

GURU JAMBHESHWAR UNIVERSITY, HISAR
SCHEME OF STUDIES AND EXAMINATIONS

B. Tech. E.C.E. 1- YEAR

SEMESTER- I

Course No.	Course Title	Teaching Schedule			
		L	T	P	Total credits
HUM-101-E	ESSENTIALS OF COMMUNICATION	3	1	-	3.5
MATH-101-E	MATHEMATICS	3	2	-	4
PHY-101-E	PHYSICS-I	3	1	-	3.5
ME-103-E	MANUFACTURING PROCESS	4	-	-	4
CSE-101-E	FUNDAMENTALS OF COMPUTER & PROGRAMMING IN C	3	1	-	3.5
ME-101-E	ELEMENTS OF MECHANICAL ENGINEERING	3	1	-	3.5
PHY-103-E	PHYSICS LAB-I	-	-	2	1
ME-107-E	WORKSHOP PRACTICE	-	-	4	2
CSE-103-E	COMUTER PROGRAMMING LAB	-	-	2	1
ME-109-E	ELEMENTS OF MECH. ENG. LAB	-	-	2	1
TOTAL		19	6	10	27

Note:-1. Students will study either GROUP A (ME-101-E, ME-103-E, CSE-101-E, ME-107-E, CSE-103-E, ME-109-E)
OR GROUP B (ME-105-E, CH-101-E, EE-101-E, CH-103-E, EE-103-E)

2. Students are allowed to use single memory-non programmable scientific calculator during examination.

HUM-101-E

ESSENTIALS OF COMMUNICATION
B.E. Semester-I
(COMMON FOR ALL BRANCHES)

L T P
3 1 -

Total Credits: 3.5

The course aims at inculcating a minimum level of language proficiency among students of Engineering and Technology. The purpose is to sensitise them to the nuances of English and its applications for various communication needs.

COURSE CONTENT:

Unit-I

Semantics: Synonyms, Antonyms, Homophones, Homonyms, Form and function of words

Unit-II

Syntax: Sentence structures, Verb patterns and their usage

Unit-III

Phonetics: Basic Concepts - Vowels, Consonants, Phonemes, Syllables; Articulation of Speech Sounds - Place and Manner of Articulation; Transcription of words and simple sentences, using International Phonetic Alphabet.

Unit-IV

Comprehension: Listening and Reading comprehension - Note taking, Reviewing, Summarising, Interpreting, Paraphrasing and Précis Writing.

Unit-V

Composition: Descriptive, Explanatory, Analytical and Argumentative Writing - description of simple objects like instruments, appliances, places, persons, principles; description and explanation of processes and operations; analysis and arguments in the form of debate and group discussion

Unit-VI

Text: *English for Students of Science* by A.Roy and P.L. Sharma (Orient Longman)

Chapters for Study:

- i) "The year 2050" by Theodore J. Gordon.
- ii) "The Mushroom of Death" by A. Bandhopadhyay.
- iii) "The Discovery" by Herman Ould.

The prescribed text will be used as a case study for various components of the syllabus.

Unit-VII (For Internal Evaluation Only):

Book Review - Herein the students will be required to read and submit a review of a book (Literary or non-literary) of their own choice. This will be followed by a presentation of the same in the class.

TEXT BOOKS:

1. *English for Students of Science* edited by A. Roy and P.L. Sharma, Orient Longman.
2. *Spoken English for India* by R.K. Bansal and J.B. Harrison, Orient Longman.
3. *Intermediate Grammar, Usage and Composition* by M.L. Tickoo and A.E. Subramanian, Orient Longman.

