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 INSTRUMENTATION ENGINEERING

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

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*Head*

Department of Electronics & Instrumentation Engg.
Lakireddy Bali Reddy College of Engg. (Autonomous)
Mylavaram - 521 230., Krishna DL, AP.
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TOTAL CREDITS: 220
T118 – APPLIED MATHEMATICS – I

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

UNIT - I


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


Head
Department of Electronics & Instrumentation Engg.
Lakireddy Bali Reddy College of Engg. (Autonomous)
Mylavaram - 521 230., Krishna DL, A.P
T131 – C - PROGRAMMING

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

UNIT - I

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

UNIT - II

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

UNIT - III

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

UNIT - IV

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

UNIT - V

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

TEXT BOOKS

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

REFERENCES

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
C/C++ for Engineers and Scientists, Harry H. Cheng,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 Swarup Bhatnagar (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

Lecture : 3 Periods/week  
Internal Marks : 25

Credits : 3  
External Marks : 75

External Examination : 3 Hrs

UNIT - I


UNIT - II


UNIT - III


UNIT - IV

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 : 4 External Examination : 3 Hrs

UNIT - I

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

UNIT - II

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

UNIT - III


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 TataMcGrahill

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

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

Lab/Practicals: 3 Period/Week
Credits : 2

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

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

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

   d) Example programs to illustrate the order of evaluation.

II) WRITE EXAMPLE PROGRAMS:

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

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

   c) To illustrate the usage of ‘goto’ statement.

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

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

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

III) EXAMPLE PROGRAMS:

   a) To Display first N natural numbers

   b) To find whether the given number is Armstrong (or) not

   c) To find reverse of the given number and to check whether it is palindrome (or) not.

   d) To find whether given number is strong number (or) not.

   e) To check whether given number is Prime (or) not

   f) To display prime numbers with in the given range(Nesting of Loops).

   g) To display the following structure(Nesting of Loops)

   i)  
   
   ii) 
   

   1 2 3 4 5 1
   1 2 3 4 2 1
   1 2 3 4 5 1
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 Hanoi 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)
ENGINEERING PHYSICS AND CHEMISTRY LAB

Lab/Practicals: 3 Period/Week
Credits: 2

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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. Moldy's experiment
5. Wedge shaped film
6. Volume Resonator
7. Refractive index of light
8. Diffraction Grating – Normal incidence method
9. Rigidity modulus of a given wire
10. Frequency of AC supply – Sonometer

ENGINEERING CHEMISTRY LABORATORY
(Any 5 experiments)

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

Head
Department of Electronics & Instrumentation Engg.
Lakireddy Bali Reddy College of Engg. (Autonomous)
Mylavaram - 521 230, Krishna Dt, A.P
P831 - ENGINEERING WORKSHOP

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TRADES FOR EXERCISES:

At least three exercise from each trade:

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

TRADES FOR EXERCISES: (MECHANICAL ENGINEERING)

At least two exercises from each trade:

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

TEXT BOOK:

T119 - APPLIED MATHEMATICS – II

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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

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).

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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


REFERENCES

4. GRE and TOEFL, Kaplan and Baron’s, Latest editions.
T264 - NUMERICAL METHODS

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**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
UNIT - I

BASICS & RESULTANT OF FORCE SYSTEMS

UNIT - II

EQUILIBRIUM OF SYSTEMS OF FORCES

UNIT - III

PROPERTIES OF SURFACES
Centroids: Introduction - Determination of Centroids by integration method - Rectangle, circle, triangle from integration – Theorems of Pappus –Guldinus - Centroids of composite plane figures (T section, I section, - Angle section, Hollow section by using standard formula).

UNIT - IV

FRICTION
Introduction - Classification of friction - Laws of dry friction - Co-efficient of friction - Angle of friction - Angle of repose - Cone of friction - Wedge friction - Ladder friction - Problems involving the equilibrium of rigid bodies with frictional forces.

UNIT - V

DYNAMICS OF PARTICLES
TEXT BOOKS


REFERENCES

T199 – ENVIRONMENTAL STUDIES

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

UNIT - I

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

UNIT – II


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.
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 AUTOCAD LAB.

<table>
<thead>
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<td>25</td>
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UNIT - I

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

P832 - ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

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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 as 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
* Krishna Mohan, Effective English Communication, Tata McGraw Hills, New Delhi, 2007
T188 – ELECTRONIC DEVICES AND CIRCUITS

<table>
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UNIT - I


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, IT- section filter, Multiple L- section and Multiple ITsection filter, and comparison of various filter circuits? in terms of ripple factors, basics of regulators.

UNIT - III

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

UNIT - IV

BIASING AND STABILISATION: BJT biasing, DC equivalent model, criteria for fixing operating point, Fixed bias, Collector to base bias, Self bias techniques for stabilization, Stabilization factors, (S, S, S), Compensation techniques, (Compensation against variation in V_{BE}, I_{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_v , R_v. Introduction to feedback Amplifier and Oscillators.

TEXT BOOK
REFERENCES


Department of Electronics & Instrumentation Engg.
Lakireddy Bal Reddy College of Engg. (Autonomous)
Mylavaram-521 230., Krishna DL, A.P.

B.TECH (ELECTRONICS AND INSTRUMENTATION ENGINEERING), A.Y.2011-2012
OBJECTIVE

The objective of this course is to introduce the concepts of electric field and magnetic fields and their applications which will be utilized in the development of the theory for power transmission lines and electrical machines.

UNIT - I

Electrostatics
Electrostatic Fields – Coulomb’s Law – Electric Field Intensity (EFI) – EFI due to a line and a surface charge – Work done in moving a point charge in an electrostatic field – Electric Potential – Properties of potential function – Potential gradient – Gauss’s law – Application of Gauss’s law – Maxwell’s first law, \( \text{div}(D) = \rho \)

UNIT - II

Conductors and Dipole

UNIT - III

Magneto Statics
Static magnetic fields – Biot-Savart’s law – Oesterd’s experiment - Magnetic field intensity (MFI) – MFI due to a straight current carrying filament – MFI due to circular, square and solenoid current – Carrying wire – Relation between magnetic flux, magnetic flux density and MFI – Maxwell’s second Equation, \( \text{div}(B) = 0 \).
Ampere's circuital law and its applications viz. MFI due to an infinite sheet of current and a long current carrying filament – Point form of Ampere’s circuital law – Curl \((H) = J_c\), Field due to a circular loop, rectangular and square loops.

UNIT - IV

Force in Magnetic fields
UNIT - V

Time Varying Fields
Time varying fields – Faraday’s laws of electromagnetic induction – Its integral and point forms – Maxwell’s fourth equation, Curl (E)=\(\vec{\nabla}\times \vec{B}/\tau\) – Statically and Dynamically induced EMFs – Simple problems - Modification of Maxwell’s equations for time varying fields – Displacement current – Pointing Theorem and Pointing vector.

TEXT BOOK


REFERENCES

2. "Electromagnetics" by J P Tewari.
4. "Electro magnetic Fields" by Sadiku, Oxford Publications
T320 – SWITCHING THEORY AND DIGITAL LOGIC

<table>
<thead>
<tr>
<th>Lecture</th>
<th>4 Periods/week</th>
<th>Internal Marks</th>
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<td>Credits</td>
<td>4</td>
<td>External Examination</td>
<td>3 Hrs</td>
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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 machine-capabilities and limitations, Mealy and Moore models-minimization of completely specified and incompletely specified sequential machines, Partition techniques and Merger chart methods-concept of minimal cover table.

UNIT - V

ALGORITHMIC 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


UNIT - II


UNIT - III

Introduction to Markets & Pricing Policies:

UNIT - IV


UNIT - V

Introduction to Financial Accounting: Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts with simple adjustments. Financial Analysis through ratios: Ratios, Importance, types (Current Ratio and quick ratio), Activity Ratios (Inventory turnover ratio and Debtor Turnover ratio), Capital structure Ratios (Debt- Equity ratio, Interest Coverage ratio), and Profitability ratios (Gross Profit Ratio, Net Profit ratio, Operating Ratio, P/E Ratio and EPS).
TEXT BOOK


REFERENCES

T294 – PULSE AND DIGITAL CIRCUITS

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

OBJECTIVE

The course has been designed to give an overall view of I/O signals, RC networks as integrator, differentiator and attenuators. The students get familiarized with diode, clippers and transistors and their characteristics. The students will be able to analyse and design multivibrators. They also get familiarized with time based generators and sampling gates.

UNIT - I

LINEAR WAVESHAPING
High pass, low pass RC circuits, their response for sinusoidal, step, pulse, square and ramp inputs. RC network as differentiator and integrator, attenuators, its applications in CRO probe, RL and RLC circuits and their response for step input, Ringing circuit.

UNIT - II

NON-LINEAR WAVE SHAPING
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 clamps.

UNIT - III

SWITCHING CHARACTERISTICS OF DEVICES
Diode as a switch, piecewise linear diode characteristics, Transistor as a switch, Break down voltage consideration of transistor, saturation parameters of Transistor and their variation with temperature, Design of transistor switch, transistor-switching times.
MULTIVIBRATORS Analysis and Design of Bistable, Monostable, Astable Multivibrators and Schmitt trigger using transistors.

UNIT - IV

TIME BASE GENERATORS
General features of a time base signal, methods of generating time base waveform, Miller and Bootstrap time base generators – basic principles, Transistor miller time base generator, Transistor Bootstrap time base generator, Current time base generators.
SYNCHRONIZATION AND FREQUENCY DIVISION Principles of Synchronization, Frequency division in sweep circuit, Astable relaxation circuits, Monostable relaxation circuits, Synchronization of a sweep circuit with symmetrical signals, Sine wave frequency division with a sweep circuit.
UNIT - V

SAMPLING GATES
Basic operating principles of sampling gates, Unidirectional and Bi-directional sampling gates, Reduction of pedestal in gate circuits, Applications of sampling gates. Realization of logic gates using diodes & transistors: AND, OR gates using Diodes, Resistor, Transistor Logic, Diode Transistor Logic.

TEXT BOOKS

REFERENCES
1. Pulse and Digital Circuits – A. Anand Kumar, PHI.
2. Wave Generation and Shaping L. Strauss.
UNIT - I


UNIT - II

Pressure Measurement: Total and Static Pressure measurements using Pitot Tube, Pitot-Static Tube, Manometers, Mechanical Gauges
Velocity Measurement: Anemometers-Cup and Vane Types, Hot-wire Anemometer

UNIT - III


UNIT - IV

Gas Power Cycles: Introduction, Analysis of Power Cycles- Carnot, Otto, Diesel, Dual, and Brayton
Internal Combustion Engines: Classification-Working of Spark Ignition and Compression Ignition Engines-2 Stroke & 4 Stroke Engines (10)

UNIT - V


TEXT BOOKS

1. Hydraulics, Fluid mechanics and Hydraulic machinery MODI and SETH.

REFERENCES

1. Fluid Mechanics, White F.M. TMH
   Engineering Thermodynamics—Cengel & Boles, TMH
   Engineering Thermodynamics — P.K.Nag, TMH
P827 – ELECTRONIC DEVICES AND CIRCUITS USING LABVIEW

Lab/Practicals : 3 Period/Week
Credits : 2

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<td>3 Hrs</td>
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Cycle 1

(Hardware Experiments minimum 5 experiments should be conducted)
1. Identification, Specifications, Testing of R, L, C Components (Colour Codes), and basic Electronic Instruments.

2. PN junction diode characteristics

3. Zener diode characteristics

4. Full wave Rectifier without & with filters

5. Transistor CB characteristics

6. Transistor CE characteristics

7. FET characteristics

Cycle 2

(Labview based Experiments minimum 5 experiments should be conducted)

8. Resister colour coding

9. Series & parallel resistors

10. PN junction diode characteristics

11. Zener diode characteristics

12. Full wave Rectifier without & with filters

13. CE Amplifier

14. CC Amplifier

15. FET Amplifier
P869 – PULSE AND DIGITAL CIRCUITS LAB.

Lecture : 3 Periods/week
Credits : 2

Internal Marks : 25
External Examination : 3 Hrs

LIST OF EXPERIMENTS :

1. Linear Wave shaping.
2. Non Linear Wave shaping – Clipper.
3. Non Linear Wave shaping – Clamper.
4. Transistor as a switch.
5. Study of logic gates & some applications.
6. Study of Flip-Flop & some applications.
7. Astable Multivibrator.
10. Schmitt Trigger.
11. UJT as a Relaxation oscillator.
T187 – ELECTRONIC CIRCUITS

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

UNIT - I


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

T133 – CALIBRATION AND ELECTRONICS MEASUREMENTS

**Lecture** : 4 Periods/week  
**Internal Marks** : 25

**Tutorial** : 1  
**External Marks** : 75

**Credits** : 4  
**External Examination** : 3 Hrs

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**UNIT - I**

Introduction to measurements - Physical measurement - Forms and methods of measurements – measurement Errors - Statistical analysis of measurement data - Probability of errors - Limiting errors.

**UNIT - II**


**UNIT - III**


**UNIT - IV**


**UNIT - V**

Oscilloscopes: CRO operation, CRT characteristics, probes, Time base sweep modes, Trigger generator, Vertical amplifier, modes of operation, A, B, alternate & chop modes, sampling oscilloscopes, storage oscilloscope, Standard specifications of CRO, Synchronous selector circuits, Spectrum analyzers, Different types of spectrum analyzer, Recorders, Introduction to magnetic recording techniques & X-Y plotters.

**TEXT BOOK**


**REFERENCES**


---

"Department of Electronics Instrumentation Engr.
Lakireddy Bali Reddy College of Engg. (Autonomous)
Mylavaram - 521 321, Krishna Dist, A.P."
# T220 – INDUSTRIAL INSTRUMENTATION

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## UNIT - I


## UNIT - II


## UNIT - III


## UNIT - IV


## UNIT - V

**FLOW MEASUREMENT**: Head type, Area type (Rota meter), electromagnetic type, Positive displacement type, mass flow meter, ultrasonic type, vortex shedding type, Hotwire anemometer type, Laser Doppler Veloci-meter.

## TEST BOOK


## REFERENCES

T184 – ELECTRICAL TECHNOLOGY

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

OBJECTIVE

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

UNIT - I

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

UNIT - II

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

UNIT - III

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. Kems, JR. J. David Irwin
UNIT - I

Introduction to measurement systems: general concepts and terminology, measurement systems, sensor classification, general input-output configuration, methods of correction. - Performance characteristics: static characteristics of measurement systems, accuracy, precision, sensitivity, other characteristics: linearity, resolution, systematic errors, random errors, dynamic characteristics of measurement systems: zero-order, first-order, and second-order measurement systems and response.

UNIT - II

Resistive sensors & Signal conditioning for resistive sensors: resistive temperature detectors (RTDs), strain gages and types, resistive temperature detectors (RTDs), thermistors, magneto resistors, light-dependent resistors (LDRs) - measurement of resistance, voltage dividers, Wheatstone bridge. Balance and deflection measurements, sensor bridge calibration and compensation instrumentation amplifiers, interference types and reduction.

UNIT - III


UNIT - IV

Signal conditioning for reactance variation sensors: problems and alternatives, ac bridges, carrier amplifiers - application to the LVDT, variable oscillators, resolver-to-digital and digital-to-resolver converters.

UNIT - V

Self-generating sensors & Signal conditioning for self-generating sensors: thermoelectric sensors, piezoelectric sensors, piezoelectric sensors, photovoltaic sensors, electrochemical sensors - chopper and low-drift amplifiers, offset and drifts amplifiers, electrometer amplifiers, charge amplifiers, noise in amplifiers.

TEXT BOOK

REFERENCES
3. Instrument Transducers – An Introduction to Their Performance and Design – by Herman K.P. Neubrat, Oxford University Press.
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.
P839 – INSTRUMENTATION – I LAB.

Lecture : 3 Periods/week
Tutorial :
Credits : 2

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

LIST OF EXPERIMENTS:

   (Current & voltage).
   (Current & voltage).
5. Measurement of Strain using Strain gauge.
7. RTD Characteristics.
8. LVDT Characteristics.
10. Piezo electric transducer.
11. Bourdon tube.
P826 – ELECTRONIC CIRCUITS LAB.

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

I) LIST OF EXPERIMENTS
1. Common Emitter and Common Source amplifier
2. Two Stage RC Coupled Amplifier
3. Current shunt Feedback Amplifier
4. Cascade Amplifier
5. Class A Power Amplifier (Transformer less)
6. Class B Complementary Symmetry Amplifier

II) Testing in the Hardware Laboratory (Six Experiments : 3 + 3):
(A) Any Three circuits simulated in Simulation laboratory
(B) Any Three of the following
   a. Class A Power Amplifier (with transformer load)
   b. Class B Power Amplifier
   c. Single Tuned Voltage Amplifier
   d. Series Voltage Regulator
   e. Shunt Voltage Regulator
T235 – LINEAR AND DIGITAL IC APPLICATIONS

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

OBJECTIVE
To teach the basic concepts in the design of electronic circuits using linear integrated circuits and their applications in the processing of analog signals.

UNIT - I

OPERATIONAL AMPLIFIER

UNIT - II

ACTIVE FILTERS & OSCILLATORS
Introduction, 1st order LPF, HPF filters. Band pass, Band reject and all pass filters. Oscillator types and principle of operation – RC, Wien and quadrature type, waveform generators – triangular, sawtooth, square wave and VCO.

UNIT - III

TIMERS & PHASE LOCKED LOOPS
Introduction to 555 timer, functional diagram, monostable and astable operations and applications, Schmitt Trigger. PLL - introduction, block schematic, principles and description of individual blocks of 565. 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.

UNIT - IV

LOGIC FAMILIES
Classification of Integrated circuits, comparison of various logic families, standard TTL NAND Gate – Analysis & characteristics, TTL open collector O/Ps, Tristate TTL, MOS & CMOS open drain and tristate outputs, CMOS transmission gate, IC interfacing - TTL driving CMOS & CMOS driving TTL. Design using TTL -74XX & CMOS 40XX series, code converters, decoders, Demultiplexers, decoders & drives for LED & LCD display. Encoder, priority Encoder, multiplexers & their applications, priority generators/checker circuits. Digital arithmetic circuits-parallel binary adder/subtractor circuits using 2's Complement system and Digital comparator circuits.
UNIT - V

SEQUENTIAL CIRCUITS & MEMORIES
74XX & CMOS 40XX series of IC counters.
ROM architecture, types & applications, RAM architecture, Static & Dynamic RAMs, synchronous DRAMs.

TEXT BOOKS

REFERENCE BOOKS
T306 – SIGNALS AND SYSTEMS

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

UNIT - I

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

UNIT - II

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

UNIT - III

SIGNAL TRANSMISSION THROUGH LINEAR SYSTEMS: Classification of Systems, impulse response, Response of a linear system, convolution in time domain and frequency domain, Transfer function of a LTI system. Filter characteristics of linear systems. Distortion less transmission through a system, Signal bandwidth, system bandwidth, Ideal LPF, HPF and BPF characteristics, relationship between bandwidth and rise time. Cross correlation and auto correlation of functions, properties of correlation function, Relation between convolution and correlation, Energy density spectrum, Parseval’s theorem, Power density spectrum, Relation between auto correlation function and energy/power spectral density function.

UNIT - IV

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

UNIT - V

TEXT BOOK


REFERENCES

T148 – CONTROL SYSTEMS

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

OBJECTIVE
In this course it is aimed to introduce to the students the principles and applications of control systems in everyday life. The basic concepts of the block diagram reduction, time domain analysis solutions to time invariant systems and also deals with the different aspects of stability analysis of systems in frequency domain and time domain.

UNIT - I

Control system modeling
Concepts of control systems- Open loop and closed loop control systems. Characteristics of feedback control systems: System concept, differential equations and transfer functions.  
Modeling of electric systems, translational and rotational mechanical systems, and Simple electromechanical systems. Block diagram representation of systems – Block diagram reduction methods – Closed loop transfer function, determination of signal flow graph. Mason’s gain formula  

UNIT - II

Time domain analysis

UNIT - III

Frequency domain analysis

UNIT - IV

Compensators
Realization of basic compensators – cascade compensation in time domain and frequency domain and feedback compensation – design of lag, lead, lag-lead compensator using Bode plot and Root locus. Introduction to P, PI and PID controllers.

UNIT - V

State variable analysis
State variable methods - introduction to the state variable concept - state space models - physical variable - phase variable and diagonal forms from time domain - diagonalisation - solution of state equations - homogenous and non homogenous cases- properties of state transition matrix - relation between transfer function and state space models, Controllability and Observability.
TEXT BOOKS


REFERENCES

T146 – COMPUTER ORGANIZATION

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

UNIT - I

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

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

UNIT - II

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

UNIT - III

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

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

UNIT IV

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

UNIT V

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

TEXT BOOK


REFERENCES

   McGraw Hill.

   Pearson PHI

   PHI/Pearson

4. Fundamentals or Computer Organization and Design, - Sivaraama Dandamudi
T254 – MICROPROCESSOR AND INTERFACING

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

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

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

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

UNIT-IV

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
2. The 8086/8088 family: Design Programming and Interfacing, John Uffenbeck, PHI Learning.
T287 – PROCESS CONTROL INSTRUMENTATION

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

UNIT - I

PROCESS DYNAMICS: Process variables-load variables-dynamics of simple pressure, flow, level and temperature process-Interacting and Non interacting systems-continuous and batch process-self regulation.

UNIT – II

CONTROL ACTIONS AND CONTROLLERS: Basic control actions- character sticks of two-position, three position, single speed and multiple floating, proportional, integral, and derivative control modes, PI, PD, PID control modes-problems. - Pneumatic, hydraulic and electronic controllers to realize various control actions.

UNIT - III


UNIT - IV

FINAL CONTROL ELEMENTS : I/P converter, P/I converter- pneumatic, electric and hydraulic actuators.- Control valves- character sticks of control valves -Globe, Butterfly, diaphragm and ball valves-control valve sizing, problems

UNIT - V

MULTI LOOP CONTROL SYSTEMS : Cascade control, feed forward control, ratio control, split range, multi variable control.

TEXT BOOKS


REFERENCES

1. Automatic process control-D.P.ECKMAN
2. Process systems analysis and control- Coughahows MCGrEW Hill
3. Process control- B.G.Liptake
T290 – PROFESSIONAL ETHICS

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

UNIT - I

ENGINEERING ETHICS
Senses of 'Engineering Ethics' variety of moral 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 Selfinterest customs and religion uses of
ethical theories.

UNIT - II

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

UNIT - III

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

UNIT - IV

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

UNIT - V

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

TEXT BOOKS
   York 1996.
   Hall of India, New Delhi, 2004.

REFERENCES
1. Charles D. Fleddermann, "Engineering Ethics", Pearson Education/ Prentice Hall,
   New Jersey,2004 ( Indian Reprint now available )
2. Charles E Harris, Michael S. Protchard and Michael J Rabins, " Engineering Ethics –
   Concepts and Cases", Wadsworth Thompson Leatning, United States, 2000 ( Indian
   Reprint now available )
   Delhi, 2003.
   Edmund G Seebauer and Robert L Barry, " Fundamentals of Ethics for
P847 – LINEAR IC APPLICATIONS LAB.

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

External Examination : 3 Hrs

LIST OF EXPERIMENTS:

1. OP-Amp applications-Adder, Subtractor & Comparator circuits.
2. Integrator & Differentiator circuits using IC 741.
3. Active filter applications-LPF & HPF (First order).
4. Active filter applications-BPF, Band Reject (Wide band) & Notch filters.
5. IC 741 oscillator circuits-Phase shift & Wien bridge oscillator.
7. IC 555 Timer-Monostable Multivibrator.
8. IC 555 Timer-Astable Multivibrator.
10. IC 565 - PLL applications.
11. IC 566 - VCO applications.
12. Voltage regulator using IC 723.
13. Three terminal voltage regulators-7805, 7809 & 7912.
14. 4-bit DAC using OP-Amp.
P865 – PROCESS CONTROL LAB.

Lab. : 3 Periods/week

Credits : 2

Internal Marks : 25

External Marks : 75

External Examination : 3 Hrs

LIST OF EXPERIMENTS:

1. Flow control.
2. Level Control.
3. Temperature Control.
4. Pressure Control.
5. I/P Converter.
6. Control valve (Quick opening & Linear) Characteristics.
7. P/I converter.
10. Multi-loop control systems-Cascade & Ratio.
11. Temperature Transmitter.
13. Level Transmitter.
14. Pressure Transmitter.
UNIT - I


UNIT - II


UNIT - III


UNIT - IV


UNIT - V


TEXT BOOK


REFERENCES

T221 - INDUSTRIAL MANAGEMENT

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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
OBJECTIVE

To understand theory and principles of modern communication systems that addresses the variety, reality, complexity, and pervasiveness of today's communication systems. Topics included are AM modulation transmission and reception, FM modulation transmission and reception, single sideband communication (SSB) communication technique, Digital, wireless communication and wireless digital communication.

UNIT - I

AMPLITUDE MODULATION SYSTEMS
Need for modulation, normal AM, generation and demodulation (envelop & synchronous detection), modulation index, SSB: Generation using filter and phasing method, detection. Frequency division multiplexed systems using SSB.

UNIT - II

ANGLE MODULATION SYSTEMS
Concept of frequency and phase modulation, frequency deviation and modulation index, FM spectra, Carson's rule, narrowband FM, generation of wideband FM Armstrong method, direct FM generation. Demodulation of FM discriminatory, PPL.

UNIT - III

SAMPLING AND DISCRETE TIME MODULATIONS
Sampling theorem – low pass and band pass, Pulse Amplified Modulation (PAM), Pulse width Modulation (PWM), Pulse Position Modulation (PPM) their generation and detection-phase time division multiplying Review of random signals and noise, signal to noise ratio in amplitude and angle modulated systems. Thermal shot noise.

UNIT - IV

DIGITAL COMMUNICATION
UNIT - V

SATELLITE & FIBRE OPTIC COMMUNICATIONS
Transmit and Receive Antennas, Line of sight systems, satellite link-GT ratio of earth station, VSATS and Concepts of FDMA, and Concepts of TDMA, Concepts of CDMA.

TEXT BOOKS

REFERENCES
2. "Modern Digital & Analog Communication System", Lathi, Oxford University
T266 – OBJECT ORIENTED PROGRAMMING (C++)

<table>
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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
Ashok N Kamthane, Object Oriented Programming with ANSI Turbo C++.
T253 – MICROCONTROLLER AND APPLICATIONS

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UNIT - I

OVERVIEW OF ARCHITECTURE AND MICROCONTROLLER RESOURCES:

UNIT - II

8051 FAMILY MICROCONTROLLERS INSTRUCTION SET: Basic assembly language programming – Data transfer instructions – Data and Bit manipulation instructions – Arithmetic instructions – Instructions for Logical operations on the test among the Registers, Internal RAM, and SFRs – Program flow control instructions – Interrupt control flow.

UNIT - III

REAL TIME CONTROL: INTERRUPTS & TIMERS: Interrupt handling structure of an MCU – Interrupt Latency and Interrupt deadline – Multiple sources of the interrupts – Non-maskable interrupt sources – Enabling or disabling of the sources – Polling to determine the interrupt source and assignment of the priorities among them – Interrupt structure in Intel 8051. - Programmable Timers in the MCU’s – Free running counter and real time control – Interrupt interval and density constraints.

UNIT - IV


UNIT - V

REAL TIME OPERATING SYSTEM FOR MICROCONTROLLERS: Real Time operating system – RTOS of Keil (RTX51) – Use of RTOS in Design – Software development tools for Microcontrollers.

TEXT BOOK

REFERENCES
T277 – POWER PLANT INSTRUMENTATION

Lecture : 4 Periods/week  
Internal Marks : 25

Tutorial :  
External Marks : 75

Credits : 3  
External Examination : 3 Hrs

UNIT - I

BRIEF OVERVIEW OF POWER GENERATION- Hydro, thermal, Nuclear, solar, wind etc.  
Importance of instrumentation for power generation- Thermal power plants – Building blocks  

UNIT - II


UNIT - III

BOILER CONTROL & MONITORING SYSTEMS IN THERMAL POWER PLANTS:  
Combustion Control – control of main header pressure, air & fuel ratio control – furnace draft and excess air control – Drum level ( 3 element) control – main and reheat temperature control, burner tilt up, by pass damper, super heater controls. ID & FD fan air flow controls – Spray and Gas recirculation control – Boiler Feed Pump recirculation Control – Hot well and deaerator level control – Control systems in Raw material (Coal) handling – Pulverizer Control – Computers in power plants.

UNIT - IV

TURBINE AND ALTERNATOR MONITORING & CONTROL: Condenser Vacuum Control –  
Gland Steam exhaust pressure control – Speed, Vibration, Shell and Bearing Temperature monitor and control – Lubricating oil temperature control – Alternator vibration monitoring –  
Hydrogen generator cooling system.

UNIT - V

ANALYSIS INSTRUMENTS IN POWER PLANTS: Thermal conductive type – Paramagnetic type oxygen analyzers- field mount type oxygen analyzers – Infra red type – trim analyzer –  

TEXT BOOK

Power Plant Engineering: BLACK & VEATCH.  
Publisher: Chapman & Hall Inc- New York, CBS Publishers & Distributors, New Delhi  
REFERENCES

T336 – VIRTUAL INSTRUMENTATION

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

UNIT - I

VIRTUAL INSTRUMENTATION: Historical perspective, advantages, block diagram and architecture of a virtual instrument, data-flow techniques, graphical programming in data flow, and comparison with conventional programming. Development of Virtual Instrument using GUI, Real-time systems, Embedded Controller, OPC, HMI / SCADA software, Active X programming.

UNIT - II

VI PROGRAMMING TECHNIQUES: VIS and sub-VIS, loops and charts, arrays, clusters and graphs, case and sequence structures, formula nodes, local and global variables, string and file I/O, Instrument Drivers, Publishing measurement data in the web.

UNIT - III

DATA ACQUISITION BASICS: Introduction to data acquisition on PC, Sampling fundamentals, Input/Output techniques and buses. ADC, DAC, Digital I/O, counters and timers, DMA, Software and hardware installation, Calibration, Resolution, Data acquisition interface requirements.

UNIT - IV

VI CHASSIS REQUIREMENTS. Common Instrument Interfaces: Current loop, RS 232C/RS485, GPIB. - Bus Interfaces: USB, PCMCIA, VXI, SCSI, PCI, PXI, Firewire, PXI system controllers, Ethernet control of PXI.

UNIT - V

Networking basics for office & Industrial applications, VISA and IVI. - VI toolsets, Distributed I/O modules. Application of Virtual Instrumentation: Instrument Control, Development of process database management system

TEXT BOOK


REFERENCES

T225 - INSTRUMENTATION AND CONTROL IN PETRO CHEMICAL INDUSTRIES

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

UNIT-I

UNIT-II
Atmospheric Distillation of Crude oil - Vacuum Distillation process - Thermal Conversion process - Control of Distillation Column - Temperature Control - Process control - Feed control - Reflux Control - Reboiler Control.

UNIT-III
Controls of chemical Reactors: Temperature Control, Pressure Control - Control of Dryers - Batch Dryers - Atmospheric and Vacuum; Continuous Dryers. - Control Heat Exchangers and Evaporators - variables and Degrees of freedom - Liquid to Liquid Heat Exchangers - Steam Heaters - Condensers -Reboilers and Vaporizers - Cascade Control - Feed forward Control.

UNIT-IV
Evaporators: Types of Evaporators. - Evaporators in Petroleum refinery

UNIT-V

TEXT BOOK
Dr. Ram Prasad, Petroleum Refining Technology, Khanna Publisher, 1st Edition, 2000

REFERENCES
UNIT - I

Role of paper in various forms in the civilised world; history of paper making; per-capita consumption of paper and board in India and in other countries. Process description in diagrammatic and functional block details; conventional and non-conventional raw materials for paper manufacture. Various grades of paper; properties of paper.

UNIT - II

Different pulping processes; importance of kraft process; continuous and batch digesters, brown stock washers, bleaching plant, chemical recovery process; paper machine operations; conversion processes. Pulping process involves various chemical processes;

UNIT - III

Impact of effluents and need for treatment and disposal. Addition and removal of water in Paper making; process water, DM water and potable water; water treatment plant. - : Cogeneration Plant for steam and power generation

UNIT - IV

Identification of various process parameters in the industry; selection of suitable measurement hardware for flow, pressure, level, temperature, density, solids, consistency, pH, ORP, conductivity. Special gauges for measurement of basis weight, moisture and caliper. Control room layout for mill operations; graphic displays; alarm management.

UNIT - V

Special applications for controls; Digester blow tank controls; digester liquor feed pump control; brown stock washer level control; stock chest level control; dissolving tank density control; white liquor classifier density control; white liquor flow control; condensate conductivity control. dryer temperature control. Basis weight control; web moisture control. - Evolution of computer applications in the industry; Review of data logging, SCADA, DDC, PLC and DCS. Computer controls for online basis weight and web moisture in modern mills.
TEXT BOOK


REFERENCES

P852 -MICROPROCESSORS AND MICROCONTROLLERS APPLICATIONS LAB.

Lecture : 3 Periods/week

Internal Marks : 25

External Marks : 75

Credits : 2

External Examination : 3 Hrs

LIST OF EXPERIMENTS:

MICROPROCESSOR 8086:

1. Introduction to MASM/TASM.

2. Arithmetic operation: – Multi byte addition & subtraction,
   Multiplication & Division,
   Signed & Unsigned arithmetic operations,
   ASCII- arithmetic operation.

3. Logic operations : - Shift & Rotate.
   Converting packed BCD to Unpacked BCD
   BCD to ASCII conversion.

4. By using string operations & Instruction prefix:- Move block of data,
   Reverse String, Sorting Inserting,
   Deleting string, Length of string,
   String comparison.

5. DOS/BIOS programming: - Reading key board
   Display characters & Strings.
   (Buffered with & without echo),

INTERFACING:

1. 8259-Interrupt controller: Generate a 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.

MICROCONTROLLER 8051:

1. Reading & writing on a parallel port.

2. Timer in different modes.

3. Serial communication implementation.
P840 : INSTRUMENTATION – II LAB.

Lecture : 3 Periods/week
Tutorial :
Credits : 2

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

-----------------------------------------

LIST OF EXPERIMENTS:

1. Design & simulation of Analog circuits using CAD package.
2. Design of PCB’s using packages & Fabrication of PCB.
3. Linearization of Thermistor using Microprocessor.
4. Study of level control using PLC.
5. PH measurement.
7. Calibration of P/I & I/P converters.
8. RPM indicator using Stroboscope.
12. Displacement measurement using Inductive pickup & Capacitive pickup.
13. PID controller setup.
UNIT - I

OPTICAL FIBERS AND THEIR PROPERTIES
Introduction to optical fibers – Light guidance – Numerical aperture – Dispersion – Different types of fibers and their properties. - Light Sources for fiber optics, Photo detectors, source coupling, splicing and connectors.

UNIT - II


UNIT - III

OPTO-ELECTRONIC COMPONENTS: LED, LD, PIN & APD, and Electro-optic, Magnetooptic and Acousto-optic Modulators

UNIT - IV


UNIT - V

MEDICAL APPLICATIONS: Lasers and tissue interaction, Laser instruments for surgery, removal tumors of vocal cords, plastic surgery, DERMATOLOGY.

TEXT BOOK


REFERENCES

UNIT - I

Introduction to PC based instrumentation, PC, I/O Ports, Plug-in Ports, O/P systems with actuators, operating interface, operating system, PC expansion systems, Back-plane Bus.

UNIT - II

PC Programming-ALP, Data transfer operations, Sealing & Linearization.

UNIT - III

PLC’s-Definition, Overview, PLC block diagram, I/O modules, Power supplies. Ladder logics-Definition, Creating Ladder diagrams, PLC functions, Registers, Timer, Counters.

UNIT - IV

PLC Intermediate functions-Arithmetic functions, Comparison functions, Skip & MCR functions, Sequencer functions.

UNIT - V

PLC Installation- Maintenance, Trouble shooting, PLC-PID functions, Ladder languages, Field bus, Pro field bus, Industrial field bus, Smart sensors, Hart protocols.

TEXT BOOK

Computer control of process - by m.chidambaram. – narosa publishers

REFERENCES

2. PC based instrumentation concepts and practice–by n.Mathivanan - phi
T115 – ANALYTICAL INSTRUMENTATION

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

UNIT - I

ELECTRO-CHEMICAL INSTRUMENTS & PH MEASURING SYSTEMS - Introduction to Al-Objectives-Electro-chemical cell, construction-potentiometers, conductivity meters-construction-measurement of conductance. polarographs-types of electrodes-instrumentation. - Principles of PH measuring electrodes, measuring-reference-selective ion type measuring circuits, industrial PH-meters

UNIT - II

SPECTRO PHOTOMETERS : Spectral methods of analysis - Beer's law UV - visible spectrophotometers - single beam and double beam instruments - source and detectors - IR spectrophotometers - sources and detectors - FTIR spectrometers - atomic absorption spectrophotometer - flame emission spectrophotometers - sources of flame photometry - applications

UNIT - III

GAS ANALYSER & CHROMATOGRAPHY - Oxygen analyser - CO monitor - Nox analyser - H2S analyser - dust and smoke measurement- thermal conductivity type - thermal analyser - industrial analysers. - Gas chromatography - liquid chromatography - principles, types and applications - high-pressure liquid chromatography - detectors

UNIT - IV

NUCLEAR MAGNETIC RESONANCE AND RADIATION TECHNIQUES
NMR - basic principle - NMR spectrometers - applications - introduction to mass spectrophotometers - nuclear radiation detectors - GM counter - proportional counter - solid state detectors - introduction - to x-ray spectroscopy.

UNIT - V

ENVIRONMENTAL POLLUTION MONITORING INSTRUMENTS: Air pollution monitoring, instrument systems for-carbon monoxide-sulpher dioxide-nitrogen oxides-hydro carbon-ozone automated wet chemical analyzers-water pollution monitoring.

TEXT BOOK


REFERENCES

T338 - VLSI DESIGN

Lecture : 4 Periods/week  Internal Marks : 25
Tutorial : 1  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 - II

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

UNIT - IV

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

UNIT - V

VHDL SYNTHESIS

TEXTBOOK:

REFERENCES:
T163 – DIGITAL SIGNAL PROCESSING

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

OBJECTIVE

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

UNIT - I

Introduction to Digital Signal Processing
Discrete time signals & sequences, linear shift invariant systems, stability, and causality. Linear constant coefficient difference equations. Frequency domain representation of discrete time signals and systems. Introduction to 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, MULTIRATE 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, multipoint 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
T262 – NEURAL NETWORKS AND FUZZY LOGIC

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

OBJECTIVE
This course introduces the basics of neural networks and essentials of artificial neural networks with single layer and multilayer feed forward networks. Also deals with associate memories and introduces fuzzy sets and fuzzy logic system components. The neural networks and fuzzy network systems application to electrical engineering is also presented. This subject is very important and useful for doing project work.

UNIT - I

Introduction to Neural Networks
Introduction, Humans and Computers, Organization of the Brain, Biological Neuron, Biological and Artificial Neuron Models, Characteristics of ANN, McCulloch-Pitts Model, Historical Developments, Potential Applications of ANN.

UNIT - II

Artificial Neural Networks
Artificial Neuron Model, Operations of Artificial Neuron, Types of Neuron Activation Function, ANN Architectures, Classification Taxonomy of ANN – Connectivity, Neural Dynamics (Activation and Synaptic), Learning Strategy (Supervised, Unsupervised, Reinforcement), Learning Rules, Types of Application.

UNIT - III

Feed Forward Neural Networks

Associative Memories

UNIT - IV

Fuzzy Logic- I
Introduction to Fuzzy sets & classical sets - properties, Operations, relations and cardinalities, Fuzzy membership functions - different types.
Fuzzification, Membership value assignment, development of rule base and Implication methods.

UNIT - V

Fuzzy Logic- II
Fuzzy logic applications: Fuzzy classification, Fuzzy logic control and fuzzy decision making.

TEXT BOOKS
2. Neural Networks – Simon Hakins, Pearson Education.
UNIT - I


UNIT - II


UNIT - III

Knowledge: Knowledge representation issues, representation & mapping, approaches to knowledge representation, issues in knowledge representation. Using predicate logic: Representing simple fact in logic, representing instant & ISA relationship, computable functions & predicates, resolution, natural deduction.

UNIT - IV

Representing knowledge using rules: Procedural verses declarative knowledge, logic programming, forward verses backward reasoning, matching, control knowledge.

UNIT - V

Reasoning: Probabilistic reasoning: Representing knowledge in an uncertain domain, the semantics of Bayesian networks, Dempster-Shafer theory, Fuzzy sets & fuzzy logics.

TEXT BOOK

Artificial Intelligence, Ritch & Knight, TMH

REFERENCES

1. Artificial Intelligence A Modern Approach, Stuart Russell & Peter Norvig Pearson
2. Introduction to Artificial Intelligence & Expert Systems, Patterson, PHI
5. Artificial Intelligence, Winston, Pearson Ed
T252 – MICRO ELECTRO MECHANICAL SYSTEMS (MEMS)

Lecture: 4 Periods/week

Internal Marks: 25

Tutorial:

External Marks: 75

Credits: 3

External Examination: 3 Hrs

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UNIT - I

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

UNIT - II

SCALING LAWS IN MINIATURIZATION
Introduction to Scaling, Scaling in Geometry, Scaling in Electrostatic forces. MEMS Design Considerations.

UNIT - III

MICRO FABRICATION - I
Introduction, Photolithography, Photoresists and Application, Light Sources, Photoresist Removal, Ion Implantation, Diffusion, Oxidation, Chemical Vapor Deposition (CVD), Sputtering, Deposition by Epitaxy, Etching.

UNIT - IV

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

UNIT - V

MEMS DEVICES AND STRUCTURES
Microsensors: Biomedical Sensors, Chemical sensors, Optical Sensors, Pressure Sensors, Thermal Sensors.
Microactuation: Actuation using thermal forces, Piezoelectric crystals, Electrostatic forces, MEMS with microactuators: Micрогrippers, Micromotors, Microgears, Micropumps.

TEXT BOOK

REFERENCES
1. Fundamentals of Micro Fabrication, Marc Madou, CRC Press
2. The MEMS Handbook, Mohamed Gad-el-Hak, CRC Press
3. Micro and Smart Systems, G.K.Anantha Suresh, Wiley India
T161 – DIGITAL IMAGE PROCESSING

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

UNIT - I


UNIT - II


UNIT - III


UNIT - IV

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

UNIT - V


TEXT BOOK


REFERENCES

REFERENCES

2. Introduction to Digital Image Processing with Matlab, Alasdair McAndrew, Thomson Course Technology
P820 – DIGITAL SIGNAL PROCESSING LAB.

Lab. : 3 Periods/week

Internal Marks : 25

External Marks : 75

Credits : 2

External Examination : 3 Hrs

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LIST OF EXPERIMENTS

USING TMS320C5X:

1. Generation of Signals
2. Linear Convolution
3. Implementation of a FIR filter
4. Implementation of an IIR filter
5. Calculation of FFT

USING MATLAB:

1. Generation of Discrete time Signals
2. Verification of Sampling Theorem
3. FFT and IFFT
4. time & Frequency response of LTI systems
5. Linear and Circular Convolution through FFT
6. Design of FIR filters (window design)
7. Design of IIR filters (Butterworth & Chebychev)
P841 – INSTRUMENTATION – III LAB.

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

LIST OF EXPERIMENTS:

1. Gas analyzer.
2. Gas & Liquid chromatography.
3. UV & VIS Spectrometer.
4. IR & FTIR Spectrometer.
5. Flame photometer.
8. Interfacing of ADC to PC.
9. Interfacing of DAC to PC & generate various types of signals.
10. Serial communication through RS232C between PCs.
11. GPIB interface-Master to slave data transfer.
12. GPIB interface-Slave to slave data transfer.
T218 – INDUSTRIAL ELECTRONICS

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

UNIT - I


UNIT - II

REGULATED POWER SUPPLIES: Block diagram, Principle of voltage regulation, Series and Shunt type Linear Voltage Regulators, Protection Techniques—Short Circuit, Over voltage and Thermal Protection.

UNIT - III

SCR AND THYRISTOR: Principle of operation and characteristics of SCR, Methods of Turn on and turn off mechanism, Gate characteristics, Ratings of SCR -Triggering of SCR, Diac and Triac Phase controlled half and full wave rectification.

UNIT - IV


UNIT - V


TEXT BOOK


REFERENCES

T243 – MANAGEMENT INFORMATION SYSTEMS

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UNIT - I


UNIT - II


UNIT - III

The wireless revolution: importance of wireless networking, wireless transmission media and devices, cellular network standards and generations, wireless computer networks and internet access, wireless technology in the enterprise. - Security and control: system vulnerability and abuse, importance of security and control, establishing a management framework for security and control, technologies and tools for security and control.

UNIT - IV

Enterprise Applications and Business Process Systems: What are enterprise systems, how enterprise systems work, supply chain management systems, customer relationship management systems, and enterprise integration trends?

UNIT - V

Redesigning the organizations with information systems: systems as planned organizational change, overview of system development, - Alternative systems building approaches – traditional systems life cycle, prototyping, end user development, application software package and outsourcing. - Managing change and international information systems: The importance of change management in information systems success and failure, managing implementation, managing global systems, technology issues and opportunities for global value chains.
TEXT BOOK


REFERENCES

T190 – EMBEDDED SYSTEMS DESIGN

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OBJECTIVE

This subject deals with the Fundamentals of Embedded systems, information about Devices and Buses for Devices network. In addition to the fundamentals, embedded programming and Real time operating systems are also discussed.

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 (RT-level), 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


Head

Department of Electronics & Instrumentation Engg.
Lakireddy Bali Reddy College of Engg. (Autonomous)
Mylavaram - 521 230, Krishna Dt, A.P.
REFERENCES

T322 – TELEMETRY AND TELE CONTROL

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

UNIT - I

UNIT - II
SYMBOLS AND CODES
Bits and Symbols, Time function pulses, Line and Channel Coding, Modulation Codes. Intersymbol Interference.

UNIT - III

UNIT - IV
SATELLITE & OPTICAL TELEMETRY

UNIT - V

TEXT BOOK
Telemetry Principles – D. Patranabis, TMH

REFERENCES
T106 – ADVANCED SENSORS

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

UNIT - I

SEMICONDUCTOR SENSORS: Metal Oxide Semiconductors, Hall Elements, Silicon Sensors, Silicon planar technology, Micromachine technology, silicon sensors for sensing radiation, mechanical, magnetic, chemical and other signals, IC sensors.

UNIT - II

CHEMICAL AND BIOMEDICAL SENSORS: Polymers, chemically modified electrodes, Membrane electrodes, Thick Film Devices, catalytic devices, Gas sensors.

OPTICAL SENSORS: Lasers, photo-detectors and optical fibre as sensors, Integrated optics

UNIT - III

MICRO SENSORS: Thin film sensors, Micro sensors for sensing thermal Radiation, Mechanical, Magnetic and Chemical signals.

UNIT - IV

INTERFACING AND SIGNAL PROCESSING: Intelligent and smart sensors, concepts of redundant and multi – sensory systems, operation in coded mode and mapping mode.

UNIT - V

SMART SENSORS: Basics of smart sensors, salient features of smart sensors, various components in smart sensors, TEDS, IEEE-1451 standards.

TEXT BOOK


REFERENCES

T159 – DIGITAL CONTROL SYSTEMS

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UNIT - I

SAMPLING AND RECONSTRUCTION:
Introduction, Examples of Data control systems – Digital to Analog conversion and Analog to Digital conversion, sample and hold operations.

UNIT - II

Z-PLANE ANALYSIS OF DISCRETE-TIME CONTROL SYSTEM:
Z-Transform method for solving difference equations; Pulse transforms function, block diagram analysis of sampled – data systems, mapping between s-plane and z-plane.

UNIT - III

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

UNIT - IV

CONTROLLABILITY AND OBSERVABILITY:

UNIT - V

STATE FEEDBACK CONTROLLERS AND OBSERVERS:
Design of state feedback controller through pole placement – Necessary and sufficient conditions, Ackerman’s formula.- State Observers – Full order and Reduced order observers.

TEXT BOOK

Discrete-Time Control systems - K. Ogata, Pearson Education/PHI, 2nd Edition

REFERENCES

1. Digital Control and State Variable Methods by M. Gopal, TMH
3. Digital Control Engineering, M. Gopal
T169 – DSP PROCESSORS AND ARCHITECTURES

Lecture : 3 Periods/week  
Internal Marks : 25

Tutorial :  
External Marks : 75

Credits : 3  
External Examination : 3 Hrs

UNIT - I

INTRODUCTION TO DIGITAL SIGNAL PROCESSING: Introduction, A Digital signal-processing system, The Sampling process, discrete time sequences. Discrete Fourier Transform (DFT) and Fast Fourier Transform (FFT), Linear time-invariant systems, Digital filters, Decimation and interpolation.

UNIT - II

COMPUTATIONAL ACCURACY IN DSP IMPLEMENTATIONS: Number formats for signals and coefficients in DSP systems, Dynamic Range and Precision, Sources of error in DSP implementations, A/D Conversion errors, DSP Computational errors, D/A Conversion Errors, Compensating filter.

UNIT - III

ARCHITECTURES FOR PROGRAMMABLE DSP DEVICES: Basic Architectural features, DSP Computational Building Blocks, Bus Architecture and Memory, Data Addressing Capabilities, Address Generation Unit, Programmability and Program Execution, Speed Issues, Features for External interfacing.

EXECUTION CONTROL AND PIPELINING: Hardware looping, Interrupts, Stacks, Relative Branch support, Pipelining and Performance, Pipeline Depth, Interlocking, Branching effects, Interrupt effects, Pipeline Programming models.

UNIT - IV

PROGRAMMABLE DIGITAL SIGNAL PROCESSORS: Commercial Digital signal-processing Devices, Data Addressing modes of TMS320C54XX DSPs, Data Addressing modes of TMS320C54XX Processors, Memory space of TMS320C54XX Processors, Program Control, TMS320C54XX instructions and Programming, On-Chip Peripherals, Interrupts of TMS320C54XX processors, Pipeline Operation of TMS320C54XX Processors.

UNIT - V

IMPLEMENTATION OF FFT ALGORITHMS: An FFT Algorithm for DFT Computation, A Butterfly Computation, Overflow and scaling, Bit-Reversed index generation, an 8-Point FFT implementation on the TMS320C54XX,
TEXT BOOKS

REFERENCES
T300 – ROBOTICS

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

UNIT-I

End Effectors: Introduction – Types of end effectors – Mechanical grippers – Vacuum cups, magnetic grippers, adhesive grippers and others – Robot / End effectors interface – Considerations in gripper selection and design

UNIT-II


UNIT-III

Manipulator jacobian – problems – Dynamics: Introduction , Lagrange Euler formulation , Problems

UNIT-IV

Trajectory Planning: Introduction – considerations on trajectory planning – joint Interpolated trajectory – Cartesian path trajectory – problems

UNIT-V

Sensors: Position sensors: Potentiometers, resolvers, encoders – velocity sensors
Robot Application in Manufacturing: Material transfer and machine loading/ unloading applications – Processing operations – Assembly and inspection – Future applications.

TEXT BOOK

REFERENCES
2. Robert J.Schilling. Fundamentals of robotics analysis & control, PHI learning private limited, New Delhi
3. Seed B.Niku, Introduction to robotics analysis systems Application, PHI learning private limited, New Delhi
4. K.I.Fu, R.C Gonzalez and C.S.G.Lee, Robotics control, Sensing, vision, and intelligence; Mc Graw HILL International Editions
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


REFERENCES

2. Medical instrumentation application & design – 3rd edition by jhon g. webster, editor jhon wiley.