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

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**TOTAL CREDITS : 220**
T118 – APPLIED MATHEMATICS – I

UNIT - I


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


TEXT BOOKS

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

REFERENCES

T131 – C - PROGRAMMING

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

2. The C Programming Language, B.W. Kemighan, Dennis M.Ritchie, PHI/Pearson Education

REFERENCES

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.Chieng,McGrawHill,
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)
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

### T191 - ENGINEERING CHEMISTRY

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

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**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, Ozonation.


**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 Tropsch'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**


**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.
UNIT - V


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


REFERENCES

# 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  
**GRATING 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 – Bragg's law-Laue method- powder method.

## UNIT - III


## 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


## TEXT BOOKS
2. Engineering Physics by V RAJENDRAN Tata McGrahill

## REFERENCES
Introduction to solid state physics, C. Kittel, John wiley, 1999.  
Engineering physics by H K MALIK AK SINGH TATA McGRAHILL
P806 – C - PROGRAMMING LAB

<table>
<thead>
<tr>
<th>Lab/Practical</th>
<th>Internal Marks</th>
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</tr>
<tr>
<td>Period/Week</td>
<td>External Examination</td>
<td>3 Hrs</td>
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</table>

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)

\[
\begin{array}{cccccc}
1 & 2 & 3 & 4 & 5 & 1 \\
1 & 2 & 3 & 4 & 5 & 1 \\
1 & 2 & 3 & 4 & 5 & 1 \\
\end{array}
\]

\[
\begin{array}{cccccc}
1 & 2 & 3 & 4 & 2 & 1 \\
1 & 2 & 3 & 4 & 2 & 1 \\
1 & 2 & 3 & 4 & 2 & 1 \\
\end{array}
\]
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)
P830 - ENGINEERING PHYSICS AND CHEMISTRY LAB

<table>
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<tr>
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<tbody>
<tr>
<td>Lab/Practicals</td>
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<td>Credits</td>
<td>2</td>
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<tr>
<td>External Examination</td>
<td>3 Hrs</td>
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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. Melody'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 Standard 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
7. Determination of Dissolved Oxygen (DO) content by Winkler's method.

Preparation of Urea formaldehyde resin.

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

Page 34
P831 - ENGINEERING WORKSHOP

<table>
<thead>
<tr>
<th>Lab/Practicals: 3 Period/Week</th>
<th>Credits: 2</th>
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<tbody>
<tr>
<td>Internal Marks: 25</td>
<td>External Marks: 75</td>
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<td>External Examination: 3 Hrs</td>
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TRAVES 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

TRAVES FOR EXERCISES: (MECHANICAL 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:

P832 - ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

<table>
<thead>
<tr>
<th>Credits</th>
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<tr>
<td>2</td>
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</table>

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
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
* Learning to Speak English - 4 CDs. The Learning Company, USA, 2002
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


UNIT - II


UNIT - III


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

REFERENCES

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- 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.
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

4. GRE and TOEFL, Kaplan and Baron’s, Latest editions.
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

UNIT - II

UNIT - III

UNIT - IV

UNIT - V

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
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-Schroedinger 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.

UNIT - III


UNIT - IV


UNIT - V


TEXT BOOKS


REFERENCES

UNIT I

JUNCTION DIODE CHARACTERISTICS: Review of semiconductor 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, Varactor 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, II- section filter, Multiple L- section and Multiple It section 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, ($S, S'$), Compensation techniques, (Compensation against variation in $V_{BE}$, $I_{C}$) 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 $A_{v}, R_{i}, A_{o}, R_{o}$. Introduction to feedback Amplifier and Oscillators.

TEXT BOOK
REFERENCES

T135 – CIRCUIT THEORY

Lecture : 4 Periods/week
Tutorial : 1 Period/Week
Credits  : 3

Internal Marks : 25
External Marks  : 75
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


UNIT - III

Network Theorems: Tellegen's, Superposition, Reciprocity, Thevinin’s, Norton’s, Max Power Transfer theorem. Millman’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


TEXT BOOK


REFERENCES

P829 - ENGINEERING DRAWING THROUGH AUTO CAD LAB.

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</table>

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

P827 – ELECTRONIC DEVICES AND CIRCUITS USING LAB.VIEW

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</tbody>
</table>

**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
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, Cascade 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-\(\pi\) Common Emitter transistor model, Hybrid-\(\pi\) conductances, Hybrid \(\pi\) capacitances, Validity of hybrid \(\pi\) 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


UNIT - V

TEXT BOOK


REFERENCES

T306 – SIGNALS AND SYSTEMS

<table>
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<th>Lecture</th>
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<th>Internal Marks</th>
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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

TEXT BOOK


REFERENCES

UNIT - I


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 machinecapabilities 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

REFERENCES

4. An Engineering Approach To Digital Design – Fletcher, PHI.
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


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]
UNIT – IV


UNIT – V


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.
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, Identifiers, 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.

TEXT BOOK

REFERENCES
T286 – PROBABILITY THEORY AND STOCHASTIC PROCESSES

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</table>

UNIT - I


UNIT - II

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

UNIT - III


UNIT - IV


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


REFERENCES

P826 – ELECTRONIC CIRCUITS LAB
Lab. : 3 Periods/week
Credits : 2

Internal Marks : 25
External Marks : 75
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.
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

Data Structures using C++, D.S. Malik.
IV-SEMESTER
T295 – PULSE AND SWITCHING TECHNIQUES

Lecture : 4 Periods/week
Tutorial : 1 Period/Week
Credits : 4

Internal Marks : 25
External Marks : 75
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 clammers.

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,
   Venkata rao K, Rama Sudha K, Manmadha rao.G, pearson publication
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


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


REFERENCES

T114 – ANALOG COMMUNICATION SYSTEMS

Lecture : 4 Periods/week  
Tutorial : 1 Period/Week  
Credits : 4

Internal Marks : 25  
External Marks : 75  
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


UNIT - V


TEXTBOOK

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

REFERENCES

1. Analog communications-sanjay sharma, 2nd Ed.,
T184 – ELECTRICAL TECHNOLOGY

Lecture : 4 Periods/week  
Tutorial : 1 Period/Week  
Credits : 4

Internal Marks : 25
External Marks : 75
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

Single phase induction motors: Principle of operation - Shaded pole motors – Capacitor motors,

UNIT - IV


UNIT - V

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

TEXT BOOK

REFERENCES

3. Essentials of Electrical and Computer Engineering - David V. Kerns, JR. J. David Irwin
T236 – LINEAR CONTROL SYSTEMS

Lecture : 4 Periods/week
Tutorial : 1 Period/Week
Credits : 4

Internal Marks : 25
External Marks : 75
External Examination : 3 Hrs

UNIT - I


UNIT - II


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

REFERENCES
P825 – ELECTRICAL TECHNOLOGY LAB

Lecture : 3 Periods/week
Internal Marks : 25
External Marks : 75

Credits : 2
External Examination : 3 Hrs

PART – A

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

2. Swinburne’s Test on DC shunt machine (Predetermination of efficiency of a given DC Shunt machine working as motor and generator).
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.
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.
10. Finding the Fourier transform of a given signal and plotting its magnitude and phase
    spectrum.
12. Locating the zeros and poles and plotting the pole-zero maps in S plane and Z-plane
    for the given transfer function.
13. Generation of Gaussian noise (real and complex), computation of its mean, M.S.
17. Verification of winer-khinchine relations.
18. Checking a random process for stationarity in wide sense.
P869 – PULSE AND DIGITAL CIRCUITS LAB

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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
10. Astable Multivibrator.
11. Monostable Multivibrator.
14. UJT Relaxation Oscillator.
15. Bootstrap sweep circuit.
V-SEMESTER
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


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.

UNIT - IV


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


REFERENCES

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

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

UNIT - II


UNIT - III


UNIT - IV


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


REFERENCES

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


REFERENCES

T146 – COMPUTER ORGANIZATION

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UNIT - I

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


UNIT - II

Micro Programmed Control: Control memory, Address sequencing, microprogram example, design of control unit Hard wired control. Micro programmed control


UNIT - III

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


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


REFERENCES


T321 – TELECOMMUNICATION SWITCHING SYSTEMS AND NETWORKS

<table>
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<th>Lecture</th>
<th>4 Periods/week</th>
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<td>External Examination</td>
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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

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, Companding 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, Shannon-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

**T290 – PROFESSIONAL ETHICS**

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<tr>
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**UNIT - I**

**ENGINEERING ETHICS**

Senses of 'Engineering Ethics' variety of moral issues, types of inquiry, moral dilemmas, moral autonomy, Kohlberg's theory, Gilligan's theory, consensus and controversy - Models of Professional Roles theories about right action, self-interest, customs and religion, uses of ethical theories.

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**UNIT - II**

**HUMAN VALUES**


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**UNIT - III**

**ENGINEERING AS SOCIAL EXPERIMENTATION**

Engineering as experimentation, engineers as responsible experimenters, codes of ethics, 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 managers, consulting engineers, as expert witnesses and advisors, moral leadership, sample code of Ethics (Specific to a particular Engineering Discipline).

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**TEXT BOOKS**


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**REFERENCES**


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.
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.
4. Time division multiplexing.
5. Pulse code modulation.
6. Delta modulation.
7. Frequency & Phase shift keying.
P837 – IC AND ECAD LAB

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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-B 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)
T254 – MICRO PROCESSORS AND INTERFACING

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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


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


REFERENCES

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 Waveguides—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 coordinates—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
UNIT - IV

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


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.


UNIT - V

MICROWAVE SOLID STATE DEVICES: Introduction, Classification, Applications.


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

T163 – DIGITAL SIGNAL PROCESSING

<table>
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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 Digital and Signals.

UNIT - II

Discrete Fourier series

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, MULTI RATE DIGITAL SIGNAL PROCESSING Introduction to Decimation, interpolation, sampling rate conversion, Implementation of sampling rate conversion.

UNIT - IV

FIR & IIR Digital Filters:

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

TEXT BOOK


REFERENCES

6. Fundamentals of DSP by Lonnie – C LUDEMAN by john willey & sons
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

UNIT-III

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

TEXTBOOK:

REFERENCES:
T221 - INDUSTRIAL MANAGEMENT

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

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

UNIT - V

Project Management
TEXT BOOK


REFERENCES

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
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


UNIT - V

MEMS devices and Structures

Microsensors: Biomedical Sensors, Chemical sensors, Optical Sensors, Pressure Sensors, Thermal Sensors.

Microactuation: Actuation using thermal forces, Piezoelectric crystals, Electrostatic forces, MEMS with microactuators: Microgrippers, Micromotors, Microgears, Micropumps.

TEXT BOOK

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

REFERENCES

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


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


TEXT BOOK

REFERENCES


T267 – OPERATING SYSTEMS

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

UNIT - I


UNIT - II


UNIT - III


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


TEXT BOOK


REFERENCES

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:

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


UNIT - IV


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


REFERENCES

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


UNIT - V


TEXT BOOK


REFERENCES

# T302 - SATELLITE COMMUNICATIONS

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## UNIT - I


## UNIT - II


## UNIT - III

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

## UNIT - IV

**EARTH SEGMENT:** Radio wave Propagation-Atmospheric losses-Ionspheric 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


## REFERENCES


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**HEAD**

[Signature]

Department of Electronics & Communication Engineering
Lakireddy Bali Reddy College of Engineering
Mylavaram Krishna Dr. Andhra Pradesh
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


UNIT - II


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


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


REFERENCES

1. Palais " Fiber optic communications " pearson 2005, 5e
2. John M. Senior-"Introduction to Optical Fiber Communications"-pearson/Prentice Hall.
UNIT I

UNIT II

UNIT III

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.
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:

REFERENCES:
1. GSN Raju, "Radar Engineering and Navigational aids", IK International Publishers, New Delhi
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-multip 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


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, Sensiters. Measurement of physical parameters force, pressure, velocity, humidity, moisture, speed, proximity and displacement, Data acquisition systems.

TEXTBOOK


REFERENCES

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

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

UNIT - IV


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,
TEXTBOOK

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

REFERENCES

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)
T308 – SOFTWARE ENGINEERING

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


REFERENCES

T164 – DIGITAL SIGNAL PROCESSORS AND APPLICATIONS

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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


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


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 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.
# T161 – DIGITAL IMAGE PROCESSING

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## 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


## UNIT - V


## TEXT BOOK


## REFERENCES

P855 – MICROWAVE AND OPTICAL COMMUNICATIONS LAB

Lab. : 3 Periods/week
Credits : 2

Internal Marks : 25
External Marks : 75
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.
P828 – EMBEDDED SYSTEM DESIGN LAB

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

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

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-
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:

REFERENCES:
ISBN 8184313888

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

ATECH ELECTRONICS AND COMMUNICATION ENGINEERING, A.Y.2011-2012
T299 – RF MICRO ELECTRONICS

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 Division and Multiplication on Phase noise, Oscillator pulling and pushing, RF Frequency Synthesizers and Frequency Dividers.

TEXT BOOK


REFERENCES

2. Reinhold Ludwig, Pavel Bretchko, “RF Circuit Design”; Pearson Education.
**T318 – SPREAD SPECTRUM COMMUNICATION**

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**UNIT - I**


**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**


**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**

T160 – DIGITAL DESIGN THROUGH VERILOG

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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


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.
TEST BOOK


REFERENCES

### T317 – SPEECH PROCESSING

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#### UNIT - I


#### 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


#### UNIT - IV


#### UNIT - V

**Automatic Speech Recognition**: Basic pattern recognition approaches, Parametric representation 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

T271 – OPTO ELECTRONICS

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**UNIT - I**


**UNIT - II**


**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**


**REFERENCES**

UNIT - I


UNIT - II


UNIT - III


UNIT - IV

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

UNIT - V


TEXT BOOK


REFERENCES

T150 – CRYPTOGRAPHY AND NETWORK SECURITY

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UNIT - I


UNIT - II


UNIT - III


UNIT - IV


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


REFERENCE

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. Welbell, Erich A. Pfeiffer – PHI Publisher

REFERENCES