SUGGESTED READING:

1. *English Grammar, Composition and Correspondence* by M.A. Pink and S.E. Thomas, S. Chand and Sons Pvt. Ltd., Delhi.
2. *A Practical English Grammar* by Thomson and Martinet, OUP, Delhi.
3. *Guide to Patterns and Usage in English* by A.S. Hornby, OUP, Delhi.
4. *A Textbook of English Phonetics for Indian Students* by T. Balasubramanian, MacMillan, Chennai.
5. *Better English Pronunciation* by J.D.O'Connor, Cambridge Univ. Press, London.
6. *English Vocabulary in Use* by McCarthy, Foundation Books (Cambridge University Press), Delhi.
7. *Assessing Listening* by Buck, Foundation Books (Cambridge University Press), Delhi.
8. *Reading Between the Lines* by McRae, Foundation Books (Cambridge

university Press), Delhi.

SCHEME OF EXAMINATION:

There will be seven questions in all covering all the units, except Unit VII which (besides other modes of internal evaluation) is for internal assessment only. All questions will be compulsory and will have sufficient internal choice.

Unit-I: 15 Marks

The question will be set so as to evaluate the following: Usage of the words given, Changing the grammatical quality and function of the words, One word Substitutes, synonyms, antonyms, homophones, homonyms.

Unit-II: 20 Marks

There will be one question having different parts. The question should test students' knowledge of sentence structures and verb patterns. The question can be in the nature of 'Do as directed', 'Tracing and rectifying structural Errors', 'Elucidating patterns through sentences and vice-versa', 'Changing the word-order', 'Synthesizing the sentences' and 'Completing the sentences', etc.

Unit-III: 15 Marks

There will be two questions from this Unit. Question one will be in the nature of short notes testing the basic concepts and articulation of speech sounds. The second question would require transcription of individual words and simple sentences.

Unit-IV: 15 Marks

Comprehension and Interpretation of a passage given (Literary or non-literary, newspaper article, story, extract from a speech etc.), will be judged for its vocabulary, general understanding and interpretation of the content in the form of question answer exercise, culling out important points, suggesting a suitable topic/title, summarising and précis writing etc.

Unit-V: 15 Marks

The question will require the definition, description, analysis, explanation of various objects and processes. Besides, a topic of contemporary relevance may be given for writing a paragraph in any one of the writing forms prescribed in the unit.

Unit-VI: 20 Marks

There will be two questions from the text prescribed. The first question will evaluate the comprehension of the text through short answer questions or a long answer question.

The second question will judge the linguistic aspect of the text such as using a particular word in its various syntactic forms like noun, adjective, verb etc.; matching the lists of words and their explanation; providing opposite/similar meanings, adding suffixes and prefixes etc.

MATH-101-E

MATHEMATICS-I

(COMMON FOR ALL BRANCHES)

L T P
3 2 -

Total Credits: 4

Part-A

Infinite series : Convergence and divergence, Comparison, D' Alembert's ratio, Integral, Raobes, Logrithmic and Cauchy root tests, Alternating series, Absolute and conditional convergence.

Applications of Differentiation : Taylor's and Maclaurin's series, Asymptotes, Curvature Asymptotes.

Partial Differentiation & its Applications : Functions of two or more variables; partial derivatives, Total differential and differentiability, Derivatives of composite and implicit functions, Jacobians, Higher order partial derivatives.

Homogeneous functions, Euler's theorem, Taylor's series for functions of two variables (without proof), maxima-minima of function of two variables, Lagrange's method of undetermined multipliers, Differentiation under integral sign.

Part-B

Applications of Single & Multiple Integration : Applications of single integration to find volume of solids and surface area of solids of revolution. Double integral, change of order of integration, Double integral in polar coordinates, Applications of double integral to find area enclosed by plane curves and volume of solids of revolution.

Triple integral, volume of solids, change of variables, Beta and gamma functions and relationship between them.

Vector Calculus : Differentiation of vectors, scalar and vector point functions Gradient of a scalar field and directional derivative, divergence and curl of a vector field and their physical interpretations.

Integration of vectors, line integral, surface integral, volume integral, Green, Stoke's and Gauss theorems (without proof) and their simple applications.

TEXT BOOKS :

1. Advanced Engineering Mathematics : F. Kreyszig.
2. Higher Engineering Mathematics : B.S. Grewal.

REFERENCE BOOKS :

1. Engineering Mathematics Part-I : S.S. Sastry.
2. Differential and Integral Calculus : Piskunov.
3. Advanced Engineering Mathematics : R.K. Jain and S.R.K.Iyengar
4. Advanced Engg. Mathematics : Michael D. Greenberg

Note: Examiner will set eight questions, taking four from Part-A and four from Part-B.
Students will be required to attempt five questions taking at least two from each part.

PHY-101-E : PHYSICS-I (COMMON FOR ALL BRANCHES)

L T P
3 1 -

Total Credits: 3.5

PART-A

PHYSICAL OPTICS

Interference : Division of wave front-Fresnel's biprism, Division of amplitude - Newton's rings, Michelson interferometer, applications.

Diffraction : Difference between Fraunhofer and Fresnel diffraction. Fraunhofer diffraction through a slit. Plane transmission diffraction grating, its dispersive and resolving powers.

Polarization : Polarised and unpolarized light, double refraction; Nicol prism, quarter and half wave plates, Polarimetry; Biquartz and Laurent's half-shade polarimeters, Simple concepts of photoelasticity.

LASER

Spontaneous and stimulated emissions, Laser action, characteristics of laser beam-concepts of coherence, He-Ne and semiconductor lasers (simple ideas), applications.

FIBRE OPTICS

Propagation of light in fibres, numerical aperture, single mode and multi mode fibres, applications.

PART-B

WAVE AND OSCILLATIONS

Simple concepts of Harmonic Oscillator, resonance, quality factor.

E.M. wave theory-review of basic ideas, Maxwell's equations, simple plane wave equations, simple concepts of wave guides and co-axial cables, Poynting vector.

DIELECTRICS

Molecular theory, polarization, displacement, susceptibility, dielectric coefficient, permittivity & various relations between these, Gauss's law in the presence of a dielectric, Energy stored in an electric field.

Behaviour of dielectrics in a.c. field-simple concepts, dielectric losses.

SPECIAL THEORY OF RELATIVITY

Michelson-Moreley experiment, Lorentz transformations, variation of mass with velocity, mass energy equivalence.

NUCLEAR PHYSICS

Neutron Cross-section, Nuclear fission, Moderators, Nuclear reactors, Reactor criticality, Nuclear fusion. Interaction of radiation with matter-basic concepts, radiation detectors-ionisation chamber, G.M. Counter, Scintillation and solid state detectors, cloud chamber and bubble chamber.

TEXT BOOKS :

1. Physics of the Atom - Wehr, Richards & Adair (Narosa)
2. Perspectives of Modern Physics - Arthur Beiser (TMH)
3. Modern Engineering Physics - A.S. Vasudeva (S. Chand)

REFERENCE BOOKS :

1. Electricity and Magnetism - F.W. Sears (Narosa)
2. Physics Vol-I & II - Resnick & Halliday (Wiley Eastern)
3. A Text Book of Optics - Brij Lal & Subramanyam

Note: The Examiners will set eight questions, taking four from each part. The students will be required to attempt five questions in all selecting at least two from each part. All questions will carry equal marks.

ME- 103 E MANUFACTURING PROCESSES

L T P
4 - -

Total Credits: 4

Unit I Introduction: Introduction to Manufacturing Processes and their Classification. Industrial Safety; Introduction, Types of Accidents, Causes and Common Sources of Accidents, Methods of Safety, First Aid.

Unit II Engineering Materials: General Properties and Applications of Engineering Materials, Mild Steel, Medium Carbon Steel, High Carbon Steel, High Speed Steel and Cast Iron.

Unit III Foundry: Introduction to Casting Processes, Basic Steps in Casting Process, Pattern, Types of Patterns, Pattern Allowances, Risers, Runners, Gates, Moulding Sand and its composition, Sand Preparation, Molding Methods, Core Sands and Core Making, Core Assembly, Mold Assembly, Melting (Cupola) and Pouring, Fettling, Casting Defects and Remedies.

Unit IV Cold Working (Sheet Metal Work): Sheet Metal Operations, Measuring, Layout Marking, Shearing, Punching, Blanking, Piercing, Forming, Bending and Joining Advantages and Limitations.
Hot Working Processes: Introduction to Hot Working, Principles of Hot Working Processes, Forging, Rolling, Extrusion, Wire Drawing..

Unit V Introduction to Machine Tools: Specifications and Uses of commonly used Machine Tools in a Workshop such as Lathe, Shaper, Planer, Milling, Drilling, Slotter, Introduction to Metal Cutting. Nomenclature of a Single Points Cutting Tool and Tool Wear. Mechanics of Chips Formations, Type of Chips , Use of Coolants in machining.

Unit VI Welding: Introduction to Welding, Classification of Welding Processes, Gas Welding: Oxy-Acetylene Welding, Resistance Welding; Spot and Seam Welding, Arc Welding: Metal Arc, TIG & MIG Welding, Welding Defects and Remedies, Soldering & Brazing.

Unit VII Plant Layout, Objectives of Layout, Types of Plant Layout and their Advantages.

Text Books :

1. Workshop Technology Volt.I & II - Hazra & Chaudhary, Asian Book Comp., New Delhi.

2. Process and Materials of Manufacture -- Lindberg, R.A. Prentice Hall of India, New Delhi.
3. Principles of Manufacturing Materials and Processes - Campbell, J.S.- McGraw- Hill.

Reference Books:

1. Manufacturing Science - Amitabha Ghosh & Ashok Kumar Malik, - East-West Press.
2. Manufacturing Process and Systems - Ostwald, Munoz, John Wiley.
3. Workshop Technology, Vol. 1, 2 & 3 – Chapman, WAJ, Edward Arnold.

Note : Eight questions will be set by the examiner, taking at least one question from each unit. Students will be required to attempt five questions.

L	T	P
3	1	-

Total Credits: 3.5

Unit-1: An Overview of Computer System: Anatomy of a digital Computer, Memory Units, Main and Auxiliary Storage Devices, Input Devices, Output Devices, Classification of Computers.

Radix number system: Decimal, Binary, Octal, Hexadecimal numbers and their inter-conversions; Representation of information inside the computers.

Unit-2: Operating System Basics: The user Interface, Running Programmes, Managing files, Introduction to PC operating Systems: Unix/Linux, DOS, Windows 2000.

Unit-3: Internet basics: : Introduction to the basic concepts of Networks and Data Communications, How Internet works, Major features of internet, Emails, FTP, Using the internet.

Unit-4: Programming Languages: Machine-, Assembly-, High Level- Language, Assembler, Compiler, Interpreter, debuggers, Programming fundamentals: problem definition, algorithms, flow charts and their symbols, introduction to compiler, interpreter, assembler, linker and loader and their inter relationship.

Unit-5: C Programming language: C fundamentals, formatted input/ output, expressions, selection statements, loops and their applications; Basic types, arrays, functions, including recursive functions, program organization: local and external variables and scope; pointers & arrays.

Unit-6: Strings: strings literals, string variables, I/O of strings, arrays of strings; applications. Preprocessor: preprocessor directives, macro definition, conditional compilation; Structures, Unions and Enumerations: Structure variables and operations on structures; Structured types, nested array structures; unions; enumeration as integers, tags and types.

Declaration: Declaration syntax, storage classes, types qualifiers, declarators, initializers.

Program Design: modules, information hiding, abstract data types, difference between C & C++, Low level programming: Bitwise operators, Bit fields in structures, other low level techniques.

Unit-7: Standard library: Input / output; streams, file operations, formatted I/O, character I/O, line I/O, block, string I/O, Library support for numbers and character data, error handling:

Text Books:

- Using Information Technology, 5th Edi, Brian K Williams & Stacey C. Sawyer, 2003, TMH
- The C Programming Language by Dennis M Ritchie, