mentor*, Globarena, Hyderabad, 2005
* *Sky Pronunciation Suite: Young India Films, Chennai, 2009*
* Mastering English in Vocabulary, Grammar, Spelling, Composition, Dorling Kindersley, USA, 2001
* Dorling Kindersley Series of Grammar, Punctuation, Composition, Dorling Kindersley, USA, 2001
* *Oxford Talking Dictionary,* The Learning Company, USA, 2002
* *Cambridge Advanced Learners English Dictionary* (with CD). Cambridge University Press, New Delhi, 2008.
* Learning to Speak English - 4 CDs. The Learning Company,USA,2002
* Herbert Puchta and Jeff Stranks with Meredith Levy: *English in Mind*: Cambridge University Press, New Delhi, 2009.
* Krishna Mohan, Effective English Communication, Tata McGraw Hills, New Delhi,2007.

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II-SEMESTER

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T119 - APPLIED MATHEMATICS – II

Lecture	**: 4 Periods/week**	**Internal Marks**	**: 25**
Tutorial	**: 1 Period/Week**	**External Marks**	**: 75**
Credits	**: 4**	**External Examination**	**: 3 Hrs**

UNIT - I

Laplace transforms of standard functions –Shifting Theorems, Transforms of derivatives and integrals – Unit step function –Dirac's delta function. Inverse Laplace transforms– Convolution theorem - Applications of Laplace transforms to ordinary differential equations

UNIT - II

Fourier Series: Determination of Fourier coefficients – Fourier series – even and odd functions – Fourier series in an arbitrary interval– Half-range sine and cosine series.

UNIT - III

Fourier integral theorem (only statement) – Fourier sine and cosine integrals – Fourier transform – sine and cosine transforms – properties – inverse transforms – Finite Fourier transforms.

UNIT - IV

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions –solutions of first order linear (Lagrange) equation. Method of Separation of Variables - Applications to wave equation one dimensional, heat equation and Laplace Equation.

UNIT - V

Z-transform – properties – Damping rule – Shifting rule – Initial and final value theorems - Inverse z-transform -Convolution theorem – Solution of difference equation by z-transforms.

TEXT BOOKS

1. Higher Engineering Mathematics by Dr. B.S. Grewal
2. Higher Engineering Mathematics by Dr. B. V. Ramana – TMGH

REFERNCES

1. Advanced Engineering Mathematics by Michael D. Greenberg – TMGH
2. Advanced Engineering Mathematics by Erwin Krezig - John Wiley & sons

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T198 - ENGLISH-II

Lecture	**: 4 Periods/week**	**Internal Marks**	**: 25**
		External Marks	**: 75**
Credits	**: 3**	**External Examination**	**: 3 Hrs**

English Language continues to be regarded as an important tool for global communication and employability. Hence, it is imperative that students need to acquire communicative competence besides their core skills. The syllabus has been designed to develop linguistic and communicative competence of Engineering students with special emphasis on professional and functional aspects of English language i.e., on Listening, Speaking, Reading and Writing (LSRW Skills).

OBJECTIVES

- To improve the language proficiency of the students in English with emphasis on LSRW skills.
- To develop the study skills and Communication skills of the students in both formal and informal situations.
- To enable the students to face the academic and professional challenges of the present day scenario.
- To help students acquire the ability to speak effectively in English in the real life situations.
- To inculcate reading as a habit and to develop reading skills among students.
- To train students to improve their active and passive vocabulary.
- To familiarize the students with different rhetorical functions of Technical English.
- To enable the students write letters and reports effectively in formal and professional situations.

UNIT - I

Chapter 4: "Disaster Management" from *Step by Step* (Pearson)
Extensive reading – *Masterminds* - The institution builders - **MeghanadSaha** *(*Orient Longman*)*

UNIT - II

Chapter 5: "Health" from *Step by Step* (Pearson)
Extensive reading – *Masterminds*- The New Age – **HomiJehangirBhabha** *(*Orient Longman*)*

UNIT - III

Chapter 6: "Sports" from *Step by Step* (Pearson)
Extensive reading – *Masterminds* - The New Age – **Vikram Sarabhai** *(*Orient Longman*)*

UNIT - IV

Grammar – Articles, Prepositions, Voice, Speech, Concord, Correction of Sentences
Vocabulary – Phrasal verbs, Gerunds, Infinitives, One word Substitutes.

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UNIT - V

Analytical writing – Comprehension, Technical dialogue writing,
Presentation skills - Note making, Information transfer / Data interpretation (Tables, Pie-charts, Bar graphs, Tree diagrams, Pictograms, etc.), Report writing

TEXTBOOK

Step by Step, Pearson Education, New Delhi 2010.
Master Minds, *(*Orient Longman*).*

REFERENCES

1. KoneruAruna. *Professional Communication:* Tata McGraw-Hill, New Delhi, 2007.
2. Effective Technical Communication, Rizvi, Tata McGraw-Hills, New Delhi, 2009.
3. Basic Communication Skills for Technology, Andrea J. Rutherford, Pearson Education.
4. GRE and TOEFL, Kaplan and Baron's, Latest editions.

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T264 - NUMERICAL METHODS

Lecture	**: 4 Periods/week**	**Internal Marks**	**: 25**
Tutorial	**: 1 Period/Week**	**External Marks**	**: 75**
Credits	**: 4**	**External Examination**	**: 3 Hrs**

UNIT - I

Linear systems of equations: Rank-Echelon form, Normal form – Solution of Linear Systems – Direct Methods- Gauss Elimination - Gauss Jordon and Gauss Seidal Methods. Eigen values – Eigen Vectors – Properties – Cayley Hamilton Theorem – Inverse and Powers of a matrix by using Cayley Hamilton Theorem.

UNIT - II

Quadratic forms – Reduction to Canonical form – Rank and Nature of Quadratic form. Solution of Algebraic and Transcendental Equations: Introduction – The Method of False Position – Newton-Raphson Method.

UNIT - III

Interpolation: Introduction- Errors in Polynomial Interpolation – Finite differences- Forward Differences- Backward differences –Central differences – Symbolic relations and separation of symbols-Differences of a polynomial- Newton's formulae for interpolation – Lagrange's Interpolation formula.

UNIT - IV

Numerical Differentiation and Integration – Differentiation using finite differences – Trapezoidal rule – Simpson's 1/3 Rule –Simpson's 3/8 Rule.

UNIT - V

Numerical solution of Ordinary Differential equations: Solution by Taylor's series-Picard's Method of successive Approximations-Euler's Method-Runge- Kutta Methods –Predictor-Corrector Methods- Milne's Method. Curve fitting: Fitting a straight line –Second degree curve-exponential curve by method of least squares.

TEXT BOOKS

1. Higher Engineering Mathematics by Dr. B.S. Grewal
2. Higher Engineering Mathematics by Dr. B. V. Ramana – TMGH

REFERENCES

1. Introductory Methods of Numerical Analysis by S. S. Sastry – PHI
2. Numerical Methods for Engineers with programming and software application by Steven .C. Chopra and Ra. P. Canale – TMGH
3. Numerical Methods for scientific and engineering by M. K. Jain, S. R. K. Iyengar – New Age International ltd.

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T120 – APPLIED PHYSICS

Lecture	: 3 Periods/week	Internal Marks	: 25
Tutorial	: 1 Period/Week	External Marks	: 75
Credits	: 3	External Examination	: 3 Hrs

UNIT - I

PRINCIPLES OF QUANTUM MECHANICS: de Broglie hypothesis- Matter waves- Davison and Germer experiment- Heisenberg Uncertainty principle-Schrodinger time independent wave equation- Physical significance of the wave function-particle in a box.

UNIT - II

ELECTRON THEORY OF METALS : Classical free electron theory- Mean free path-Relaxation time and drift velocity-Quantum free electron theory- Fermi-Dirac distribution(analytical) and its dependence on temperature-Fermi energy.
SEMICONDUCTORS: Introduction-Intrinsic Semiconductor and carrier concentration – Equation for conductivity – Extrinsic Semiconductor and carrier concentration- Drift and diffusion – Einstein's Equation- Hall effect – Direct and indirect band gap semiconductors.

UNIT - III

MAGNETIC MATERIALS: Magnetic parameters-Origin of magnetic moment-Classification of magnetic materials- Dia, Para, Ferro magnetic , Antiferromagnetic , Ferrimagnetic materials- Quantum theory of Ferromagnetism-Curie-Weiss Law , Domain theory of ferromagnetism, Hysteresis curve- Soft and Hard magnetic materials. Structure of Ferrites, Applications of magnetic materials

UNIT - IV

DIELECTRIC PROPERTIES: Introduction – Dielectric constant- Electronic, Ionic and Orientational polarizations- internal fields in solids- Clausius – Mossotti equation- - frequency dependence of the polarizability- Ferro and Piezo electricity.

UNIT - V

PHYSICS OF NANOMATERIALS: Introduction – Properties and preparation of Nano Materials- Surface occupancy-Reduction of Dimensionality-Quantum wires- Quantum dots and Quantum wells- Carbon Nanotubes- Applications of nanomaterials

TEXT BOOKS

1. Introduction to Solid State Physics by C. Kittel, 7th Edition, John Wiely & Sons, New Delhi, (1996).
2. Solid State Physics by A.J.Dekker, Rajiv-Beri for Macmilan India Ltd, New Delhi, (2000).

REFERENCES

1. Engineering Physics by V. Rajendran, Tata McGraw-Hill, New Delhi, (2010).
2. Engineering physics by H.K. Malik, A.K. Singh, Tata McGraw-Hill, New Delhi, (2009).
3. Introduction to Solid State Physics by C. Kittel, 7th Edition,John Wiely & Sons, New Delhi, (1996).

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T188 – ELECTRONIC DEVICES AND CIRCUITS

Lecture	: 4 Periods/week	Internal Marks	: 25
Tutorial	: 1 Period/Week	External Marks	: 75
Credits	: 4	External Examination	: 3 Hrs

UNIT - I

JUNCTION DIODE CHARACTERISTICS : Review of semi conductor Physics – n and p –type semi conductors, Mass Action Law, Continuity Equation, Hall Effect, Fermi level of semiconductors, Energy band diagram of PN diode, PN diode-biasing, The current components, Diode equation, V-I characteristics, Temperature dependence of VI characteristic, Transition and Diffusion capacitances, Breakdown Mechanisms in p-n Diode, Zener diode, Tunnel Diode, Varactar Diode, LED, LCD. And photo diode

UNIT - II

RECTIFIERS AND FILTERS : Half wave rectifier, ripple factor, full wave rectifier, Harmonic components in a rectifier circuit, Inductor filter, Capacitor filter, L- ?section filter, Π- section filter, Multiple L- section and Multiple Πsection filter, and comparison of various filter circuits? in terms of ripple factors, basics of regulators.

UNIT - III

TRANSISTOR and FET CHARACTERISTICS : Junction transistor, Transistor current components, Transistor as an amplifier, Transistor construction, Current components in a transistor, Input and Output characteristics of transistor in Common Base, Common Emitter, and Common collector configurations, Relation between Alpha,Beta and gama, FET- JFET characteristics, Small signal model of JFET, MOSFET characteristics (Enhancement and depletion mode), Comparison of Transistors, Introduction to SCR and UJT.

UNIT - IV

BIASING AND STABILISATION : BJT biasing, DC equivalent model, criteria for fixing operating point, Fixed bias, Collector to base bias, Self bias techniques for stabilization, Stabilization factors, (S, S', S''), Compensation techniques, (Compensation against variation in V_{BE}, I_{co},) Thermal run away, Thermal stability.

UNIT - V

AMPLIFIERS: Small signal low frequency transistor amplifier circuits: h-parameter representation of a transistor, 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 A_I , R_i , A_v , R_o, Introduction to feedback Amplifier and Oscillators.

TEXT BOOK

Electronic Devices and Circuits – J.Millman, C.C.Halkias, and Satyabratha Jit Tata McGraw Hill, 2nd Ed., 2007.

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REFERENCES

1. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, Pearson/Prentice Hall,9th Edition,2006.
2. Electronic Devices and Circuits – S Salivahanan, N.Suresh Kumar and A Vallavaraj, McGraw Hill, 5th edition, 2010.
3. Electronic Devices and Circuits – T.F. Bogart Jr., J.S.Beasley and G.Rico, Pearson Education, 6th edition, 2004.
4. Principles of Electronic Circuits – S.G.Burns and P.R.Bond, Galgotia Publications, 2nd Edn.., 1998.
5. Microelectronics – Millman and Grabel, Tata McGraw Hill, 1988.
6. Electronic Devices and Circuits – Dr. K. Lal Kishore, B.S. Publications, 2nd Edition, 2005.
7. Electronic Devices and Circuits- Prof GS N Raju I K International Publishing House Pvt. Ltd 2006.

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T135 – CIRCUIT THEORY

Lecture	**: 4 Periods/week**	**Internal Marks**	**: 25**
Tutorial	**: 1 Period/Week**	**External Marks**	**: 75**
Credits	**: 3**	**External Examination**	**: 3 Hrs**

UNIT - I

DC Circuits: Basic components and electrical circuits, charge, current, voltage & power. Voltage and current sources, ohms law, current & voltage law & Kirchhoff's current & voltage law .The single node-pair circuit, series and parallel connected independent sources, resistor in series and parallel, voltage and current division, basic nodal and mesh analysis. Nodal and mesh analysis. Introduction to network topology, trees and nodal analysis. Links and loop analysis.

UNIT - II

A.C Circuits: R.M.S and Average values and form factor for different periodic wave forms, Steady state analysis of R, L and C (in series, parallel and series parallel combinations) with sinusoidal excitation – Concept of self and mutual inductances – co-efficient of coupling series circuit analysis with mutual inductance. Resonance – series, parallel circuits, concept of band width and Q factor. Three phase circuits: Phase sequence – Star and delta connection – Relation between line and phase voltages and currents in balanced systems – Calculations of active and reactive power.

UNIT - III

Network Theorems: Tellegens, Superposition, Reciprocity, Thevinin's, Norton's, Max Power Transfer theorem. Milliman's Theorem – Statement and proofs problem solving using dependent and independent sources for d.c and a.c excitation.

UNIT – IV

Transient Analysis : Transient response of R-L, R-C, R-L-C circuits (Series combinations only) for d.c. and sinusoidal excitations – Initial conditions - Solution using differential equation approach and Laplace transform methods of solutions.

UNIT - V

Two-port networks and Filters : Z,Y, ABCD, h-parameters – Conversion of one parameter to another parameter – condition for reciprocity and symmetry – 2 port network connections in series, parallel and cascaded – problem solving. L.P, H.P, B.P, B.E, Prototype filters design – M-derived filters of L.P. and H.P.- Composite filter design of L.P. and H.P design of various symmetrical attenuators.

TEXT BOOK

Network Analysis – ME Van Valkenburg, Prentice Hall of India, 3rd Edition, 2000.

REFERENCES

1. Engineering Circuit Analysis – William Hayt and Jack E Kemmerly, McGraw Hill, 5th Edition, 1993.
2. Network Analysis – N.C.Jagan and C.Lakshminarayana, B.S. Publications, 2006.
3. Electric Circuits – J.Edminister and M.Nahvi – Schaum's Outlines, TMH, 1999.
4. Networks, Lines and Fields - JD Ryder, PHI, 2nd Edition, 1999.

P829 - ENGINEERING DRAWING THROUGH AUTO CAD LAB.

		Internal Marks	**: 25**
Lab/Practicals	**: 3 Period/Week**	**External Marks**	**: 75**
Credits	**: 2**	**External Examination**	**: 3Hrs**

UNIT - I

Introduction to Engineering Drawing and its importance -Introduction to Computer Aided Drafting, Auto CAD commands, Setup Commands, Drawing Commands, Editing Commands , Dimensioning Commands -Theory of Projection – Elements of projection, planes of projection, and methods of projection.
Orthographic Projection - Lines used in general engineering drawing, types of surfaces, invisible lines, precedence of lines, selection of views, principles of multi view drawing, steps to draw orthographic views, orthographic projection of different objects.

UNIT - II

Isometric Drawing- Theory of isometric projection-Isometric view and Isometric projection Isometric projection from Orthographic views for simple objects.

UNIT – III

Projections of points - Projection of straight Lines –Various positions of straight lines w.r.t reference planes, inclined to both planes.

UNIT – IV

Projections of Planes –Introduction, Planes parallel to reference planes, inclined to one reference plane and perpendicular to other, planes perpendicular to both reference planes, planes inclined to both reference planes.

UNIT - V

Projections of Solids –Types of solids, Polyhedra, solids of revolution, Projection of solids in simple position, projection of solids with axis inclined to one reference plane and parallel to other.

TEXT BOOKS

1. Engineering Graphics with AutoCAD by Bethune PHI Learning Private Limited, New Delhi, 2009.
2. Engineering Graphics with AutoCAD by M. Kulkarni, A.P Rastogi, and A.K. Sarkar; PHI Learning Private Limited, New Delhi, 2009
3. Engineering Drawing by N.D. Bhatt, Charitor publications.

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P827 – ELECTRONIC DEVICES AND CIRCUITS USING LAB.VIEW

		Internal Marks	**: 25**
Lab/ Practicals : 3 Period/Week		**External Marks**	**: 75**
Credits	**: 2**	**External Examination**	**: 3 Hrs**

CYCLE - 1:

1. Resistor Color coding
2. Series & parallel Resistance
3. Signal Generation
4. Zener diode characteristics
5. Full wave Rectifier without & with filters
6. Transistor CE characteristics

CYCLE - 2:

1. PN junction diode characteristics
2. Transistor CB characteristics
3. FET characteristics
4. CE Amplifier
5. CC Amplifier
6. FET Amplifier

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III-SEMESTER

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T187 – ELECTRONIC CIRCUITS

Lecture	: 4 Periods/week	Internal Marks	: 25
Tutorial	: 1 Period/Week	External Marks	: 75
Credits	: 5	External Examination	: 3 Hrs

UNIT - I

SMALL SIGNAL AMPLIFIERS : Common emitter amplifier with emitter resistance, Emitter follower, FET small signal model, Low frequency common source and common drain amplifiers, FET as Voltage Variable Resistor, Cascading Transistor Amplifiers, High input Resistance Transistor Circuits – Darlington pair, Cascode amplifier, Frequency response and analysis of RC Coupling, Direct coupling and Transformer coupling, Difference amplifier, Two Stage RC Coupled JFET amplifiers (in Common Source (CS) configuration). Transistor at High Frequencies, Hybrid- π Common Emitter transistor model, Hybrid- π conductances, Hybrid π capacitances, Validity of hybrid π model, Variation of Hybrid Parameters, CE short circuit gain, Current gain with resistive load, Single stage CE transistor amplifier response, Gain Bandwidth product, Emitter follower at High frequencies.

UNIT - II

LARGE SIGNAL AMPLIFIERS : Classification of amplifiers, Class A large signal amplifiers, second harmonic distortion, higher order harmonic distortion, transformer-coupled class A audio power amplifier – efficiency of Class A amplifiers. Class B amplifier – efficiency - push-pull amplifier - distortion in amplifiers - complementary-symmetry (Class B) push-pull amplifier, Class C,Class D amplifier – Class S amplifier – MOSFET power amplifier, Thermal stability and heat sink.

UNIT - III

FEEDBACK AMPLIFIERS: Block diagram, Loop gain, Gain with feedback, Effects of negative feedback – Sensitivity and desensitivity of gain, Cut-off frequencies, distortion, noise, input impedance and output impedance with feedback, Four types of negative feedback connections – voltage series feedback, voltage shunt feedback, current series feedback and current shunt feedback, Method of identifying feedback topology and feedback factor, Nyquist criterion for stability of feedback amplifiers.

UNIT - IV

OSCILLATORS : Classification, Barkhausen Criterion - Mechanism for start of oscillation and stabilization of amplitude, General form of an Oscillator, Analysis of LC oscillators - Hartley, Colpitts, Clapp, Franklin, Armstrong, Tuned collector oscillators, RC oscillators - phase shift – Wienbridge - Twin-T Oscillators, Frequency range of RC and LC Oscillators, Quartz Crystal Construction, Electrical equivalent circuit of Crystal, Miller and Pierce Crystal oscillators, frequency stability of oscillators.

UNIT - V

TUNED AMPLIFIERS AND VOLTAGE REGULATORS: Introduction, Q-Factor, Small Signal Tuned Amplifier – Capacitance single tuned amplifier, Double Tuned Amplifiers, Effect of Cascading Single tuned amplifiers on Band width, Effect of Cascading Double tuned amplifiers on Band width, Staggered tuned amplifiers, Stability of tuned amplifiers, Voltage regulation – Line Regulation, Load Regulation, Types of Regulators, Series voltage regulator, shunt regulators, Overload Voltage protection.

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TEXT BOOK

Millman J and Halkias .C., Integrated Electronics, TMH, 2007.

REFERENCES

1. Robert L. Boylestad and Louis Nashelsky, Electronic Devices and Circuit Theory, 9th Edition, Pearson Education / PHI, 2007.
2. Sedra / Smith, Micro Electronic Circuits Oxford University Press, 2004.
3. S. Salivahanan, N. Suresh Kumar and A. Vallavaraj, Electronic Devices and Circuits, 2nd Edition, TMH, 2007.

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T306 – SIGNALS AND SYSTEMS

Lecture	**: 4 Periods/week**	**Internal Marks**	**: 25**
Tutorial	**: 1 Period/Week**	**External Marks**	**: 75**
Credits	**: 4**	**External Examination**	**: 3 Hrs**

UNIT - I

SIGNAL ANALYSIS : Classification of signals, Analogy between vectors and signals, Norm of a Vector, Orthogonal signal space, Signal approximation using orthogonal functions, Mean square error, Closed or complete set of orthogonal functions, Orthogonality in complex functions, Exponential and sinusoidal signals, Concepts of Impulse function, Unit step function, Signum function.

UNIT - II

FOURIER SERIES AND FOURIER TRANSFORMS: Representation of Fourier series, Continuous time periodic signals, properties of Fourier series, Dirichlet's conditions, Trigonometric Fourier series and Exponential Fourier series, Complex Fourier spectrum, Deriving Fourier transform from Fourier series, Fourier transform of arbitrary signal, Fourier transform of standard signals, Fourier transform of periodic signals, properties of Fourier transforms, Fourier transforms involving impulse function and Signum function. Introduction to Hilbert Transform and its application to Band Pass signals.

UNIT - III

SIGNAL TRANSMISSION THROUGH LINEAR SYSTEMS: Classification of Systems, impulse response, Response of a linear system, convolution in time domain and frequency domain, 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, relationship between bandwidth and rise time. Cross correlation and auto correlation of functions, properties of correlation function, Relation between convolution and correlation, Energy density spectrum, Parseval's theorem, Power density spectrum, Relation between auto correlation function and energy/power spectral density function.

UNIT - IV

LAPLACE TRANSFORMS : Review of Laplace transforms, Partial fraction expansion, Inverse Laplace transform, Concept of region of convergence (ROC) for Laplace transforms, constraints on ROC for various classes of signals, Properties of L.T's relation between L.T's, and F.T. of a signal. Laplace transform of certain signals using waveform synthesis.

UNIT - V

Z–TRANSFORMS : Fundamental difference between continuous and discrete time signals, discrete time signal representation using complex exponential and sinusoidal components, Periodicity of discrete time using complex exponential signal, Concept of Z- Transform of a discrete sequence. Distinction between Laplace, Fourier and Z transforms. Region of convergence in Z-Transform, constraints on ROC for various classes of signals, Inverse Z-transform, properties of Z-transforms.

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TEXT BOOK

Signals, Systems & Communications - B.P. Lathi, BS Publications, 2003.

REFERENCES

1. Signals & Systems - Simon Haykin and Van Veen,Wiley, 2nd Edition.
2. Signals and Systems - A.V. Oppenheim, A.S. Willsky and S.H. Nawab, PHI, 2nd Edn.
3. Communication Systems - Simon Haykin, John Wiley, 2nd Ed.
4. Signals, Systems and Transforms - C. L. Philips, J.M.Parr and Eve A.Riskin, Pearson education.3rd Edition, 2004.

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T320 – SWITCHING THEORY AND DIGITAL LOGIC

Lecture	**: 4 Periods/week**	**Internal Marks**	**: 25**
Tutorial	**: 1 Period/Week**	**External Marks**	**: 75**
Credits	**: 4**	**External Examination**	**: 3 Hrs**

UNIT - I

NUMBER SYSTEMS & BOOLEAN ALGEBRA : Philosophy of number systems – complement representation of negative numbers-binary arithmetic-binary codes-error detecting & error correcting codes – hamming codes.
Fundamental postulates of Boolean Algebra - Basic theorems and properties - switching functions–Canonical and Standard forms-Algebraic simplification of digital logic gates, properties of universal gates-Multilevel NAND/NOR realizations.

UNIT - II

MINIMIZATION OF SWITCHING FUNCTIONS:
Map method, Prime implicants, Don't care combinations, Minimal SOP and POS forms, Tabulation Method, Prime –Implicant chart, simplification rules.

UNIT - III

COMBINATIONAL LOGIC DESIGN: Design using conventional logic gates, Encoder, Decoder, Multiplexer, De-Multiplexer, Modular design using IC chips MSI & LSI: MUX Realization of switching functions, Parity bit generator, Code-converters.
PROGRAMMABLE LOGIC DEVICES Basic PLD's-ROM, PROM, PLA, PLD. Realization of Switching functions using PLD's.

UNIT - IV

SEQUENTIAL CIRCUITS: Classification of sequential circuits (Synchronous, Asynchronous, Pulse mode, Level mode with examples) Basic flip-flops-Triggering and excitation tables. Steps in synchronous sequential circuit design. Design of modulo-N Ring & Shift counters, Serial binary adder, sequence detector.
Finite state machine-capabilities and limitations, Mealy and Moore models-minimization of completely specified and incompletely specified sequential machines, Partition techniques and Merger chart methods-concept of minimal cover table.

UNIT - V

ALGOROTHIMIC STATE MACHINES: Salient features of the ASM chart-Simple examples-System design using data path and control subsystems-control implementations-examples.

TEXT BOOKS

Digital Design – Morris Mano, PHI, 3rd Edition, 2006.

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Department of Electronics & Communication Engineering
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REFERENCES

1. Digital Design, J F Wakerly, Prentice Hall 2000
2. Digital Electronics, 3rd Edition, RP Jain, Modern TMH, 2000
3. Switching & Finite Automata theory – Zvi Kohavi, TMH,2nd Edition.
4. An Engineering Approach To Digital Design – Fletcher, PHI.
5. Digital Integrated Electronics, Taub and Schilling, Mc-Graw Hill, 1977.
6. Fundamentals of Logic Design – Charles H. Roth, Thomson Publications, 5th Edition, 2004.
7. Digital Logic Applications and Design – John M. Yarbrough, Thomson Publications, 2006.

LBRCE EXAMINATION SECTION

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Department of Electronics & Communication Engineering
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T199 – ENVIRONMENTAL STUDIES

Lecture	: 3 Periods/week	Internal Marks	: 25
Tutorial	: 1	External Marks	: 75
Credits	: 3	External Examination	: 3 Hrs

UNIT - I

Multidisciplinary nature of Environmental Studies: Definition, Scope and Importance – Need for Public Awareness.

Natural Resources : Renewable and non-renewable resources – Natural resources and associated problems – Forest resources – Use and over – exploitation, deforestation, case studies – Timber extraction – Mining, dams and other effects on forest and tribal people – Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems -Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. - Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. Energy resources: Growing energy needs, renewable and non-renewable energy sources use of alternate energy sources. Case studies. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles. **[11 Lectures]**

UNIT – II

Ecosystems : Concept of an ecosystem. - Structure and function of an ecosystem.- Producers, consumers and decomposers. - Energy flow in the ecosystem – Ecological succession. - Food chains, food webs and ecological pyramids.

Biodiversity and its conservation: Introduction - Definition: genetic, species And ecosystem diversity. - Bio-geographical classification of India - Value of Biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. - India as a mega diversity nation - Hot-spots of biodiversity - Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. - Endangered and endemic species of India – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

[11 Lectures]

UNIT – III

Environmental Pollution: Definition, Types, Cause, effects and control measures of:

a. Air pollution
b. Water pollution
c. Soil pollution
d. Marine pollution
e. Noise pollution
f. Thermal pollution
g. Nuclear hazards

Solid waste Management: Causes, effects and control measures of urban and industrial wastes. - Role of an individual in prevention of pollution. - Pollution case studies. - Disaster management: floods, earthquake, cyclone and landslides. **[11 Lectures]**

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UNIT – IV

Social Issues and the Environment: From Unsustainable to Sustainable development - Urban problems related to energy -Water conservation, rain water harvesting, watershed management -Resettlement and rehabilitation of people; its problems and concerns. Case Studies -Environmental ethics: Issues and possible solutions. -Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies. - Wasteland reclamation. – Consumerism and waste products. **[11 Lectures]**

UNIT – V

Human Population and the Environment: Population growth, variation among nations. Population explosion – Family Welfare Programme -Environment and human health. - Human Rights. -Value Education. HIV/AIDS. -Women and Child Welfare. -Role of information Technology in Environment and human health. –Case Studies. Environment Protection Act. -Air (Prevention and Control of Pollution) Act. –Water (Prevention and control of Pollution) Act -Wildlife Protection Act -Forest Conservation Act -Issues involved in enforcement of environmental legislation. -Public awareness. **[11 Lectures]**

TEXT BOOKS

1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.
2. Environmental Studies by R. Rajagopalan, Oxford University Press.

REFERENCES

Textbook of Environmental Sciences and Technology by M. Anji Reddy BS Publication.

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T266 – OBJECT ORIENTED PROGRAMMING (C++)

Lecture	: 4 Periods/week	Internal Marks	: 25
Tutorial	: 1 Period/Week	External Marks	: 75
Credits	: 4	External Examination	: 3 Hrs

UNIT - I

Introduction:
OOP Paradigm ,OOPS principles, Merits of OOP languages, Demerits of Procedure Oriented Programming languages,C++ Overview, Data types, Identifers, Operators, Type casting, C++ Characteristics, Difference between class and structure, declaration of variables, dynamic initialization of variables, *new* and *delete* operators, I/O Manipulators.

UNIT - II

Classes and Objects:
Defining Classes in C++, accessing class members, access specifiers(Public and Private),defining member functions, static data members, static member functions, friend functions, friend classes, inline functions, nested classes, passing objects to functions, returning objects, object assignment, Array of objects, Constructor and Destructor , *constant* and *volatile* keywords, constant and volatile member functions

UNIT - III

Inheritance:
Base class, derived class, access specifier (Protected), scope rules, abstract base class, virtual base class, single inheritance, multiple inheritance, multilevel inheritance, hierarchical inheritance and hybrid inheritance, calling base class constructors.
String class-Usage of standard library *string class* with example programs.

UNIT - IV

Polymorphism:
Pointers, Pointers to objects, 'this' Pointer, Pointers to derived Classes. Concept of Polymorphism, Compile time Polymorphism: Operator Overloading, Overloading Unary Operators, and Overloading Binary Operators, Function Overloading,
Run time Polymorphism: Virtual functions, Pure Virtual Functions.
Templates: Introduction, Class Templates, Function Templates.

UNIT - V

Files and Exception Handling:
Exception Handling: Introduction, Mechanism, throw, catch, Specifying Exceptions.
I/O Streams: C++ Streams, C++ Stream classes, Unformatted I/O Operations, Formatted I/O Operations, Formatting using Manipulators.
C++ Files: Introduction, Classes for file stream Operations, Opening and closing a file, detecting end-of-file, I/O Operations, command line arguments.

TEXT BOOK
Herbert Schildt, The Complete Reference C++, Fourth Edition, Tata McGraw Hill.

REFERENCES
1. E.Balaguruswamy, Object Oriented Programming with C++, Third Edition, TMH.
2. Deitel & Deitel, C++ How to Program, Third Edition, Pearson Education.
3. Ashok N Kamthane, Object Oriented Programming with ANSI& Turbo C++.

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T286 – PROBABILITY THEORY AND STOCHASTIC PROCESSES

Lecture	**: 4 Periods/week**	**Internal Marks**	**: 25**
Tutorial	**: 1 Period/Week**	**External Marks**	**: 75**
Credits	**: 4**	**External Examination**	**: 3 Hrs**

UNIT - I

RANDOM VARIABLES : Discrete and continuous random variables – Moments - Moment generating functions and their properties. Binomial, Poisson ,Geometric, Uniform, Exponential, Gamma and normal distributions – Function of Random Variable.

UNIT - II

TWO DIMENSIONAL RANDOM VARIBLES: Joint distributions - Marginal and conditional distributions – Covariance - Correlation and Regression - Transformation of random variables - Central limit theorem (for iid random variables)

UNIT - III

CLASSIFICATION OF RANDOM PROCESSES : Definition and examples - first order, second order, strictly stationary, wide-sense
stationary and ergodic processes - Markov process - Binomial, Poisson and Normal processes - Sine wave process – Random telegraph process.

UNIT - IV

CORRELATION AND SPECTRAL DENSITIES: Auto correlation - Cross correlation - Properties – Power spectral density – Cross
spectral density - Properties – Wiener-Khintchine relation – Relationship between cross power spectrum and cross correlation function.

UNIT - V

LINEAR SYSTEMS WITH RANDOM INPUTS: Linear time invariant system - System transfer function – Linear systems with random inputs – Auto correlation and cross correlation functions of input and output – white noise.

TEXT BOOK

Peebles Jr. P.Z., "Probability Random Variables and Random Signal Principles", Tata McGraw-Hill Publishers, Fourth Edition, New Delhi, 2002.

REFERENCES

1. Oliver C. Ibe, "Fundamentals of Applied probability and Random processes", Elsevier, First Indian Reprint (20072. Miller,S.L and Childers, S.L, "Probability and andom Processes with applications to Signal Processing and Communications", Elsevier Inc., First Indian Reprint 2007.
2. H. Stark and J.W. Woods, "Probability and Random Processes with Applications to Signal Processing", Pearson Education (Asia), 3rd Edition, 2002.
3. Hwei Hsu, "Schaum's Outline of Theory and Problems of Probability, Random Variables and Random Processes", Tata McGraw-Hill edition, New Delhi, 2004.

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P826 – ELECTRONIC CIRCUITS LAB

Lab.	**: 3 Periods/week**	**Internal Marks**	**: 25**
		External Marks	**: 75**
Credits	**: 2**	**External Examination**	**: 3 Hrs**

List of Experiments (Twelve experiments to be done) :

PART-I: Design and Simulation in Simulation Laboratory

1. Common Emitter , Common Source and Common Collector amplifiers
2. Two Stage RC Coupled Amplifier
3. Series and Shunt Feedback Amplifiers
4. Cascade Amplifier
5. Oscillators
6. Power Amplifiers
7. High Frequency Common base (BJT) / Common Gate(JFET) Amplifiers.

PART-II -Testing in the Hardware Laboratory

1. Common Emitter , Common Source and Common Collector amplifiers
2. Two Stage RC Coupled Amplifier
3. Series and Shunt Feedback Amplifiers
4. Cascade Amplifier
5. Oscillators
6. Power Amplifiers
7. High Frequency Common base (BJT) / Common Gate(JFET) Amplifiers.

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P861– OBJECTED ORIENTED PROGRAMMING (C++) LAB

Lab.	**: 3 Periods/week**	**Internal Marks**	**: 25**
		External Marks	**: 75**
Credits	**: 2**	**External Examination**	**: 3 Hrs**

OBJECTIVES

- To make the students familiar with the concepts of Object Oriented Programming using C++

1. Write a C++ program to find the sum of individual digits of a positive integer.
2. Write a C++ program to generate the first 'n' terms of the sequence. A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are formed by adding the preceding two terms in the sequence.
3. Write a C++ program to generate all the **prime numbers** between 1 and n. Where 'n' is a value supplied by the user.
4. Write a C++ programs that use both **recursive** and **non-recursive** functions

a) To find the factorial of a given integer.
b) To find the GCD of two given integers.
c) To find the n^{th} Fibonacci number.

5. Write a C++ program to perform addition, subtraction and multiplication operations on two complex numbers using **classes and objects.**
6. Write a C++ program to find out the total and average marks of 10 students using **Classes and objects?**
7. Write a C++ program to implement **static data members** and **static member functions**
8. Write a C++ program to implement the **matrix ADT using** a class. The operations Supported by this ADT are:

a) Reading a matrix.
b) Displaying a matrix
c) Addition of matrices.
d) Multiplication of matrices.

9. Write a C++ program to illustrate the usage of following:
Default Constructor, **Parameterized** Constructor, **Copy** Constructor and **Destructor**
10. Write a C++ program that illustrates the following:
a) **Friend** Function b) **inline** function
11. Write C++ programs that illustrates the usage of following forms of **inheritance.** (Exercise the access specified *protected* also)

a) Single Inheritance
b) Multiple Inheritance
c) Multi level Inheritance
d) Hierarchical Inheritance

12. Write a C++ program to count the lines, words and characters in a given text using standard library **string object.**
13. Write a C++ program that illustrates the concept of **Function over loading**?
14. Write a C++ program that overloads the **binary + operator** to concatenate two strings and to add two complex numbers.
15. Write a C++ program that overloads the **unary ++ operator** to increment each element of the given one dimensional array by '1'?
16. Write a C++ program that illustrates **run time polymorphism** by using virtual functions.
17. Write a **template** based C++ program to check whether the given item is existed in the array or not.
18. Write an example C++ program to illustrate the procedure of **exceptions handling.**
19. Write a C++ program to display the contents **of a text file.**
20. Write a C++ program which **copies the contents of one file to another.**

TEXT BOOKS

1. Data Structures and Algorithms in C++, Third Edition, Adam Drozdek, Thomson.
2. Data Structures using C++, D.S. Malik.

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T295 – PULSE AND SWITCHING TECHNIQUES

Lecture	: 4 Periods/week	Internal Marks	: 25
Tutorial	: 1 Period/Week	External Marks	: 75
Credits	: 4	External Examination	: 3 Hrs

UNIT - I

LINEAR AND NON-LINEAR WAVE SHAPING: High pass, low pass RC circuits, their response for sinusoidal, step, pulse, square and ramp inputs. RC network as differentiator and integrator, double differentiation, attenuators, RL and RLC circuits and their response for step input, Diode clippers, Transistor clippers, clipping at two independent levels, Transfer characteristics of clippers, Emitter coupled clipper, Comparators, applications of voltage comparators, clamping operation, clamping circuits using diode with different inputs, Clamping circuit theorem, practical clamping circuits, effect of diode characteristics on clamping voltage, Transfer characteristics of clampers.

UNIT - II

SWITCHING CHARACTERISTICS OF DEVICES : Diode and Transistor as switches, Break down voltage consideration of transistor, saturation parameters of Transistor and their variation with temperature, Design of transistor switch, transistor-switching times.

UNIT - III

MULTIVIBRATORS :
Analysis & Design of Bistable Multivibrators : Fixed bias& self biased transistor binary, Commutating capacitors, Triggering in binary, Schmitt trigger circuit,Applications, Analysis & design of Monostable Multivibrator: Collector-coupled and Emitter-coupled Monostable multivibrators, Triggering in monostable multi; Analysis & design of Astable multivibrator (Collector coupled and Emitter-coupled) using transistors

UNIT - IV

TIMEBASE GENERATORS : General features of time base signals – RC ramp generator – constant current ramp generator, UJT saw tooth generator – Bootstrap ramp generator – Miller integrator ramp generator.

UNIT - V

BLOCKING OSCILLATORS: Blocking Oscillator – Free running blocking oscillator - Astable Blocking Oscillators with base timing – Push-pull Astable blocking oscillator with emitter timing, Triggered blocking oscillator – Monostable blocking oscillator with base timing – Monostable blocking oscillator with emitter timing,

TEXT BOOK

Millman J. and Taub H., M.S. P. Rao, Pulse Digital and Circuits, T.M.H

REFERENCES

1. A. Anadha Kumar, Pulse & Digital Circuits, P.H.I Publications,
2. Venkata rao K, Rama Sudha K, Manmadha rao.G, pearson publication

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T185 – ELECTRO MAGNETIC FIELDS AND WAVES

Lecture	**: 4 Periods/week**	**Internal Marks**	**: 25**
Tutorial	**: 1 Period/Week**	**External Marks**	**: 75**
Credits	**: 5**	**External Examination**	**: 3 Hrs**

Pre-requisite: Review of Co-ordinate systems, Vector Calculus.

UNIT - I

ELECTRIC FIELD: Coulomb's law - Electric field intensity, electric fields due to point charge, line charge, surface charge and volume charge distributions – Electric flux density -Gauss's law and its applications- Electric potential – Potential gradient, Maxwell's Two equations for Electro static Fields-Poisson and Laplace equations - Dipole and dipole moment, Capacitors - Capacitance of different configurations –Energy associated with different charge distributions – Energy density.

UNIT - II

MAGNETIC FIELD : Magnetic field intensity and Magnetic flux density–Biotsavart's law and applications – Ampere's law- Maxwell's Two equations for Magneto static Fields – Force on a current element, Force between current carrying conductors – Vector and Scalar Magnetic potential-Force and Torque on closed conductor-Faraday's law of electromagnetic induction– Lenz's law-Inductance of solenoids, toroids- Mutual inductance – Energy stored in magnetic fields and energy density –Boundary conditions.

UNIT - III

MAXWELL'S EQUATIONS: Equation of Continuity for Time varying fields, Inconsistency of Ampere's law and Displacement Current density-Maxwell's equations for Time varying fields, Free space- Maxwell's equations in different final forms and Word statements-Time varying Potentials, Retarded Potentials, Helmholtz's theorem.

UNIT - IV

ELECTROMAGNETIC WAVES-I : Wave equations for Conducting and Perfect Dielectric, Uniform plane wave –Relation between E and H- Wave propagation in a lossy medium, lossless medium, free space, good dielectric, good conductor – Depth of penetration – Polarization and different types.

UNIT - V

ELECTROMAGNETIC WAVES-II : Reflection and Refraction of plane waves –Normal and Oblique incidences for both perfect conductor and Perfect Dielectrics, Brewster angle, Critical angle, Total internal reflection, Surface impedance, Poynting theorem –Applications, Power loss in a plane Conductor.

TEXT BOOK

Matthew N.O.Sadiku, "Elements of Engineering Electromagnetics" Oxford University Press.

REFERENCES

1. William Hayt, "Electromagnetic fields, TMH,
2. Electronic fields and Radiating systems, Jordan and Balmain, Pearson edu.

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T114 – ANALOG COMMUNICATION SYSTEMS

Lecture	**: 4 Periods/week**	**Internal Marks**	**: 25**
Tutorial	**: 1 Period/Week**	**External Marks**	**: 75**
Credits	**: 4**	**External Examination**	**: 3 Hrs**

UNIT - I

AM, DSB and SSB MODULATION: Introduction to communication system, Need for modulation, Amplitude Modulation, Generation of AM waves, Demodulation of AM Waves, DSBSC, Generation of DSBSC Waves, quadrature–Carrier Multiplexing, SSB Modulation, Generation of AM SSB Modulated Waves, Vestigial side band modulation(VSB), Discussion, Frequency Translation, frequency (FDM).

UNIT - II

ANGLE MODULATION: Basic definitions: Phase Modulation(PM) and Frequency Modulation(FM), Single tone frequency modulation, Narrow band FM, Wide band FM, Multitone FM waves, Transmission bandwidth of FM Waves, Generation of FM Waves, Demodulation of FM waves, Response of Linear filters to FM waves, Non linear effects in FM systems.

UNIT - III

PULSE MODULATION: Sampling theorem, Sampling of Band-pass signals, Practical aspects of sampling, Reconstruction of a Message process from its samples, Types of Pulse modulation: TDM, PAM, PWM, PPM

UNIT - IV

TRANSMITTERS AND RECEIVERS: Radio Transmitter - Classification of Transmitter, AM Transmitter, Effect of feedback on performance of AM Transmitter, FM Transmitter – Variable reactance type and phase modulated FM Transmitter, frequency stability in FM Transmitter. Radio Receiver - Receiver Types - Tuned radio frequency receiver, Superhetrodyne receiver, RF section and Characteristics - Frequency changing and tracking, Intermediate frequency, AGC, FM Receiver, Comparison with AM Receiver, Amplitude limiting.

UNIT - V

NOISE EFFECTS : Noise, Narrow Band Noise, Envelope of Sine-Wave Plus Narrow Band Noise, SNR, Noise in DSB & SSB Systems, Noise in AM Receiver using envelope detector, Noise in Angle Modulation System, Threshold effect in Angle Modulation, Pre-emphasis & de-emphasis

TEXTBOOK

Communication Systems - Simon Haykin, John Wiley, 2nd Ed.,.

REFERENCES

1. Analog communications-sanjay sharma, 2nd Ed.,.
2. Principles of Communication Systems – H Taub & D. Schilling, Gautam Sahe, TMH, 2007 3rd Edition
3. Electronics & Communication System – George Kennedy and Bernard Davis, TMH 2004.

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T184 – ELECTRICAL TECHNOLOGY

Lecture	**: 4 Periods/week**	**Internal Marks**	**: 25**
Tutorial	**: 1 Period/Week**	**External Marks**	**: 75**
Credits	**: 4**	**External Examination**	**: 3 Hrs**

OBJECTIVE

This course introduces the concepts of various AC & DC machines and basic Instruments in Electrical Engineering discipline. The emphasis of this course is laid on the machines which include D.C.Machines, Transformers, three phase Induction motors, Alternators and Electrical Instruments.

UNIT - I

DC MACHINES: Principle of operation of DC Machines- EMF equation – Types of generators – Magnetization and load characteristics of DC generators
D.C. MOTORS : DC Motors – Types of DC Motors – Characteristics of DC motors – Losses and efficiency – Swinburne's test – Speed control of DC shunt motor – Flux and Armature voltage control methods.

UNIT - II

TRANSFORMERS: Principle of operation of single phase transformer – types – Constructional features Phasor diagram on No Load and Load – Equivalent circuit
Performance of transformers: Losses and Efficiency of transformer and Regulation – OC and SC tests – Predetermination of efficiency and regulation (Simple Problems).

UNIT - III

THREE PHASE INDUCTION MOTOR: Principle of operation of three-phase induction motors –Slip ring and Squirrel cage motors – Slip-Torque characteristics – Efficiency calculation – Starting methods.
Single phase induction motors: Principle of operation - Shaded pole motors – Capacitor motors,

UNIT - IV

ALTERNATORS : Alternators – Constructional features – Principle of operation – Types - EMF Equation – Distribution and Coil span factors – Predetermination of regulation by Synchronous Impedance Method – OC and SC tests.

UNIT - V

ELECTRICAL INSTRUMENTS: Basic Principles of indicating instruments – Moving Coil and Moving iron Instruments (Ammeters, Voltmeters and Energy Meters)

TEXT BOOK

Introduction to Electrical Engineering – M.S Naidu and S. Kamakshaiah, TMH Publ.

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REFERENCES

1. Principles of Electrical Engineering - V.K Mehta, S.Chand Publications.
2. Theory and Problems of basic electrical engineering - I.J. Nagarath amd D.P Kothari, PHI Publications
3. Essentials of Electrical and Computer Engineering - David V. Kerns, JR. J. David Irwin
4. Basic Electrical Engineering - T.K. Nagasarkar and M.S.Sukhija, Oxford University Press, 2005

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T236 – LINEAR CONTROL SYSTEMS

Lecture	**: 4 Periods/week**	**Internal Marks**	**: 25**
Tutorial	**: 1 Period/Week**	**External Marks**	**: 75**
Credits	**: 4**	**External Examination**	**: 3 Hrs**

UNIT - I

INTRODUCTION : Concepts of Control Systems- Open Loop and closed loop control systems and their differences- Different
examples of control systems- Classification of control systems, Feed-Back Characteristics, Effects of feedback. Mathematical models – Differential equations, Impulse Response and transfer functions - Translational and Rotational mechanical systems, Transfer Function of DC Servo motor - AC Servo motor- Synchro transmitter and Receiver, Block diagram representation of systems considering electrical systems as examples -Block diagram algebra – Representation by Signal flow graph - Reduction using mason's gain formula.

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 – Effects of proportional derivative, proportional integral systems.

UNIT - III

STABILITY DOMAIN ANALYSIS: The concept of stability – Routh's stability criterion – qualitative stability and conditional stability – limitations of Routh's stability
Root Locus Technique: The root locus concept - construction of root loci-effects of adding poles and zeros to G(s)H(s) on the root loci.

UNIT - IV

FREQUENCY RESPONSE ANALYSIS: Introduction, Frequency domain specifications-Bode diagrams-Determination of Frequency domain specifications and transfer function from the Bode Diagram-Phase margin and Gain margin-Stability Analysis from Bode Plots, Polar Plots, Nyquist Plots Stability Analysis, Compensation techniques – Lag, Lead, Lead-Lag Controllers design in frequency Domain, PID Controllers.

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 BOOK

Control Systems Engineering – by I. J. Nagrath and M. Gopal, New Age International (P) Limited, Publishers, 2nd edition.

REFERENCES

1. Automatic Control Systems 8th edition– by B. C. Kuo 2003– John wiley and son's.,
2. Modern Control Engineering – by Katsuhiko Ogata – Prentice Hall of India Pvt. Ltd., 3rd edition, 1998.
3. Control Systems by N.K.Sinha, New Age International (P) Limited Publishers, 3rd Edition, 1998.

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P825 – ELECTRICAL TECHNOLOGY LAB

Lecture	**: 3 Periods/week**	**Internal Marks**	**: 25**
		External Marks	**: 75**
Credits	**: 2**	**External Examination**	**: 3 Hrs**

PART – A

1. Serial and Parallel Resonance – Timing, Resonant frequency, Bandwidth and Q-factor determination for RLC network.
2. Time response of first order RC/RL network for periodic non-sinusoidal inputs – time constant and steady state error determination.
3. Two port network parameters – Z-Y Parameters, chain matrix and analytical verification.
4. Verification of Superposition and Reciprocity theorems.
5. Verification of maximum power transfer theorem. Verification on DC,verification on AC with Resistive and Reactive loads.
6. Experimental determination of Thevenin's and Norton's equivalent circuits and verification by direct test.

PART – B

1. Magnetization characteristics of D.C. Shunt generator. Determination of critical field resistance.
2. Swinburne's Test on DC shunt machine (Predetermination of efficiency of a given DC Shunt machine working as motor and generator).
3. Brake test on DC shunt motor. Determination of performance characteristics.
4. OC & SC tests on Single-phase transformer (Predetermination of efficiency and regulation at given power factors and determination of equivalent circuit).
5. Brake test on 3-phase Induction motor (performance characteristics).
6. Regulation of alternator by synchronous impedance method.

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P872 – SIGNAL ANALYSIS LAB USING MATLAB

Lecture	**: 3 Periods/week**	**Internal Marks**	**: 25**
		External Marks	**: 75**
Credits	**: 2**	**External Examination**	**: 3 Hrs**

LIST OF EXPERIMENTS

1. Basic Operations on Matrices.
2. Generation of Various Signals and Sequences (Periodic and Aperiodic), such as Unit impulse, unit step, square, saw tooth, triangular, sinusoidal, ramp, sinc.
3. Observations 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 parts of signal.
5. Convolution between signals and sequences.
6. Autocorrelation and cross correlation between signals and sequences.
7. Verification of linearity and time invariance properties of a given continuous/discrete system.
8. Computation of unit sample, unit step and sinusoidal responses of the given LTI system and verifying its physical realizability and stability properties.
9. Gibbs phenomenon.
10. Finding the Fourier transform of a given signal and plotting its magnitude and phase spectrum.
11. Waveform synthesis using Laplace Transform.
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 autocorrelation / cross correlation.
16. Extraction of periodic signal masked by noise using correlation.
17. Verification of winer-khinchine relations.
18. Checking a random process for stationarity in wide sense.

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P869 – PULSE AND DIGITAL CIRCUITS LAB

Lecture	**: 3 Periods/week**	**Internal Marks**	**: 25**
		External Marks	**: 75**
Credits	**: 2**	**External Examination**	**: 3 Hrs**

Minimum Twelve experiments to be conducted:

1. Wave shaping.
2. Diode and Transistor as switch.
3. Implementation of simple Boolean expression using universal gates
4. 2 to 4 MUX and implementation of combination logic
5. Half adder and Full adder
6. JK and RS flip flop implementation using logic gates
7. Synchronous up/down counter
8. Data transfer using shift registers
9. Sampling Gates.
10. Astable Multivibrator.
11. Monostable Multivibrator.
12. Bistable Multivibrator.
13. Schmitt Trigger.
14. UJT Relaxation Oscillator.
15. Bootstrap sweep circuit.

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V-SEMESTER

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T116 – ANTENNAS AND WAVE PROPAGATION

Lecture	**: 4 Periods/week**	**Internal Marks**	**: 25**
Tutorial	**: 1 Period/Week**	**External Marks**	**: 75**
Credits	**: 4**	**External Examination**	**: 3 Hrs**

UNIT - I

TRANSMISSION LINES: Transmission line Types, Parameters, Transmission line equations, Primary and Secondary Constants, Expressions for Characteristic Impedance and Propagation Constant, Infinite Line Concepts, Lossless, Low loss, Distortionless Transmission lines, Phase and Group Velocities, Loading of Lines and its types. Input Impedance relations, Short Circuit and Open Circuit Lines, UHF Lines as Circuit elements, Reflection Coefficient, VSWR, Power in a Transmission line, Matched Lines-λ/4, λ/2, λ/8 lines-Impedance Transformations-Losses in Transmission lines - Smith Chart – Applications of the Smith Chart, single stub matching and double stub matching.

UNIT - II

RADIATION FUNDAMENTALS: Definition and function of Antenna, Radiation Mechanism, Potential functions-heuristic approach, Maxwell's equation approach, Potential functions for sinusoidal oscillations, Analysis of Radiation fields of a Alternating current element , Power radiated by current element, Radiation resistance of current element, Radiation from quarter wave Monopole and half wave dipole, Radiation pattern expressions of Center-fed vertical Dipole, Center-fed Horizontal Dipole.

ANTENNA FUNDAMENTALS: Net work Theorems and their application to Antennas, Antenna Parameters: Radiation intensity- Radiation Pattern, Directive gain- Directivity- Power gain- Beam Width- Band Width- Gain -Reciprocity principle- Effective length and Effective area- Relation between gain, effective length and radiation resistance.

UNIT - III

ANTENNA ARRAY ANALYSIS: Various forms of Antenna Arrays, Linear and Circular arrays, Arrays of Two Point Sources, Linear Arrays of N-Point Sources, Expression for electric field from two, three and N element arrays- linear arrays: Broad-side array and End-Fire array- Binomial array, Patterns of Array of Non Isotropic Radiators, Method of pattern multiplication,Effect of Earth on Vertical Patterns, and on radiation resistance, Methods of Excitation of Antennas.

ARRAY SYNTHESIS: Definition of Synthesis, Different Synthesis Methods: Schelnuoff Polynomial Method, Fourier Transform Method, Woodward-Lawson Method, Dolph-Chebyshev Method, Taylor's Method, Laplace Transform Method, Standard Amplitude Distributions.

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UNIT - IV

HF,VHF and UHF Antennas : Introduction to Isotropic Radiators, Directional Antennas, Omni-Directional Antennas, Resonant Antennas, Non Resonant Antennas, LF Antennas, Different Antennas: Folded Dipole, Yagi-Uda Antenna, V-Antenna, Inverted V-Antenna, Rhombic Antenna, Loop Antenna, Helical Antenna, Log-Periodic Antenna.

MICROWAVE ANTENNAS: Different types of Reflectors, Corner, Parabolic Reflector Antennas, Feed System, Horn Antenna, Lens Antenna, Aperture Antennas, Microstrip or Patch Antenna, Slot Antenna.

UNIT – V

ANTENNA MEASUREMENTS: Reciprocity in Antenna measurements – Near-field and Far-field – Measurements ranges - Measurement of different Antenna parameters- Directional pattern, Radiation resistance, Gain (Two Antenna, Three Antenna Methods), Directivity, Beam width, SLR, Polarization, Impedance, Radiation Efficiency, Aperture Efficiency.

WAVE PROPAGATION: Fundamental equation for Free space Propagation, Modes of Wave Propagation: Ground wave or Surface wave Propagation, Sky wave or Ionospheric Propagation, Space wave Propagation, Tropospheric Scatter Propagation, Duct Propagation, Theoretical description and Mathematical analysis of these modes, Line of Sight, Ionospheric abnormalities, LUF, Fading, MUF, Skip Distance.

TEXT BOOK

G.S.N Raju, "Antennas and Wave Propagation", Pearson Education Pubishers.

REFERENCES

1.G.S.N Raju, "Electromagnetic Field Theory and Transmission lines", Pearson Education Pubishers.
2.Constantine A.Balanis, "Antenna Theory: Analysis and Design", John Wiley & Sons Publishers
3.K.D Prasad, "Antennas and Wave Propagation", Satya Prakashan Publishers

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T237 – LINEAR INTEGRATED CIRCUITS & APPLICATIONS

Lecture	: 4 Periods/week	Internal Marks	: 25
Tutorial	: 1 Period/Week	External Marks	: 75
Credits	: 4	External Examination	: 3 Hrs

UNIT - I

INTEGRATED CIRCUITS : Differential Amplifier- DC and AC analysis of Dual input Balanced output Configuration, Properties of other differential amplifier configuration (Dual Input Unbalanced Output, Single Ended Input – Balanced/ Unbalanced Output), DC Coupling and Cascade Differential Amplifier Stages, Level translator, Integrated circuits-Types, Classification, Package Types and temperature ranges, Power supplies, Op-amp Block Diagram, ideal and practical Op-amp specifications, 741 op-amp & its features, FET input. Op-Amps, Op-Amp parameters & Measurement

DC and AC characteristics: Input & Out put Off set voltages & currents, slew rates, CMRR, PSRR, drift, Frequency Compensation technique.

UNIT - II

APPLICATIONS OF OP- AMPS : Inverting and Non-inverting amplifier, Integrator and differentiator, Difference amplifier, Instrumentation amplifier, AC amplifier, V to I, I to V converters, Buffers. Non- Linear function generation, Comparators, Multivibrators, Triangular and Square wave generators, Log and Anti log amplifiers, Precision rectifiers. Four Quadrant multiplier, balanced modulator, IC 1496, Applications of analog switches and Multiplexers, Sample & Hold amplifiers.

UNIT - III

OSCILLATORS AND WAVEFORM GENERAGTORS : Introduction, Butter worth filters – 1st order, 2nd order LPF, HPF filters. Band pass, Band reject and all pass filters. Applications of VCO (566).

UNIT - IV

TIMERS & PHASE LOCKED LOOPS : Introduction to 555 timer, functional diagram, Monostable and Astable operations and applications, Schmitt Trigger. PLL - introduction, block schematic, principles and description of individual blocks, 565 PLL, Applications of PLL – frequency multiplication, frequency translation, AM, FM & FSK demodulators.

UNIT - V

D to A & A to D CONVERTERS : Introduction, basic DAC techniques, weighted resistor DAC, R-2R ladder DAC, inverted R-2R DAC, and IC 1408 DAC, Different types of ADCs - parallel comparator type ADC, counter type ADC, successive approximation ADC and dual slope ADC. DAC and ADC Specifications, Specifications AD 574 (12 bit ADC).

TEXT BOOK

Linear Integrated Circuits – D. Roy Chowdhury, New Age International (p) Ltd, 2nd Edition, 2003.

REFERENCES

1. Op-Amps & Linear ICs - Ramakanth A. Gayakwad, PHI,1987.
2. Design with Operational Amplifiers & Analog Integrated Circuits - Sergio Franco, McGraw Hill, 1988.

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T165 – DIGITAL SYSTEM DESIGN

Lecture	: 4 Periods/week	Internal Marks	: 25
Tutorial	: 1 Period/Week	External Marks	: 75
Credits	: 4	External Examination	: 3 Hrs

UNIT - I

LOGIC FAMILIES AND INTERFACING: Introduction to logic families, CMOS logic, CMOS steady state electrical behavior, CMOS dynamic electrical behavior, CMOS logic families. Bipolar logic, Transistor logic, TTL families, CMOS/TTL interfacing, low voltage CMOS logic and interfacing, Emitter coupled logic, Comparison of logic families, Familiarity with standard 74XX and CMOS 40XX series-ICs – Specifications.

UNIT - II

THE VHDL HARDWARE DESCRIPTION LANGUAGE AND VHDL DESIGN ELEMENTS: Design flow, program structure, types and constants, functions and procedures, libraries and packages, Structural design elements, data flow design elements, behavioral design elements, time dimension and simulation synthesis.

UNIT - III

COMBINATIONAL LOGIC DESIGN : Decoders, encoders, three state devices, multiplexers and demultiplexers, Code Converters, EX-OR gates and parity circuits, comparators, adders & subtractors, ALUs, Combinational multipliers. VHDL modes for the above ICs.

UNIT - IV

DESIGN EXAMPLES (USING VHDL): Design examples (using VHDL) - Barrel shifter, comparators, floating point encoder, dual parity encoder, Latches and flip-flops, PLDs, counters, shift register, and their VHDL models, synchronous design methodology, impediments to synchronous design.

UNIT - V

MEMORIES: ROMs Internal structure, 2D-decoding commercial types, timing and applications, Static RAM-Internal structure, SRAM timing, standard SRAMS, synchronous RAMS, Dynamic RAM-Internal structure, timing, synchronous DRAMs. Familiarity with Component Data Sheets –Cypress CY6116, CY7C1006, Specifications.

TEXT BOOK

Digital Design Principles & Practices – John F. Wakerly, PHI/ Pearson Education Asia, 3rd Ed., 2005.

REFERENCES

1. VHDL Primer – J. Bhasker, Pearson Education/ PHI,3rd Edition.
2. Digital System Design Using VHDL – Charles H. Roth Jr., PWS Publications,1998.
3. Introduction to Logic Design – Alan B. Marcovitz,TMH, 2nd Edition, 2005.

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T146 – COMPUTER ORIGANIZATION

Lecture	**: 3 Periods/week**	**Internal Marks**	**: 25**
Tutorial	**: 1 Period/Week**	**External Marks**	**: 75**
Credits	**: 3**	**External Examination**	**: 3 Hrs**

UNIT - I

Register Transfer Language And Microoperations: Register Transfer language, register Transfer Bus and memory transfers, Arithmetic Mircrooperatiaons, logic micro operations, shift micro operations, Arithmetic logic shift unit.

Basic Computer Organization And Design: Instruction codes. Computer Registers ',Computer instructions– Instruction cycle. Memory – Reference Instructions. Input – Output and Interrupt.

UNIT - II

Micro Programmed Control: Control memory, Address sequencing, microprogram example, design of control unit Hard wired control. Micro programmed control **Central Processing Unit:** STACK organization. Instruction formats. Addressing modes. DATA Transfer and manipulation. Program control. Reduced Instruction set computer.

UNIT - III

Pipelining And Vector Processing: parallel processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC pipeline, Vector Processing

Computer Arithmetic : Data Representation. Fixed Point Representation. Floating – Point Representation ,Addition and subtraction, multiplication Algorithms, Division Algorithms, Floating – point Arithmetic operations. Decimal Arithmetic unit Decimal Arithmetic operations

UNIT IV

Memory Organization: Memory Hierarchy, Main Memory, Auxiliary Memory. Associative Memory Cache Memory, Virtual Memory

UNIT V

INPUT-OUTPUT ORGANIZATION : Peripheral Devices, Input-Output Interface, Asynchronous data transfer Modes of Transfer, Priority Interrupt, Direct memory Access, Input –Output Processor (IOP) Serial communication

TEXT BOOK

Computer Systems Architecture – M.Moris Mano, IIIrd Edition, Pearson/PHI

REFERENCES

1. Computer Organization – Carl Hamacher, Zvonks Vranesic, SafeaZaky, Vth Edition, McGraw Hill.
2. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson/PHI
3. Structured Computer Organization – Andrew S. Tanenbaum, 4th Edition PHI/Pearson
4. Fundamentals or Computer Organization and Design, - Sivaraama Dandamudi Springer Int.Edition.

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T321 – TELECOMMUNICATION SWITCHING SYSTEMS AND NETWORKS

Lecture	: 4 Periods/week	Internal Marks	: 25
Tutorial	: 1 Period/Week	External Marks	: 75
Credits	: 4	External Examination	: 3 Hrs

UNIT - I

TELECOMMUNICATION SWITCHING SYSTEMS : Introduction, Elements of switching systems, switching network configuration, principles of cross bar switching, Electronic space division switching, Time division switching, Combination switching.

UNIT - II

TELEPHONE NETWORKS AND SIGNALING TECHNIQUES: Subscriber loop systems, switching hierarchy and routing, transmission plan, numbering plan, charging plans, In channel signaling, common channel signaling, Network traffic load and parameters, grade of service and blocking probability.

UNIT - III

DATA COMMUNICATION NETWORKS: Introduction, network architecture, layered network architecture, protocols, data communications hardware, data communication circuits. Public switched data networks, connection oriented & connection less service, Circuit Switching, packet switching and virtual circuit switching concepts, OSI reference model, LAN, WAN, MAN & Internet. Repeaters, Bridges, Routers and gate ways.

UNIT - IV

INTEGRATED SERVICES DIGITAL NETWORK (ISDN): Introduction, motivation, ISDN architecture, ISDN interfaces, functional grouping, reference points, protocol architecture, signaling, numbering, addressing, BISDN.

UNIT - V

DSL Technology: ADSL, Cable Modem, Traditional Cable Networks, HFC Networks, Sharing, CM & CMTS and DOCSIS, SONET- Devices, Frame, Frame Transmission, Synchronous Transport Signals, STS I, Virtual Tributaries and Higher rate of service.

TEXT BOOK

Tele communication switching system and networks - **Thyagarajan Viswanath**, PHI, 2000.

REFERENCES

1. Advanced electronic communications systems - **Wayne Tomasi**, PHI, 2004.
2. Data communication and networking—**BEHROUZ A FOROUZAN**, 4th Edition, Tata McGraw Hill.

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T158 – DIGITAL COMMUNICATIONS

Lecture	: 4 Periods/week	Internal Marks	: 25
Tutorial	: 1 Period/Week	External Marks	: 75
Credits	: 4	External Examination	: 3 Hrs

UNIT - I

PULSE DIGITAL MODULATION : Elements of digital communication systems, advantages of digital communication systems, Elements of PCM: Sampling, Quantization & Coding, Quantization error, Compading in PCM systems. Differential PCM systems (DPCM), Delta modulation, its draw backs, adaptive delta modulation, comparison of PCM and DM systems, noise in PCM and DM systems.

UNIT - II

DIGITAL MODULATION: Introduction, ASK, FSK, PSK, DPSK, DEPSK, QAM, QPSK, M-ary PSK, FSK, similarity of BFSK and BPSK, Constellation diagrams.

UNIT - III

DATA TRANSMISSION : Base band signal receiver, probability of error, the optimum filter, matched filter, probability of error using matched filter, coherent reception, non-coherent detection of FSK, calculation of error probability of ASK, BPSK, BFSK,QPSK, ISI, Eye diagram, ICI, Signal transmission through Band limited channels.

UNIT - IV

INFORMATION THEORY AND CODING: Discrete messages, concept of amount of information and its properties. Average information, Entropy and its properties. Information rate, Mutual information and its properties, Shannon's theorem, Shanon-Fano coding, Huffman coding,

UNIT - V

BLOCK CODES AND CONVOLUTION CODES: Matrix description of Linear Block codes, Error detection and error correction capabilities of Linear block codes, Hamming codes, Binary cyclic codes, Algebraic structure, encoding, syndrome calculation, BCH Codes, encoding of convolution codes, time domain approach, transform domain approach. Graphical approach, state, tree and trellis diagram decoding using Viterbi algorithm.

TEXT BOOK

Digital communications - Simon Haykin, John Wiley, 2005

REFERENCES

1. Principles of Communication Systems – **H. Taub & D. Schilling** , TMH, 2nd Edition, 2003
2. Digital Communications – John Proakis, TMH, 1983. Communication Systems Analog & Digital – Singh & Sapre, TMH, 2004

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T290 – PROFESSIONAL ETHICS

Lecture	: 4 Periods/week	Internal Marks	: 25
Tutorial	: 1 Period/Week	External Marks	: 75
Credits	: 3	External Examination	: 3 Hrs

UNIT - I

ENGINEERING ETHICS

Senses of 'Engineering Ethics' variety of moral issued types of inquiry moral dilemmas moral autonomy Kohlberg's theory Gilligan's theory consensus and controversy – Models of Professional Roles theories about right action Selfinterest customs and religion uses of ethical theories.

UNIT - II

HUMAN VALUES

Morals, Values and Ethics – Integrity – Work Ethic – Service Learning – Civic Virtue – Respect for Others – Living Peacefully – caring – Sharing – Honesty – Courage – Valuing Time – Cooperation – Commitment – Empathy – SelfConfidence – Character – Spirituality

UNIT - III

ENGINEERING AS SOCIAL EXPERIMENTATION

Engineering as experimentation engineers as responsible experimenters codes of ethics a balanced outlook on law the challenger case study

UNIT - IV

SAFETY, RESPONSIBILITIES AND RIGHTS

Safety and risk assessment of safety and risk risk benefit analysis and reducing risk the three mile island and chernobyl case studies. Collegiality and loyalty respect for authority collective bargaining confidentiality conflicts of interest occupational crime professional rights employee rights Intellectual Property Rights (IPR) discrimination.

UNIT - V

GLOBAL ISSUES

Multinational corporations Environmental ethics computer ethics weapons development engineers as managersconsulting engineersengineers as expert witnesses and advisors moral leadershipsample code of Ethics (Specific to a particular Engineering Discipline).

TEXT BOOKS

1. Mike Martin and Roland Schinzinger, "Ethics in engineering", McGraw Hill, New York 1996.
2. Govindarajan M, Natarajan S, Senthil Kumar V. S, " Engineering Ethics", Prentice Hall of India, New Delhi, 2004.

REFERENCES

1. Charles D. Fleddermann, "Engineering Ethics", Pearson Education/ Prentice Hall, New Jersey,2004 (Indian Reprint now available)
2. Charles E Harris, Michael S. Protchard and Michael J Rabins, " Engineering Ethics – Concepts and Cases", Wadsworth Thompson Leatning, United States, 2000 (Indian Reprint now available)
3. John R Boatright, " Ethics and the Conduct of Business", Pearson Education, New Delhi, 2003.
4. Edmund G Seebauer and Robert L Barry, " Fundamentals of Ethics for Scientists and Engineers", Oxford University Press, Oxford, 2001.

P809 – COMMUNICATION SYSTEMS LAB

Lecture	**: 3 Periods/week**	**Internal Marks**	**: 25**
		External Marks	**: 75**
Credits	**: 2**	**External Examination**	**: 3 Hrs**

Minimum 12 experiments should be conducted

Part 1: Analog communications (Minimum six experiments is to be conducted)

1. Amplitude modulation and demodulation.
2. Frequency modulation and demodulation.
3. Balanced modulator and Synchronous detector.
4. Pre-emphasis & de-emphasis.
5. Phase locked loop.
6. SSB system.
7. Spectral analysis of AM and FM signals using spectrum analyzer.
8. AGC Characteristics.

Part 2: Digital communications (Minimum six experiments is to be conducted)

1. Pulse Amplitude Modulation and demodulation.
2. Pulse Width &Pulse Position Modulation and demodulation.
3. Sampling Theorem – verification.
4. Time division multiplexing.
5. Pulse code modulation.
6. Delta modulation.
7. Frequency& Phase shift keying.

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MYLAVARAM Krishna Dt., Andhrapradesh.

P837 – IC AND ECAD LAB

Lecture	**: 3 Periods/week**	**Internal Marks**	**: 25**
		External Marks	**: 75**
Credits	**: 2**	**External Examination**	**: 3 Hrs**

Minimum Twelve Experiments to be conducted:
(Six from each part A & B)
Part A (IC Application Lab):

1. OP AMP Applications – Adder, Subtractor, Comparator Circuits.
2. Active Filter Applications – LPF, HPF (first order)
3. Function Generator using OP AMPs.
4. IC 555 Timer – Monostable and Astable Operation Circuit.
5. IC 566 – VCO Applications.
6. Voltage Regulator using IC 723.
7. 4 bit DAC using OP AMP.

Part B (ECAD Lab):
Simulate the internal structure of the following Digital IC's using VHDL / VERILOG and verify the operations of the Digital IC's (Hardware) in the Laboratory

1. D Flip-Flop 7474
2. Decade counter-7490
3. Shift registers-7495 7
4. 3-8 Decoder -74138
5. 4 bit Comparator-7485
6. 8 x 1 Multiplexer -74151 and 2x4 Demultiplexer-74155
7. RAM (16x4)-74189 (Read and Write operations)

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MYLAVARAM Krishna Dt., Andhrapradesh

VI-SEMESTER

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T254 – MICRO PROCESSORS AND INTERFACING

Lecture	**: 4 Periods/week**	**Internal Marks**	**: 25**
Tutorial	**: 1 Period/Week**	**External Marks**	**: 75**
Credits	**: 4**	**External Examination**	**: 3 Hrs**

UNIT-I

Architecture of 8086 Microprocessor, Special functions of General purpose registers. 8086 flag register and function of 8086 Flags, Addressing modes of 8086. Instruction set of 8086. Assembler directives, simple programs, procedures, and macros, Assembly language programs involving logical, Branch & Call instructions, sorting, evaluation of arithmetic expressions, string manipulation.

UNIT-II

Pin diagram of 8086-Minimum mode and maximum mode of operation, Timing diagram, Memory interfacing to 8086 (Static RAM & EPROM), Need for DMA. DMA data transfer Method, Interfacing with 8237/8257.

UNIT-III

8255 PPI – various modes of operation and interfacing to 8086, Interfacing Keyboard, Displays, 8279 Stepper Motor and actuators, D/A and A/D converter interfacing.

UNIT-IV

Interrupt structure of 8086. Vector interrupt table. Interrupt service routines. Introduction to DOS and BIOS interrupts, 8259 PIC Architecture and interfacing cascading of interrupt controller and its importance, Serial data transfer schemes. Asynchronous and Synchronous data transfer schemes, 8251 USART architecture and interfacing, TTL to RS 232C and RS232C to TTL conversion, Sample program of serial data transfer, Introduction to High-speed serial communications standards, USB.

UNIT-V

Introduction to 80286, Salient Features of 80386, Real and Protected Mode Segmentation & Paging, Salient Features of Pentium, Branch Prediction. 8051 Microcontroller Architecture, Register set of 8051, Modes of timer operation, Serial port operation, Interrupt structure of 8051, Memory and I/O interfacing of 8051.

TEXT BOOKS

1. Microprocessors and Interfacing 2nd revised edition – Douglas V. Hall, Tata Mc. Graw Hill.
2. The 8051 Microcontroller, 3rd Edition – Kenneta J. Ayala, Thomson Delmar learning.

REFERENCES

1. Advanced microprocessor and Peripherals, 2nd Edition - A.K.Ray, K.M.Bhurchandi, Tata Mc. Graw Hill.
2. The 8086/8088 family: Design Programming and Interfacing, John Uffenbeck, PHI Learning.
3. Micro Controllers: Theory and Applications Ajay V. Deshmukh, Tata Mc.Graw Hill

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MYLAVARAM Krishna Dt., Andhrapradesh.

T256 – MICRO WAVE ENGINEERING

Lecture	**: 4 Periods/week**	**Internal Marks**	**: 25**
Tutorial	**: 1 Period/Week**	**External Marks**	**: 75**
Credits	**: 4**	**External Examination**	**: 3 Hrs**

UNIT I

Introduction, Microwave Spectrum and Bands, Applications of Microwaves.

GUIDED WAVES: Waves between parallel plates of perfect conductors–Transverse electric and transverse magnetic waves – characteristics of TE and TM Waves – Transverse Electromagnetic waves – Velocities of propagation –uniform plane waves between parallel plates – Attenuation of TE and TM waves in parallel plate guides – Wave impedances.

RECTANGULAR WAVEGUIDES: Transverse Magnetic Waves in Rectangular Wave guides – Transverse Electric Waves in Rectangular Waveguides – Field Expressions in both cases-characteristics of TE and TM Waves – Cutoff wavelength and phase velocity, group velocity, guided wave length, free space wave length – Impossibility of TEM waves in waveguides – Dominant mode in rectangular waveguide – Attenuation of TE and TM modes in rectangular waveguides – Wave impedances for TE and TM cases – Excitation of modes.

CIRCULAR WAVE GUIDES: Bessel functions – Solution of field equations in cylindrical co-ordinates – TM and TE waves in circular guides–Field Expressions in both cases- wave impedances and characteristic impedance – Dominant mode in circular waveguide – Excitation of modes.

UNIT – II

CAVITY RESONATORS: Rectangular cavity resonators, Derivation of Field expressions, Q factor of a Rectangular Cavity resonator. Circular cavity resonators, Derivation of Field expressions, Q factor of a Circular Cavity resonator. Types of Coupling, Coupling Coefficient, Re-entrant Cavities, different types, diagrams, related expressions.

MICROSTRIP LINES: Introduction, Characteristic Impedance of Microstrip lines, Effective Dielectric Constant, Losses in Microstrip lines, related expressions, Quality factor of Microstrip lines.

UNIT – III

WAVEGUIDE COMPONENTS: Waveguide Multiport Junctions – E plane and H plane Tees, Magic Tee, Hybrid Ring; Directional Couplers – 2 Hole, Bethe Hole types. Scattering Matrix–Significance, Formulation and Properties. S Matrix Calculations for E plane and H plane Tees, Magic Tee, Directional Coupler. Coupling Mechanisms – Probe, Loop, Aperture types. Waveguide Discontinuities – Waveguide irises, Tuning Screws and Posts, Matched Loads. Waveguide Attenuators – Resistive Card, Rotary Vane types; Waveguide Phase Shifters – Dielectric, Rotary Vane types, Ferrites– Composition and Characteristics, Faraday Rotation; Ferrite Components – Gyrator, Isolator, Circulator. Circulator and Isolator.

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HEAD
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Lakireddy Bali Reddy College of Engineering
MYLAVARAM Krishna Dt., Andhrapradesh

UNIT - IV

MICROWAVE TUBES: Limitations and Losses of conventional tubes at microwave frequencies. Microwave tubes – O type and M type classifications.

KLYSTRON TUBES: Two Cavity Klystrons – Structure, Velocity Modulation Process and Applegate Diagram, Bunching Process– Expressions for o/p Power and Efficiency.
Reflex Klystrons – Structure, Applegate Diagram and Principle of working, Mathematical Theory of Bunching, Power Output, Efficiency, Electronic Admittance; Oscillating Modes and o/p Characteristics.

HELIX TWTS: Significance, Types and Characteristics of Slow Wave Structures; Structure of TWT and Amplification Process, Axial Electric Field, Convection Current, Propagation Constants, Gain Considerations.

M-TYPE TUBES : Introduction, Cross-field effects, Magnetrons – Different Types, 8-Cavity Cylindrical Travelling Wave Magnetron: Hull Cut-off and Hartree Conditions, Modes of Resonance and PI-Mode Operation, o/p characteristics, Frequency Pulling and Frequency Pushing, Strapping.

UNIT - V

MICROWAVE SOLID STATE DEVICES: Introduction, Classification, Applications.

Transferred Electron Devices: Introduction, Gunn Diode – Principle, Two Valley Model Theory, RWH Theory, Characteristics, Modes of Operation.

Avalanche Transit Time Devices: Introduction, IMPATT and TRAPATT Diodes – Principle of Operation and Characteristics, related expressions, Problems.

MICROWAVE MEASUREMENTS: Description of Microwave Bench – Different Blocks and their Features, Precautions; Measurement of Attenuation, Frequency, VSWR, Cavity Q, Impedance, Power.

TEXT BOOK

G.S.N.Raju,"Microwave Engineering", IK International Publishers, New Delhi

REFERENCES

1. K.D Prasad, "Antennas and Wave Propagation", Satya Prakashan Publishers
2. Microwave Circuits and Passive Devices by Sisodia& Raghuvamshi, New Age International Publishers
3. M.Kulkarni, "Micro Wave and Radar Engineering", Umesh Publications
4. Samuel Y. Liao, "Microwave Devices and Circuits", PHI Publishers

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T163 – DIGITAL SIGNAL PROCESSING

Lecture	**: 4 Periods/week**	**Internal Marks**	**: 25**
Tutorial	**: 1Period/Week**	**External Marks**	**: 75**
Credits	**: 4**	**External Examination**	**: 3 Hrs**

OBJECTIVE

To introduce the concept of DFT and its computation.To study the properties of DFS and FFS. To study the Z-transforms and its applications.To understand the basic structures of IIR and FIR systems. This course will help to understand the design techniques for digital filters.

UNIT - I

Introduction to Digital Signal Processing
Discrete time signals & sequences, linear shift invariant systems, stability, and causality. Linear constant coefficient difference equations. Frequency domain representation of discrete time signals and systems. Introduction to Digitals and Signals.

UNIT - II

Discrete Fourier series
Properties of discrete Fourier series, DFS representation of periodic sequences, Discrete Fourier transforms: Properties of DFT, linear convolution of sequences using DFT, Computation of DFT. FAST FOURIER TRANSFORMS: Fast Fourier transforms (FFT) - Radix-2 decimation in time and decimation in frequency FFT Algorithms, Inverse FFT, and FFT for composite N.

UNIT - III

Realization of Digital Filters
Review of Z-transforms, Applications of Z – transforms, Relation between Z-transform and DFS solution of difference equations of digital filters, Block diagram representation of linear constant-coefficient difference equations, Basic structures of IIR systems, Transposed forms, Basic structures of FIR systems, System function, MULTIRATE DIGITAL SIGNAL PROCESSING Introduction to Decimation, interpolation, sampling rate conversion, Implementation of sampling rate conversion.

UNIT - IV

FIR& IIR Digital Filters:
Characteristics of FIR Digital Filters, frequency response. Design of FIR Digital Filters using Window Techniques, Frequency Sampling technique, Comparison of IIR & FIR filters. Analog filter approximations – Butter worth and Chebyshev, Design of IIR Digital filters from analog filters, Design Examples: Analog-Digital transformations.

UNIT - V

Architecture of TMS320XXX
Introduction to programmable DSPs: Multiplier and Multiplier Accumulator (MAC), Modified Bus Structures and Memory Access schemes in DSPs Multiple access memory, multiport memory, VLSI Architecture, Pipelining, Special addressing modes, On-Chip Peripherals. Introduction –Architectural overview – Memory and I/O spaces -Internal architecture, Central Processing Unit (CPU) – Program control.

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Addressing Modes and Assembly Language Instructions of C2xxx
Data formats – Addressing modes – groups of addressing mode – Assembly language instructions

TEXT BOOK

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

REFERENCES

1. Discrete Time Signal Processing – A.V.Oppenheim and R.W. Schaffer, PHI
2. Digital Signal Processing: Andreas Antoniou, TATA McGraw Hill , 2006
3. Digital Signal Processing: MH Hayes, Schaum's Outlines, TATA Mc-Graw Hill, 2007.
4. DSP Primer - C. Britton Rorabaugh, Tata McGraw Hill, 2005.
5. Fundamentals of Digital Signal Processing using Matlab – Robert J. Schilling, Sandra L.Harris, Thomson, 2007.
6. Fundanentals of DSP by Lonnie – C LUDEMAN by john willey & sons

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T338 – VLSI DESIGN

Lecture	: 4 Periods/week	Internal Marks	: 25
Tutorial	: 1 Period/Week	External Marks	: 75
Credits	: 4	External Examination	: 3 Hrs

UNIT –I

IC TECHNOLOGY

MOS, PMOS, NMOS, CMOS & BiCMOS technologies, Photolithography and Pattern Transfers , Basic Electrical Properties of MOS and CMOS Circuits: Ids-Vds relationships, MOS transistor threshold Voltage, gm, gds, figure of merit ; Pass transistor, NMOS Inverter, Various pull ups, CMOS Inverter analysis and design.

UNIT-II

VLSI CIRCUIT DESIGN PROCESSES

VLSI Design Flow, MOS Layers, Stick Diagrams, Design Rules and Layout, 2 micro meter CMOS Design rules for wires, Contacts and Transistors Layout Diagrams for NMOS and CMOS Inverters and Gates, Scaling of MOS circuits, NAND and NOR Gates – Complex Logic Gates.

UNIT -II

CMOS Logic Gates Design and Layout

Basic circuit concepts, Sheet Resistance RS and its concept to MOS, Area Capacitance Units, Calculations of Delays, Driving large Capacitive Loads, Wiring Capacitances, Alternate gate circuits, Tri state circuits, Transmission Gate and Pass Transistor Logic.

UNIT-IV

SUBSYSTEM DESIGN

Subsystem Design,4-by-4 barrel Shifters, carry look ahead Adder, ALUs, 4x4 array Multipliers, Parity generators, Comparators, Zero/One Detectors, binary Counters, Memory Elements: SRAM,DRAM,basic ROM.

UNIT-V

VHDL SYNTHESIS

VHDL Synthesis, Circuit Design Flow, Circuit Synthesis, Simulation, Layout, Design capture tools, Design Verification Tools, need for testing, manufacturing test principles:D-algoritham .

TEXTBOOK :

1. Essentials of VLSI circuits and systems – Kamran Eshraghian, Eshraghian Dougles and A. Pucknell, PHI, 2005 Edition.

REFERENCES :

1. Chip Design for Submicron VLSI: CMOS Layout & Simulation, - John P. Uyemura, Thomson Learning.
2. Principles of CMOS VLSI Design - Weste and Eshraghian, Pearson Education, 1999.
3. Modern VLSI Design - Wayne Wolf, Pearson Education, 3rd Edition, 1997.

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T221 - INDUSTRIAL MANAGEMENT

Lecture	**: 4 Periods/week**	**Internal Marks**	**: 25**
Tutorial	**:**	**External Marks**	**: 75**
Credits	**: 3**	**External Examination**	**: 3 Hrs**

AIM

To make the student to understand concepts and contributions of Management, types of Organizations and also prepare them to have knowledge of several types of managements conducted in Industrial Organizations.

UNIT - I

Introduction
Management- Definition, Nature, importance and Functions of Management-Taylor's Scientific Management Theory, Fayol's Principles of Management, Contribution of Elton Mayo, Maslow, Herzberg, Douglas Mc Gregor. Basic concepts of Organization – Authority, Responsibility, Delegation of Authority, Span of Control, Departmentation and Decentralization-Organization Structures (Line organization, Line and staff organization, functional organization, Committee organization, matrix organization)

UNIT - II

Operations Management
Plant Location, Factors influencing location, Principles and Types of Plant Layouts-Methods of production (Job, batch and Mass Production), Work Study -Basic procedure involved in Method Study and Work Measurement.

UNIT - III

Quality and Materials Management
Statistical Quality Control-Meaning, variables and attributes- X chart, R chart, C chart, P chart, (simple Problems), Acceptance Sampling, Sampling plans, Deming's contribution to quality. Materials Management-Objectives, Need for Inventory control, Purchase Procedure, Store records, EOQ, ABC Analysis, stock levels.

UNIT - IV

Human Resource Management
HRM : Concepts of HRM, Basic functions of HR Manager: Manpower planning, Recruitment, Selection, Training and Development, Placement, Wage and Salary Administration, Promotion, Transfer, Separation, Performance Appraisal, Job Evaluation and Merit Rating.

UNIT - V

Project Management
Early techniques in Project Management- Network Analysis: Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), identifying critical path, Probability of Completing the project within given time, Project Cost Analysis, Project Crashing (simple problems).

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TEXT BOOK

Dr. Aryasri: Management Science, TMH, 4th edition, 2009.

REFERENCES

1. Koontz and Weihrich – Essentials of Management, TMH, 8th edition, 2010
2. Stoner, Freeman, Gilbert, Management, 6th Ed, Pearson Education, New Delhi, 2004
3. O.P.Khana, Industrial Engineering and Management
4. L.S. Srinath, PERT & CPM

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T252 – MICRO ELECTRO MECHANICAL SYSTEMS (MEMS)

Lecture	: 3 Periods/week	Internal Marks	: 25
Tutorial	: 1 Period/Week	External Marks	: 75
Credits	: 4	External Examination	: 3 Hrs

UNIT - I

Overview of MEMS: MEMS and Microsystems definitions and examples, Difference between Microsystems and Microelectronics, Benefits of miniaturization, Applications: Industrial/automotives sensors, Medical systems, aircraft sensors, Structural health monitoring, Telecommunication etc, Materials for MEMS.

UNIT - II

Scaling Laws in Miniaturization: Introduction to Scaling, Scaling in Geometry, Scaling in Electrostatic forces. MEMS Design Considerations.

UNIT - III

Micro Fabrication –I: Introduction, Photolithography, Photoresists and Application, Light Sources, Photoresist Removal, Ion Implantation, Diffusion, Oxidation, Chemical Vapor Deposition (CVD), Sputtering, Deposition by Epitaxy, Etching.

UNIT - IV

Micro Fabrication – II : Bulk Micromachining: Etching-Isotropic and Anisotropic, Wet Etching and Dry Etching (Plasma, Deep reactive ion) Comparison.
Surface Micromachining: Process, associated Mechanical problems (Adhesion, Interfacial stresses, Stiction), LIGA process, MEMS Packaging.

UNIT - V

MEMS devices and Structures
Microsensors: Biomedical Sensors, Chemical sensors, Optical Sensors, Pressure Sensors, Thermal Sensors.
Microactuation: Actuation using thermal forces, Piezolelctric crystals, Electrostatic forces, MEMS with microactuators: Microgrippers, Micromotors, Microgears, Micropumps.

TEXT BOOK

Tai-Ran Hsu, MEMS & Microsystems Design and Manufacture, Tata McGraw Hill.

REFERENCES

1. Fundamentals of Micro Fabrication, Marc Madou, CRC Press.
2. The MEMS Handbook, Mohamed Gad-el-Hak, CRC Press
3. Micro and Smart Systems, G.K.Anantha Suresh, Wiley India

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T151 – DATA AND COMPUTER COMMUNICATIONS

Lecture	: 3 Periods/week	Internal Marks	: 25
Tutorial	: 1 Period/Week	External Marks	: 75
Credits	: 4	External Examination	: 3 Hrs

UNIT - I

NETWORK MODELS: Data communications- Networks- LAN, MAN and WAN- Internet, Intranet and Extranets- Protocols and standards- The OSI/ISO reference model- Layers in the OSI model-TCP/IP protocol suite- IP addressing- Broadband ISDN- ATM protocol reference model-ATM layers- SONET/SDH architecture- FDDI-DQDB- Structure of circuit and packet switches.

UNIT - II

DATA LINK CONTROL: Types of errors- Error detection and correction- Checksum- Framing- Flow control-Error control- Stop and wait protocol- Go-back N- Selective repeat protocols- HDLC-Random access protocols- Controlled access- Wired LANs- Ethernet- Fast Ethernet- Gigabit Ethernet- IEEE standards, IEEE 802.3, 802.4, 802.5 and 802.6- Wireless LANs- IEEE 802.11 and Bluetooth.

UNIT - III

NETWORK ROUTING ALGORITHMS: Logical addressing- IPv4 addresses- IPv6- Internet protocol- Transition from IPv4 to IPv6- Mapping logical to physical address- Mapping physical to logical address- ICMP-Direct Vs indirect delivery- Forwarding- Unicast and Multicast routing protocols- Routers and gateways.

UNIT - IV

CONGESTION AND TRAFFIC MANAGEMENT : Queuing analysis- Queuing models- Single server and multi server queues- Congestion control in data networks and internets- Effects of congestion- Congestion and control- Traffic management- Congestion control in packet networks- TCP flow control- TCP congestion control- Requirements for ATM traffic and congestion control- Performance of TCP over ATM.

UNIT - V

NETWORK SECURITY: Security issue- threats and responses- Preservation measures- Firewalls, Protection form spam, Home networks security, Intrusion detection systems, intrusion prevention systems- Legal implications- Next generation virus defence- wireless network security- Radiation- Wireless security features- WEP,WPA,TKIP- Defensive strategies- Network auditing and intrusion detection- Network administration.

TEXT BOOK

Behrouz. A. Forouzan, "Data Communication and Networking", Fourth Edition, Tata McGraw-hill, New Delhi, 2006.

REFERENCES

1. William Stallings, "High Speed Networks and Internets", Second Edition, Pearson Education Asia, New Delhi, 2002.
2. Andrew .S. Tanenbaum, "Computer Networks", Fourth Edition PHI Learning Private Ltd, New Delhi, 2008.
3. Houston. H. Carr and Charles. A. Snyder, "Data Communications and Network security", Tata McGraw-hill, New Delhi, 2007.

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T267 – OPERATING SYSTEMS

Lecture	**: 4 Periods/week**	**Internal Marks**	**: 25**
Tutorial	**: 1**	**External Marks**	**: 75**
Credits	**: 4**	**External Examination**	**: 3 Hrs**

UNIT - I

Introduction Computer-System Organization, Computer-System Architecture, Operating-System Structure, Operating-System Operations , Process Management , Memory Management, Storage Management, Protection and Security , Distributed Systems , Special-Purpose Systems .**Operating-System Structures-** Operating-System Services , User Operating-System Interface, System Calls , Types of System Calls, System Programs , Operating-System Design and Implementation, Operating-System Structure, Virtual Machines, Operating-System Generation, System Boot.

UNIT - II

Processes-Concept, Process Scheduling, Operations on Processes, Inter-process Communication, Examples of IPC Systems, Communication in Client-Server Systems **Multithreaded Programming**- Multithreading Models, Thread Libraries, Threading Issues. **Process Scheduling**-Scheduling Criteria, Scheduling Algorithms, Multiple-Processor Scheduling.

UNIT - III

Synchronization-The Critical-Section Problem, Peterson's Solution, Synchronization Hardware, Semaphores, Classic Problems of Synchronization, Monitors, Synchronization Examples, and Atomic Transactions. **Deadlocks**- System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention. Deadlock Avoidance, Deadlock Detection. Recovery from deadlock.

UNIT - IV

Memory Management Strategies- Swapping, Contiguous Memory Allocation, Paging, Structure of the Page Table, Segmentation. **Virtual Memory Management**- Demand Paging, Page Replacement, Allocation of Frames, Thrashing, Memory-Mapped Files, Allocating Kernel Memory

UNIT - V

File-System - The Concept of a File, Access Methods, Directory Structure, File-System Mounting, File Sharing, Protection. **Implementing File system**- File-System Structure, File-System Implementation, Directory Implementation, Allocation Methods, Free-Space Management, Efficiency and Performance, Recovery

TEXT BOOK

Silberschatz & Galvin, 'Operating System Concepts', 7th edition, Wiley.

REFERENCES

1. William Stallings-"Operating Systems"- 5th Edition - PHI
2. Charles Crowley, 'Operating Systems: A Design-Oriented Approach', Tata McGraw Hill Co., 1998 edition.
3. Andrew S.Tanenbaum, 'Modern Operating Systems', 2nd edition,1995, PHI.

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T147 – CONSUMER AND ENTERTAINMENT ELECTRONICS

Lecture	: 3 Periods/week	Internal Marks	: 25
Tutorial	: 1 Period/Week	External Marks	: 75
Credits	: 3	External Examination	: 3 Hrs

UNIT - I

Loudspeakers and Microphones:
Dynamic Loudspeaker, Electrostatic loudspeaker, Permanent Magnet Loudspeaker, Woofers and Tweeters - Microphone Characteristics, Carbon Microphones, Dynamic Microphones and Wireless Microphones.

UNIT - II

Audio Tape Recorders: The magnetic bias principle, The erase principle, The noise reduction principle, Tape recorder analysis, other noise-reduction technologies

UNIT - III

Television systems: Components of a TV system – interlacing –composite video signal. Colour TV – Luminance and Chrominance signal; Monochrome and Colour Picture Tubes - Colour TV systems – NTSC, PAL, SECAM - Components of a Remote Control.

UNIT - IV

Optical Recording and Reproduction: Audio Disc – Processing of the Audio signal –read out from the Disc – Reconstruction of the audio signal – Video Disc – Video disc formats-recording systems – Playback Systems, The CD player, CD-ROM,Digital Audio tape,

Video Cassette Recorders: Comparison to audio tape recording, Encoding, The conceptual VCR, Nonidealities and their solutions, Remaining VCR Circuitry, a real VCR, special effects, enhancements

UNIT - V

Home Appliances: Basic principle and block diagram of microwave oven; washing machine hardware and software; components of air conditioning and refrigeration systems.

TEXT BOOK

S.P.Bali, "Consumer Electronics", Pearson Education, 2005.

REFERENCES

Philip Hoff, "Consumer Electronics for Engineers", Cambridge University Press ISBN 9780521582070

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P851 – MICRO PROCESSORS AND INTERFACING LAB

Lecture	**: 3 Periods/week**	**Internal Marks**	**: 25**
		External Marks	**: 75**
Credits	**: 2**	**External Examination**	**: 3 Hrs**

I. Microprocessor 8086 :

1. Introduction to MASM/TASM.
2. Arithmetic operation – Multi byte Addition and Subtraction, Multiplication and Division – Signed and unsigned Arithmetic operation, ASCII – arithmetic operation.
3. Logic operations – Shift and rotate – Converting packed BCD to unpacked BCD, BCD to ASCII conversion.
4. By using string operation and Instruction prefix: Move Block, Reverse string, Sorting, Inserting, Deleting, Length of the string, String comparison.
5. DOS/BIOS programming: Reading keyboard (Buffered with and without echo) – Display characters, Strings.

II. Interfacing :

1. 8259 – Interrupt Controller : Generate an interrupt using 8259 timer.
2. 8279 – Keyboard Display : Write a small program to display a string of characters.
3. 8255 – PPI : Write ALP to generate sinusoidal wave using PPI.
4. 8251 – USART : Write a program in ALP to establish Communication between two processors.

III. Microcontroller 8051

1. Reading and Writing on a parallel port.
2. Timer in different modes.
3. Serial communication implementation.

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P873 – SIGNAL PROCESSING LAB

Lecture	**: 3 Periods/week**	**Internal Marks**	**: 25**
		External Marks	**: 75**
Credits	**: 2**	**External Examination**	**: 3 Hrs**

LIST OF EXPERIMENTS :

1. To study the architecture of DSP chips – TMS 320C 5X/6X Instructions.
2. To verify linear convolution.
3. To verify the circular convolution.
4. To design FIR filter (LP/HP) using windowing technique
   a) Using rectangular window
   b) Using triangular window
   c) Using Kaiser window
5. To Implement IIR filter (LP/HP) on DSP Processors
6. N-point FFT algorithm.
7. MATLAB program to generate sum of sinusoidal signals.
8. MATLAB program to find frequency response of analog LP/HP filters.
9. To compute power density spectrum of a sequence.
10. To find the FFT of given 1-D signal and plot.
11. To Design FIR filter using frequency sampling method.
12. To study interpolation and decimation.
13. To implement the following applications of DSP.
    i) Convolution Sum ii) Speech processing
    iii) Interpolation and Decimation

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VII-SEMESTER

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T190 – EMBEDDED SYSTEMS DESIGN

Lecture	: 4 Periods/week	Internal Marks	: 25
Tutorial	: 1 Period/Week	External Marks	: 75
Credits	: 4	External Examination	: 3 Hrs

UNIT - I

EMBEDDED SYSTEM INTRODUCTION: Embedded systems overview, design challenge, processor technology, IC technology, Design Technology, Trade-offs. Single purpose processors RT-level combinational logic, sequential logic (RTlevel), custom single purpose processor design (RT-level), optimizing custom single purpose processors.

UNIT - II

STATE MACHINE AND CONCURRENT PROCESS MODELS : Introduction, models Vs. languages, finite state machines with data path model (FSMD), using state machines, program state machine model (PSM), concurrent process model, concurrent processes, communication among processes, synchronization among processes, Implementation, data flow model, real-time systems.

UNIT - III

EMBEDDED / RTOS CONCEPTS : Architecture of the Kernel, Tasks and Task scheduler, Interrupt service routines, Semaphores, Mutex, Mailboxes , Message Queues, Event Registers, Pipes, Signals, Timers, Memory Management, Priority inversion problem, Embedded operating systems Embedded Linux, Real-time operating systems, RT Linux, Handheld operating systems, Windows CE.

UNIT - IV

HARDWARE–SOFTWARE CO-DESIGN IN AN EMBEDDED SYSTEM: Embedded System Project Management Embedded System Design and Co-Design Issues in System Development Process.

UNIT - V

DESIGN CYCLE IN THE DEVELOPMENT PHASE FOR AN EMBEDDED SYSTEM: Use of Target Systems, use of Software Tools for Development of an Embedded System, use of Scopes and Logic Analysis for System, Hardware Tests. Issues in Embedded System Design.

TEXT BOOK

Embedded System Design – A Unified Hardware/Software Introduction - Frank Vahid, Tony D. Givargis,John Wiley, 2002.

REFERENCES

1. An Embedded Software Primer – David E. Simon, Pearson Ed., 2005.
2. Embedded / Real Time Systems – KVKK Prasad, Dreamtech Press, 2005.
3. Microcontrollers Architecture, Programming, Interfacing and System Design – Raj Kamal, Pearson Education, 2005

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T302 – SATELLITE COMMUNICATIONS

Lecture	: 4 Periods/week	Internal Marks	: 25
Tutorial	: 1 Period/Week	External Marks	: 75
Credits	: 4	External Examination	: 3 Hrs

UNIT - I

ORBIT DYNAMICS: Kepler's Three laws of Planetary motion- Definition of terms for Earth-Orbiting Satellites- orbital elements- orbital parameters- orbital perturbations- station keeping frequency allocation- non Geo-stationary orbits- Geo stationary orbits- sun transit outages-limits of visibility- Look Angle determination-Sub satellite point- Elevation Angle Calculation-Azimuth angle calculation- Launching of Geo Stationary satellites.

UNIT - II

SPACE SEGMENT AND LINK DESIGN: Power Supply – Attitude Control – Spinning Satellite Stabilization – Momentum Wheel Stabilization – Station Keeping – Thermal Control – TT&C Subsystem – Transponders – Wideband Receiver – Input Demultiplexer – Power Amplifier – Antenna Subsystem Satellite up link – down link- link power budget- c/no- G/T-Noise temperature- System noise

UNIT - III

SATELLITE ACCESS: Single Access- Pre assigned FDMA – Demand Assigned FDMA-SPADE system- TWT amplifier operation-Downlink analysis –TDMA- reference bursts-Preamble- Postamble- Carrier recovery-Network synchronization-Pre assigned TDMA – Assigned –CDMA introduction

UNIT - IV

EARTH SEGMENT: Radio wave Propagation-Atmospheric losses-Ionsopheric effects-Rain Attenuation-polarization-Antenna polarization-polarization of satellite signals-cross-polarization discrimination-MATV- CATV-Transmit-Receive Earth Stations

UNIT - V

SATELLITE APPLICATIONS: INTELSAT Series- Direct Broadcast satellites (DBS)-Direct to home Broadcast (DTH)-MSAT-VSAT-RADARSAT-Global positioning Satellite System (GPS)-GSM

TEXT BOOKS

1. Dennis Roddy- 'Satellite Communication'- Tata McGraw Hill-2006
2. Wilbur L- Pritchard- Hendri G- Suyderhoud- Robert A- Nelson- 'Satellite Communication Systems Engineering'- Pearson/Prentice Hall- II Edition- 1993
3. Pratt and Bostian" Satellite Communication" John Wiley - 2001

REFERENCES

1. Timothy Pratt - Charles Bostian& Jeremy Allmuti- Satellite Communications- John Willy & Sons (Asia) Pvt- Ltd- 2004
2. M-Richharia : Satellite Communication Systems (Design Principles) Pearson Second Edition 2005

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T269 – OPTICAL COMMUNICATIONS

Lecture	**: 4 Periods/week**	**Internal Marks**	**: 25**
Tutorial	**: 1 Period/Week**	**External Marks**	**: 75**
Credits	**: 4**	**External Examination**	**: 3 Hrs**

UNIT - I

OPTICAL FIBERS – STRUCTURE: Evolution of Fiber Optic Systems – Elements of an Optical fiber Transmission link – Basic laws and definitions – ray optics – Optical fiber modes and configurations – Mode theory of circular waveguides – Overview of modes – Key modal concepts – Linearly Polarized waves – Single Mode Fibers – Graded Index Fiber Structure

UNIT - II

SIGNAL DEGRADATION IN OPTICAL FIBERS: Attenuation – absorption loss – Scattering loss – Bending loss – Core and Cladding loss – Signal distortion in optical wave guides – Information capacity determination – Group delay – material dispersion – Wave Guide dispersion – Signal distortion in single mode fibers – Polarization mode dispersion – Intermodal dispersion – Pulse broadening in GI fibers – Mode Coupling – design optimization of SM fibers – RI profile and cut – off wavelength

UNIT - III

OPTICAL SOURCES: LED's – LASER Diodes, Semiconductor Laser Diodes- Fabry-Perot Lasers - Distributed Feedback (DFB) Lasers – Modulation of LASER diodes – Temperature effects - Power Launching and Coupling : Source to fiber power launching – Lensing Schemes for Coupling improvement - LED coupling to single mode fibers

UNIT - IV

OPTICAL RECEIVERS: PIN Photo detector – Schottky-Barrier Photodiodes - Avalanche Photodiodes – Photo detector noise – Detector response time – Avalanche multiplication of Noise – Temperature effects on Photo detectors – Phototransistors - Fundamental Receiver operation – preamplifiers – Error sources – Receiver configuration – Probability of error – Quantum limit.

UNIT - V

DIGITAL TRANSMISSION SYSTEMS: Point to point link systems considerations – Link Power budget – Rise time budget – Noise effects on system performance – Operational principles of WDM – Solitons – EDFA's – Basic concepts of SONET/SDH.

TEXT BOOK

G.P Agarwal- "Fiber Optic Communication systems"- II edition- John wiley & Sons- NewYork- 1997.

REFERENCES

1. Palais " Fiber optic communications " pearson 2005, 5e
2. John M. Senior-"Introduction to Optical Fiber Communications"-pearson/Prentice Hall.
3. Harry J. R Dutton- "Understanding Optical Communications"- IBM Corporation- International Technical Support Organization- 1998
4. Gerd Keiser- 'Optical Fiber Communication "- Tata Mc Graw Hill - 3rd ed- 2007

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T296 – RADAR AND NAVIGATIONALS AIDS

Lecture	**: 4 Periods/week**	**Internal Marks**	**: 25**
Tutorial	**: 1 Period/Week**	**External Marks**	**: 75**
Credits	**: 4**	**External Examination**	**: 3 Hrs**

UNIT I

RADAR FUNDAMENTALS: Introduction Nature of Radar, 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 and SNR, Integration of Radar Pulses, Radar Cross Section of Targets (simple targets - sphere, cone-sphere),Transmitter Power, PRF and Range Ambiguities, System Losses.

UNIT II

CW AND FREQUENCY MODULATED CW RADAR : Doppler Effect, CW Radar – Block Diagram, Isolation between Transmitter and Receiver, Non-zero IF Receiver, Receiver Bandwidth Requirements, Applications of CW radar. FM-CW Radar, Range and Doppler Measurement, Block Diagram and Characteristics (Approaching/ Receding Targets), FM-CW altimeter, Measurement Errors, 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. Non-coherent MTI, MTI versus Pulse Doppler Radar.

TRACKING RADAR : Tracking with Radar, Sequential Lobing, Conical Scan, Monopulse Tracking Radar – Amplitude Comparison Monopulse (one- and two- coordinates), Phase Comparison Monopulse. Target Reflection Characteristics and Angular Accuracy. Tracking in Range, Acquisition and Scanning Patterns. Comparison of Trackers.

UNIT IV

RADAR RECEIVERS – Noise Figure and Noise Temperature. Derivation for expressions

RADAR DISPLAYS – types, significance.

RADAR DUPLEXERS – Branch type and Balanced type, Circulators as Duplexers.

RADAR ANTENNAS-Phased Array Antennas – Basic Concepts, Radiation Pattern, Beam Steering and Beam Width changes, Series versus Parallel Feeds, Applications, Advantages and Limitations.

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.

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UNIT V:

NAVIGATIONAL AIDS: Introduction, operation, features and applications of different Navigational aids like Global Positioning System(GPS), Instrument Landing system(ILS), Distance measurement equipment (DME), Very High frequency Omni directional Range(VOR), Tactical Air Navigation(TACAN), Microwave Landing system (MLS), Simplified directional Facility(SDF),Long range navigation(LORAN),DECCA and DECTRA systems, OMEGA,GCA,PAR,RDF.

TEXT BOOKS :

Merrill I. Skolnik, "Introduction to Radar Systems", SECOND EDITION, McGraw-Hill, 1981.

REFERENCES :

1. GSN Raju, "Radar Engineering and Navigationals aids", IK International Publishers, New Delhi
2. Merrill I. Skolnik, "Introduction to Radar Systems", THIRD EDITION, McGraw-Hill, 2001.

LBRCE EXAMINATION SECTION

HEAD
Department of Electronics & Communication Engineering
Lakireddy Bali Reddy College of Engineering
MYLAVARAM Krishna Dt., Andhra pradesh.

T189 – ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

Lecture	**: 4 Periods/week**	**Internal Marks**	**: 25**
Tutorial	**:**	**External Marks**	**: 75**
Credits	**: 3**	**External Examination**	**: 3 Hrs**

UNIT - I

Performance characteristics of instruments, Static characteristics, Accuracy, Resolution, Precision, Expected value, Error, Sensitivity, Errors in Measurement, Dynamic Characteristics-speed of response, Fidelity, Lag and Dynamic error, DC Volt meters-Multirange, Range extension/Solid state and differential voltmeters, AC voltmeters- multi range, range extension, shunt, Thermocouple type RF ammeter, Ohmmeters series type, shunt type Multimeter for Voltage, Current and resistance measurements.

UNIT - II

Signal Generator- fixed and variable, AF oscillators, Standard and AF sine and square wave signal generators, Function Generators, Square pulse, Random noise, sweep, Arbitrary waveform.

UNIT - III

AC Bridges Measurement of inductance- Maxwell's bridge, Anderson bridge. Measurement of capacitance - Schearing Bridge. Wheat stone bridge. Wien Bridge, Errors and precautions in using bridges. Q-meter. Wave Analyzers, Harmonic Distortion Analyzers, Spectrum Analyzers, Digital Fourier Analyzers.

UNIT - IV

Oscilloscopes CRT features, vertical amplifiers, horizontal deflection system, sweep, trigger pulse, delay line, sync selector circuits, simple CRO, triggered sweep CRO, Dual beam CRO, Measurement of amplitude and frequency. Dual trace oscilloscope, sampling oscilloscope, storage oscilloscope, digital readout oscilloscope, digital storage oscilloscope, Lissajous method of frequency measurement, standard specifications of CRO, probes for CRO- Active & Passive, attenuator type, Frequency counter, Time and Period measurement.

UNIT - V

Transducers- active & passive transducers : Resistance, Capacitance, inductance; Strain gauges, LVDT, Piezo Electric transducers, Resistance Thermometers, Thermocouples, Thermistors, Sensistors. Measurement of physical parameters force, pressure, velocity, humidity, moisture, speed, proximity and displacement, Data acquisition systems.

TEXTBOOK

Modern Electronic Instrumentation and Measurement Techniques – A.D. Helfrick and W.D. Cooper, PHI, 5th Edition, 2002.

REFERENCES

1. Electronic instrumentation, second edition - H.S.Kalsi, Tata McGraw Hill, 2004
2. Electronic Instrumentation & Measurements - David A. Bell, PHI, 2nd Edition, 2003.
3. Electronic Measurements & Instrumentations by K. Lal Kishore, Pearson Education, 2005.

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T260 – NANO ELECTRONICS

Lecture	**: 3 Periods/week**	**Internal Marks**	**: 25**
Tutorial	**: 1 Period/Week**	**External Marks**	**: 75**
Credits	**: 3**	**External Examination**	**: 3 Hrs**

UNIT - I

Introduction

Historical Development: Miniaturization of Electrical and Electronic Devices, Moore's Law and the SIA Roadmap, Nano and Nature- our technologies and the world we live in-Nano the Beginning- Electron microscopes-Scanning probe microscopes- Optical microscopes for Nano technology- X Ray diffraction-Associated Techniques.

UNIT - II

Quantum Mechanical Aspects : General Considerations, Simulation of the Properties of Molecular Clusters, Formation of the Energy Gap, Preliminary Considerations for Lithography, Confinement Effects, Discreteness of Energy Levels, Tunneling Currents, Evaluation and Future Prospects

UNIT - III

Nanoparticles

Fabrication of Nanoparticles: Grinding with Iron Balls, Gas Condensation, Laser Ablation, Thermal and Ultrasonic Decomposition, Reduction Methods, Self-Assembly, Low-Pressure, Low-Temperature Plasma, Thermal High-Speed Spraying of Oxygen/Powder/Fuel, Atom Optics, Sol gels, Precipitation of Quantum Dots, Other Procedures, **Characterization of Nanoparticles**: Optical Measurements, Magnetic Measurements, Electrical Measurements, Applications of Nanoparticles..

UNIT - IV

Extension of Conventional Devices by Nano techniques : MOS Transistors: Structure and Technology, Electrical Characteristics of Sub-100 nm MOS Transistors, Limitations of the Minimum Applicable Channel Length, Low-Temperature Behavior, High K Materials for CMOS gate oxide applications, Evaluation and Future Prospects, Bipolar Transistors: Structure and Technology, Evaluation and Future Prospects

UNIT - IV

Innovative Electronic Devices Based on Nanostructures

General Properties,

Resonant Tunneling Diode: Operating Principle and Technology, Applications in High Frequency and Digital Electronic Circuits and Comparison with Competitive Devices,

Quantum Cascade Laser: Operating Principle and Structure, Quantum Cascade Lasers in Sensing and Ultrafast Free Space Communication Applications,

Single Electron Transistor: Operating Principle,Technology , Applications, **Carbon Nanotube Devices**: Structure and Technology, Carbon Nanotube Transistors.

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TEXTBOOK

Nano Terchnology and Nano Electronics – Materials, devices and measurement Techniques by WR Fahrner – Springer

REFERENCES

1. Nano: The Essentials – Understanding Nano Scinece and Nanotechnology – by T.Pradeep; Tata Mc.Graw Hill.
2. H.S. Nalwa (Ed.), " Encyclopedia of Nanoscience and Nanotechnology, Vol1-10, American Scientific Publishers, 2004.
3. Nanomaterials: Synthesis, properties and applications\edited by A S Edelstein and R C Cammarata (Institute of Physics, UK Series in Micro and Nanoscience and Technology)

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T308 – SOFTWARE ENGINEERING

Lecture	: 4 Periods/week	Internal Marks	: 25
Tutorial	:	External Marks	: 75
Credits	: 3	External Examination	: 3 Hrs

UNIT - I

Introduction to software engineering : The evolving role of Software, software, changing nature of software, legacy software, software myths
Software process: layered technology, process frame work, CMMI, process patterns, assessment, personal and team process models, process technology, product and process

UNIT - II

Process models: Prescriptive models, water fall model, incremental, evolutionary and specialized process models, unified process
Software engineering practice: communication practices, planning practices, modeling practices, construction practice and deployment.

UNIT - III

Requirements Engineering : A bridge to design and construction, RE tasks, initiating the RE process, Eliciting Requirements, developing use cases, building the analysis models, negotiating and validating requirements.
Building the analysis model: requirements analysis, analysis modeling approaches, data modeling concepts, OOA, scenario based modeling, flow rated modeling, class based modeling, creating a behavior model

UNIT - IV

Design Engineering: Design within the context of software engineering, design process and software quality, design concepts, design model, pattern based software design
Creating an architectural design: software architecture, data design, architectural styles and patterns, architectural design

UNIT - V

Testing Strategies: A strategic to software testing, strategic issues, test strategies for conventional software, object oriented software, validation testing, system testing, the art of debugging **Testing tactics :** software testing fundamentals, white box testing: basis path testing, control structure testing. Black box testing, OO testing methods

TEXT BOOK

Roger S.Pressman, Software engineering- A practitioner's Approach, McGraw-Hill International Edition, 6th edition, 2005.

REFERENCES

1. Ian Sommerville, Software engineering, Pearson education, 8th edition, 2008.
2. Ali Behforooz and Frederick J Hudson, "Software Engineering Fundamentals", Oxford University Press, New Delhi, 1996.
3. Stephan Schach, Software Engineering, Tata McGraw Hill, 2007
4. Pfleeger and Lawrence Software Engineering: Theory and Practice, Pearson education, second edition, 2001.

LBRCE EXAMINATION SECTION

HEAD
Department of Electronics & Communication Engineering
Lakireddy Bali Reddy College of Engineering
Mylavaram, Krishna Dt., Andhra Pradesh

T164 – DIGITAL SIGNAL PROCESSORS AND APPLICATIONS

Lecture	: 3 Periods/week	Internal Marks	: 25
Tutorial	: 1 Period/Week	External Marks	: 75
Credits	: 3	External Examination	: 3 Hrs

UNIT - I

Freescale DSP56XXX Architecture and Programming : Introduction, Core Architecture Overview, Data Arithmetic Logic Unit, Address Generation Unit, Program Control Unit, PLL and Clock Generator, Debugging Support, Instruction Cache, External Memory Interface, DMA Controller, Operating Modes and Memory Spaces, Instruction Set, Benchmark Programs.

UNIT - II

FFT and Filter Implementation using DSP56XXX : Implementation of FFT: Radix- 2 fast Fourier transforms – Block floating point scaling – Optimized radix- 2 DIT FFTLeakage- Implementation of digital filters: single and double precision FIR Filters – IIR Filters – Multirate filters.

UNIT - III

TMS320C6x Architecture :CPU Operation – Pipelined CPU- VelociTI – C64x DSP Software tools: EVM – DSK Target C6x board – Assembly file – Memory management- Compiler utility- Code initialization – Code composer studio – Interrupt data processing.

UNIT - IV

Code Optimization: Word – wide optimization – Mixing C and assembly- software pipelining – C64x improvements - Real time filtering – Circular buffering- Adaptive filtering.

UNIT - V

Frame Processing, Real Time Analysis and Scheduling: Frame processing: DMA DSP Host Communication- DFT and FFT Implementation- Real time FFT – Real time analysis- Real time scheduling – real time data exchange – DSP / BIOS – Data synchronization and communication.

TEXT BOOKS

Digital Signal Processing Applications using the ADSP – 2100 Family, Volume 1 Analog devices , DSP Division Prentice Hall, 1992(Unit I,II).

REFERENCES

1. Nasser Kehtarnavaz and Mansour Keramat, "DSP System design using the TMS320C600 Prentice hall 2001(Unit III,IV ,V)
2. Mohammed El-Sharkawy,Digital Signal Processing Applications With Motorola's DSP56002.
3. Sophocles J.Orfanidis, " Introduction to signal processing " , Prentice Hall, 1996.
4. Sen M.Kuo , Bob H.Lee," Real – time digital signal processing- Implementations, applications and experiments with the TMS320C55x" , John Wiley and Sons, 2001.

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T161 – DIGITAL IMAGE PROCESSING

Lecture	**: 3 Periods/week**	**Internal Marks**	**: 25**
Tutorial	**: 1 Period/Week**	**External Marks**	**: 75**
Credits	**: 3**	**External Examination**	**: 3 Hrs**

UNIT - I

DIGITAL IMAGE PROCESSING: Fundamental & Applications of Image Processing, Fundamental Steps & Components of an Image Processing System, Concept of gray levels, Gray level to binary image conversion, Sampling and quantization, Relationship between pixels ,Imaging Geometry.

UNIT - II

IMAGE TRANSFORMATION: 2-D FFT , Properties. Walsh transform, Hadamard Transform, Discrete cosine Transform, Haar transform, Slant transform, KL Transform.

UNIT - III

IMAGE ENHANCEMENT IN SPIATIAL,FREQUENCY DOMAIN : Spatial domain Enhancement, Point processing , Gray Level Transformations, Histogram Processing, Smoothing Spatial Filters & Sharpening Spatial Filters, Frequency domain Enhancement, Smoothing Frequency Domain Filters & Sharpening Frequency Domain Filters, Laplacian in the Frequency Domain, Image Restoration Degradation model, Noise Models, Restoration in the Presence of Noise Only–Spatial Filtering, Mean Filters ,Least mean square filters, Order-Statistics Filters, Constrained Least Squares Restoration.

UNIT - IV

IMAGE SEGMENTATION &IMAGE COMPRESSION : Image segmentation: Detection of discontinuities, Thresholding, Region oriented segmentation, Edge Linking and Boundary Detection, Local Processing, Global Processing via the Hough Transform& Graph-Theoretic Techniques, Thresholding, The Role of Illumination, Basic Global Thresholding, Basic Adaptive Thresholding, Region-Based Segmentation, Region Growing, Region Splitting and Merging,

Image compression: Introduction, Image compression Redundancies and their removal methods, Image Compression Models, The Source Encoder and Decoder, The Channel Encoder and Decoder, Error-Free Compression, Lossy Compression.

UNIT - V

COLOR IMAGE PROCESSING: Introduction, Color Models, Pseudocolor Image Processing, Intensity Slicing , Gray Level to Color Transformations, Basics of Full-Color Image Processing, Color Transformation, Histogram Processing.

TEXT BOOK

Digital Image processing – R.C. Gonzalez & R.E. Woods, Addison Wesley/ Pearson education,3nd Education, 2002.

REFERENCES

Fundamentals of Digital Image processing – A.K.Jain , PHI

LBRCE EXAMINATION SECTION

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P855 – MICROWAVE AND OPTICAL COMMUNICATIONS LAB

Lab.	**: 3 Periods/week**	**Internal Marks**	**: 25**
		External Marks	**: 75**
Credits	**: 2**	**External Examination**	**: 3 Hrs**

Minimum Twelve Experiments to be conducted:

Part – 1 : Microwave communications

1. Reflex Klystron Characteristics.
2. Gunn Diode Characteristics.
3. Attenuation Measurement.
4. Directional Coupler Characteristics.
5. VSWR Measurement.
6. Impedance and Frequency Measurement.
7. Scattering parameters of Circulator.
8. Scattering parameters of Magic Tee.

Part – 2 : Optical communications

09. LED Characteristics.
10. Laser Diode Characteristics.
11. Measurement of Data rate for Digital Optical link.
12. Measurement of Numerical Aperture of Optical fibre.
13. Measurement of losses for Analog Optical link.

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P828 – EMBEDDED SYSTEM DESIGN LAB

Lab.	**: 3 Periods/week**	**Internal Marks**	**: 25**
		External Marks	**: 75**
Credits	**: 2**	**External Examination**	**: 3 Hrs**

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1. Voltage Measurement with display Designing a voltmeter to measure voltage from 0 to 5 volts and displaying the measured value using 7 segment displays
2. Design of Water Pump Controller to sense the water level in a tank
3. Digital Clock with LCD display
4. Temperature Measurement with 7 segment display
5. PC Communication Interfacing the microcontroller to a PC through RS232 interface and displaying the messages sent by the microcontroller on the PC using Visual Basic program running in PC
6. Remote Control through FM Link Establishing an FM link between two microcontrollers for data transfer.
7. Hot Chamber Controller to maintain the temperature at the set point.
8. Obstacle Detector using ultrasonic transmitter- receiver
9. Moisture sensor and sprinkler controller design
10. Designing a lamp controller having a light sensor and a timer

MODELING AND SIMULATION LAB

1. Embedded System Design With Fpga Using Hdla. Simple Alarm Systemb. Parity Checkerc. Scrolling Message Displayd. Multimode Calculators-
2. Logical Design- Advanced Verification And Digital Implementation And Pcb Design Using Spice-
3. Modeling And Prototyping With Simulink And Code Composer Studio With Dsk.
4. Graphical Simulation And Modeling Using Mathematical Tools-
5. Simulation Of A Communication System Like Delta Modulation adaptive Delta Modulation- Qpsk- Constellation Diagrams Using Simulink.

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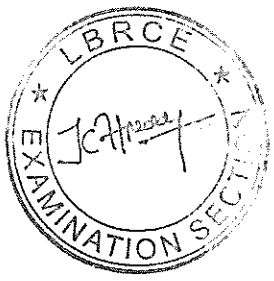
VIII-SEMESTER



T134 – CELLULAR AND MOBILE COMMUNICATIONS

Lecture	**: 4 Periods/week**	**Internal Marks**	**: 25**
Tutorial	**: 1 Period/Week**	**External Marks**	**: 75**
Credits	**: 4**	**External Examination**	**: 3 Hrs**

UNIT - I

INTRODUCTION TO CELLULAR SYSTEMS : Basic Cellular System, Performance criteria, uniqueness of mobile radio environment, operation of cellular systems, Hexagonal shaped cells, concept of frequency Reuse channels, Co-channel Interference Reduction Factor, desired C/I from a normal case in a omni directional Antenna system, Cell splitting, consideration of the components of Cellular system, Concept of Analog and Digital Cellular systems.

UNIT - II

MOBILE RADIO PROPAGATION: Basics of mobile radio propagation, Free space propagation, Link budget design, Propagation models, Small scale multi path propagation, Types of small-scale fading, Statistical models for multipath propagation.
CELL SITE AND MOBILE ANTENNAS : Cell site antenna height, Omni directional antennas, directional antennas for interference reduction, space diversity antennas, umbrella pattern antennas, Minimum separation of cell site receiving antennas, Mobile high gain antennas, Concept of Sum and difference patterns.

UNIT - III

INTERFERENCE : Introduction to Co-Channel Interference, real time Co-Channel interference, Co-Channel measurement, design of Antenna system, Antenna parameters and their effects, diversity receiver, non-co-channel interference-different types.

UNIT - IV

HANDOFFS AND DROPPED CALLS: Types of handoff, handoff invitation, delaying handoff, forced handoff, mobile assigned handoff, Intersystem handoff, dropped call rates and their evaluation.
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, Cell splitting.

UNIT - V

DIGITAL CELLULAR SYSTEMS AND MULTIPLE ACCESS TECHNIQUES: Global System for Mobile, Time Division Multiple Access, Frequency Division Multiple Access, Code Division Multiple Access.

TEXTBOOKS :

1. Mobile Cellular Communication by G Sasibhushana Rao, Pearson Education India,2012
2 Wireless and Cellular Telecommunications – William.C.Y. Lee, Tata McGraw Hill, 3rd Edition, 2006.

REFERENCES :

1. Wireless Communications - Theodore. S. Rapport, Pearson education, 2nd Edn., 2002.
2.Mobile Communications by V. Jeyasri Arokiamary, Technical Publications, ISBN: 8184313888

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T299 – RF MICRO ELECTRONICS

Lecture	**: 3 Periods/week**	**Internal Marks**	**: 25**
Tutorial	**: 1 Period/Week**	**External Marks**	**: 75**
Credits	**: 3**	**External Examination**	**: 3 Hrs**

UNIT - I

CHARACTERISTICS OF PASSIVE COMPONENTS: Characteristics of chip resistor, capacitor and inductors, Semiconductor realization of resistors, capacitors, inductors, transformers. Design of Coaxial, strip line, and microstrip line.

UNIT - II

MOS CHARACTERISTICS: MOSFET Long and Short channel approximations, Transit Time effects

High frequency amplifier Design: Design of Series, shunt amplifiers, tuned amplifiers, neutralization, Cascaded Amplifier.

UNIT - III

RF POWER AMPLIFIERS: Class A,B,C,D,E,F Power amplifiers, Power amplifier characteristics, Design Procedures.

UNIT - IV

LOW NOISE AMPLIFIERS AND MIXERS: Noise definitions and noise models, two port noise parameters of MOSFET, LNA topologies, Bipolar LNAs,CMOS LNAs, noise match and power match design considerations, linearity and large signal performance of LNAs, Mixer fundamentals, nonlinear systems as mixers, multiplier based mixers, sub-
sampling mixers, Bipolar mixers, CMOS mixers, Design of Mixers.

UNIT - V

OSCILLATORS AND PHASE LOCKED LOOPS: Oscillators in the RF frequency range, Design of Colpitts oscillator, Ring Oscillators, VCOs.Introduction to PLL, Analysis and Design, noise properties of PLLs, phase detectors, loop filters, charge pumps, PLL design examples, Phase noise introduction and detailed considerations, Effect of Phase noise in RF Communications, Phase noise Mechanisms, Effect of Frequency Divison and Multiplication on Phase noise, Oscillator pulling and pushing, RF Frequency Synthesizers and Frequency Dividers.

TEXT BOOK

Thomas Lee, "The Design of Radio Frequency CMOS Integrated Circuits", Cambridge University Press.

REFERENCES

1. Behzad Razavi "RF Microelectronics", John Wiley, 2006.
2. Reinhold Ludwig, Pavel Bretchko , "RF Circuit Design"; Pearson Education.

L.B.R.C.E. EXAMINATION SECTION

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T318 – SPREAD SPECTRUM COMMUNICATION

Lecture	**: 3 Periods/week**	**Internal Marks**	**: 25**
Tutorial	**: 1 Period/Week**	**External Marks**	**: 75**
Credits	**: 3**	**External Examination**	**: 3 Hrs**

UNIT - I

Introduction: Origins of SS communications – Advantages of Spectrum spreading – Types of techniques used for spread spectrum – Processing gain and other fundamental parameters – Jamming methods – Linear Feedback shift register sequence generation – Msequence
and their statistical properties. Introduction to Non-linear sequences – Gold codes; Kasami sequences & chaotic sequences

UNIT - II

Direct Sequence Spread Spectrum System: Coherent direct sequence systems – Model of a DS/BPSK system, Chernoff bound – Performance of encoded DS/BPSK – Constant power and pulse jammer. Coded DS/BPSK Performance for known and unknown channel states

UNIT - III

Frequency Hopping SS System: Non-coherent FH system model – Uncoded FH/BFSK performance under constant power broadband jammer – Partial band noise jammer – Multitone jammer. Coded FH/BFSK performance for partial and multitone jammer. Performance of FH/MDPSK in the presence of partial band mutitone jamming

UNIT - IV

Synchronization of SS Receivers: Acquisition and tracking in DS SS receivers & FH SS receivers – Sequential estimation – Matched filter techniques of acquisition and tracking – Delay locked loop – Tau-Dither loop.

UNIT - V

Applications: Space systems – Satellite communication. Anti jam military communication – Low probability of intercept communication – Mobile communications.

REFERENCES

1. R.C. Dixon, "Spread spectrum systems", John Wiley, 1984.
2. M.K. Simon, J.K.Omura, R.A. Schiltz and B.K.Levitt, "Spread spectrum communication", Vol-I, II & IV, Computer Science Press, USA, 1985.
3. G.R.Coopeand, CD.Mc.Gillem, "Modern communications and spread spectrum", McGraw Hill, 1986.

LBRCE EXAMINATION SECTION

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T160 – DIGITAL DESIGN THROUGH VERILOG

Lecture	**: 3 Periods/week**	**Internal Marks**	**: 25**
Tutorial	**: 1 Period/Week**	**External Marks**	**: 75**
Credits	**: 3**	**External Examination**	**: 3 Hrs**

UNIT - I

INTRODUCTION TO VERILOG: Verilog as HDL, Levels of Design Description, Concurrency, Simulation and Synthesis, Functional Verification, System Tasks, Programming Language Interface (PLI), Module, Simulation and Synthesis Tools, Test Benches.
LANGUAGE CONSTRUCTS AND CONVENTIONS: Introduction, Keywords, Identifiers, White Space Characters, Comments, Numbers, Strings, Logic Values, Strengths, Data Types, Scalars and Vectors, Parameters, Memory, Operators, System Tasks, Exercises.

UNIT - II

GATE LEVEL AND BEHAVIORAL MODELING: Introduction, AND Gate Primitive, Module Structure, Other Gate Primitives, Illustrative Examples, Tri-State Gates, Array of Instances of Primitives, Additional Examples, Design of Flip- flops with Gate Primitives, Delays, Strengths and Contention Resolution, Net Types, Design of Basic Circuits, Exercises.Introduction, Operations and Assignments, Functional Bifurcation, *Initial* Construct, *Always* Construct, Examples, Assignments with Delays, *Wait* construct, Multiple Always Blocks, Designs at Behavioral Level, Blocking and Non blocking Assignments, The *case* statement, Simulation Flow. *if* and *if-else* constructs, *assign-deassign* construct, *repeat* construct, *for* loop, the *disable* construct, *while* loop, *forever* loop, parallel blocks, *force-release* construct, Event.

UNIT - III

MODELING AT DATA FLOW LEVEL AND SWITCHLEVEL DATA FLOW LEVEL MODELING: Introduction, Continuous Assignment Structures, Delays and Continuous Assignments, Assignment to Vectors, Operators.
SWITCH LEVEL MODELING: Introduction, Basic Transistor Switches, CMOS Switch, Bi-directional Gates, Time Delays with Switch Primitives, Instantiations with Strengths and Delays, Strength Contention with Trireg Nets, Exercises.

UNIT - IV

SYSTEM TASKS, FUNCTIONS, AND COMPILER DIRECTIVES: Introduction, Parameters, Path Delays, Module Parameters, System Tasks and Functions, File-Based Tasks and Functions, Compiler Directives, Hierarchical Access, General Observations, Exercises,
FUNCTIONS, TASKS, AND USER-DEFINED PRIMITIVES : Introduction, Function, Tasks, User- Defined Primitives (UDP), FSM Design (Moore and Mealy Machines)

UNIT - V

DIGITAL DESIGN: State Machine Charts, Derivation of SM Charts, Realization of SM Charts, Implementation of the Dice Game, Alternative realizations for SM Charts using Microprogramming, Linked State Machines. Xilinx 3000 Series FPGAs, Designing with FPGAs, Using a One-Hot State Assignment, Altera Complex Programmable Logic Devices (CPLDs), Altera FLEX 10K Series CPLDs.

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TEST BOOK

Design through Verilog HDL – T.R. Padmanabhan and B. Bala Tripura Sundari, WSE, 2004 IEEE Press.

REFERENCES

1. Fundamentals of Logic Design with Verilog – Stephen. Brown and Zvonko Vranesic, TMH, 2005.
2. Digital Systems Design using VHDL – Charles H Roth, Jr. Thomson Publications, 2004.
3. Digital systems Design using VHDL – Charles H Roth, Jr. Thomson Publications, 2004.

LBRCE EXAMINATION SECTION

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T317 – SPEECH PROCESSING

Lecture	**: 3 Periods/week**	**Internal Marks**	**: 25**
Tutorial	**: 1 Period/Week**	**External Marks**	**: 75**
Credits	**: 3**	**External Examination**	**: 3 Hrs**

UNIT - I

Fundamentals of Digital Speech Processing: Anatomy & Physiology of Speech Organs, The process of Speech Production, The Acoustic Theory of Speech Production, 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, The short time autocorrelation function, The short time average magnitude difference 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 AutoCorrelation Equations, Comparision between the Methods of Solution of the LPC Analysis Equations, Applications of LPC Parameters.

UNIT - IV

Speech Enhancement: Nature of interfering sounds, Speech enhancment techniques: Single Microphone Approach : spectral substraction, Enhancement by re-synthesis, Comb filter, Wiener filter.

UNIT - V

Automatic Speech Recognition: Basic pattern recognition approaches, Parametric represention of speech, Evaluating the similarity of speech patterns, Isolated digit Recognition System,Continuous digit Recognition System

TEXT BOOK

Digital processing of speech signals - L.R Rabiner and S.W.Schafer. Pearson Education.

REFERENCES

Speech Communications: Human & Machine – Douglas 'Shaughnessy, 2nd ed., IEEE Press.

LBRCE EXAMINATION SECTION

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T271 – OPTO ELECTRONICS

Lecture	**: 3 Periods/week**	**Internal Marks**	**: 25**
Tutorial	**: 1 Period/Week**	**External Marks**	**: 75**
Credits	**: 3**	**External Examination**	**: 3 Hrs**

UNIT - I

ELEMENTS OF LIGHT AND SOLID STATE PHYSICS: Wave nature of light- Polarization- Interference- Diffraction- Light Source- review of Quantum Mechanical concept- Review of Solid State Physics- Review of Semiconductor Physics and Semiconductor Junction Device

UNIT - II

DISPLAY DEVICES AND LASERS : Introduction- Photo Luminescence- Cathode Luminescence- Electro Luminescence-Injection Luminescence- Injection Luminescence-LED- Plasma Display- Liquid Crystal Displays- Numeric Displays- Laser Emission-Absorption- Radiation- Population Inversion- Optical Feedback- Threshold condition- Laser Modes- Classes of Lasers-Mode Locking- laser applications

UNIT - III

OPTICAL DETECTION DEVICES: Photo detector- Thermal detector- Photo Devices- Photo Conductors- Photo diodes-Detector Performance

UNIT - IV

OPTOELECTRONIC MODULATOR: Introduction- Analog and Digital Modulation- Electro-optic modulators- Magneto Optic Devices- Acoustoptic devices- Optical- Switching and Logic Devices

UNIT - V

OPTOELECTRONIC INTEGRATED CIRCUITS: Introduction- hybrid and Monolithic Integration- Application of Opto Electronic
Integrated Circuits- Integrated transmitters and Receivers- Guided wave devices-

TEXT BOOK

J-Wilson and J-Haukes- "Opto Electronics – An Introduction"- Pearson/Prentice Hall of India Pvt- Ltd-- New Delhi- 2007

REFERENCES

1. Bhattacharya "Semiconductor Opto Electronic Devices"- Pearson/Prentice Hall of India Pvt-- Ltd-- New Delhi- 2006
2. Jasprit Singh- "Opto Electronics – As Introduction to materials and devices" McGraw-Hill International Edition- 1998
3. Joachim Piprek, Semiconductor Optoelectronic Devices, Elsavier-2003

LBRCE EXAMINATION SECTION

HEAD
Department of Electronics & Communication Engineering
Lakireddy Bali Reddy College of Engineering
MYLAVARAM, Krishna Dt., Andhrapradesh

T342 – WIRE LESS SENSOR NETWORKS

Lecture	**: 3 Periods/week**	**Internal Marks**	**: 25**
Tutorial	**: 1 Period/Week**	**External Marks**	**: 75**
Credits	**: 3**	**External Examination**	**: 3 Hrs**

UNIT - I

OVERVIEW OF WIRELESS SENSOR NETWORKS: Challenges for Wireless Sensor Networks-Characteristics requirements-required mechanisms, Difference between mobile ad-hoc and sensor networks, Applications of sensor networks- Enabling Technologies for Wireless Sensor Networks.

UNIT - II

ARCHITECTURES: Single-Node Architecture - Hardware Components, Energy Consumption of Sensor Nodes , Operating Systems and Execution Environments, Network Architecture - Sensor Network Scenarios, Optimization Goals and Figures of Merit, Gateway Concepts.

UNIT - III

NETWORKING SENSORS: Physical Layer and Transceiver Design Considerations, MAC Protocols for Wireless Sensor Networks, Low Duty Cycle Protocols And Wakeup Concepts - S-MAC , The Mediation Device Protocol, Wakeup Radio Concepts, Address and Name Management, Assignment of MAC Addresses, Routing Protocols- Energy-Efficient Routing, Geographic Routing.

UNIT - IV

INFRASTRUCTURE ESTABLISHMENT: Topology Control, Clustering, Time Synchronization, Localization and Positioning, Sensor Tasking and Control.

UNIT - V

SENSOR NETWORK PLATFORMS AND TOOLS: Operating Systems for Wireless Sensor Networks, Sensor Node Hardware – Berkeley Motes, Programming Challenges, Node-level software platforms, Node-level Simulators, State-centric programming.

TEXT BOOK

Holger Karl & Andreas Willig, " Protocols And Architectures for Wireless Sensor Networks" , John Wiley, 2005.

REFERENCES

1. Feng Zhao & Leonidas J. Guibas, "Wireless Sensor Networks- An Information Processing Approach", Elsevier, 2007.
2. Kazem Sohraby, Daniel Minoli, & Taieb Znati, "Wireless Sensor Networks- Technology, Protocols, And Applications", John Wiley, 2007.
3. Anna Hac, "Wireless Sensor Network Designs", John Wiley, 2003. Education, 2007.

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T150 – CRYPTOGRAPHY AND NETWORK SECURITY

Lecture	**: 3 Periods/week**	**Internal Marks**	**: 25**
Tutorial	**: 1 Period/Week**	**External Marks**	**: 75**
Credits	**: 3**	**External Examination**	**: 3 Hrs**

UNIT - I

Security Problems: Security problem in computing- Security Attacks – Security Services– Security Mechanisms – OSI security attack-Standards and standard setting organizations

UNIT - II

Data Security: Basic encryption and decryption-Substitution-Transposition-Block ciphers-Data encryption standard encryption and decryption-Differential and linear crypto analysis-Advanced encryption–Standard encryption and decryption-Block cipher models-Triple DES with two keys-Stream cipher-RC4- RSA algorithm – Diffie-Hellman key exchange algorithm.

UNIT - III

Message Authentication: Hash Functions – MD5-Hash algorithm - SHA 512 logic - Authentication Protocols-Digital signature standards

UNIT - IV

Network Security: IP security overview, IP security architecture, Authentication header, Encapsulating security pay load, combining security association, Key management-Web security considerations, Secure socket layer, Secure electronic transaction.

UNIT - V

System Security: Intruders and intrusion detection-Malicious software, Viruses and related threats, virus counter measures, distributed denial of services attack-Firewalls design principles-Trusted systems.

TEXT BOOK

William Stallings, "Cryptography and Network Security – Principles & Practice", Third Edition Pearson Education.

REFERENCE

Charles P. Pleeger, "Security in Computing", PHI Learning, 1998.

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T128 – BIOMEDICAL INSTRUMENTATION

Lecture	**: 3 Periods/week**	**Internal Marks**	**: 25**
Tutorial	**:**	**External Marks**	**: 75**
Credits	**: 3**	**External Examination**	**: 3 Hrs**

OBJECTIVES

To study different types of electrodes used in bio-potential recording.
- To understand the characteristics of bio-amplifiers and different types of recorders.
- To understand how to measure various biochemical and nonelectrical parameters of human system.
- To study the instrumentation concerned with measuring the blood flow volume, velocity and number of particles in the blood.

UNIT - I

Components of medical instrumentation system, Bio signals, Static & Dynamic Characteristics ,Bio amplifier, Problems with components of Medical system, Cell structure, Nernest equation, Action & Resting potentials.

UNIT - II

Bio-potential electrodes ,Bio chemical electrodes, Internal Electrodes, External electrodes.

UNIT - III

ECG –Heart cardiac cycle, Electrical & Mechanical activities of heart, Cardiovascular system, ECG Recorder, Enthoven triangle (12-Lead configuration) , Blood Pressure measurement, Blood flow measurement, Electrodes for ECG.

UNIT - IV

Pacemaker, Defibrillators , Short wave Diathermy ,Hemo-Dialysis ,EEG-Anatomy ,Recorders ,Electrodes for EEG ,Electrode-Placement, MG-Introduction ,Recorder ,Electrodes for EMG.

UNIT - V

Respiration, Spirometry ,Pnuemotachograph ,Ventilators.

TEXT BOOK

Bio medical instrumentation & measurements – 2nd edition by leslie chromwell, fred j. Weibell, erich a. Pfeiffer – phi publisher

REFERENCES

1. Bio medical instrumentation—Armugam.
2. Medical instrumentation application & design – 3rd edition by jhon g.webster, editor jhon wiley.

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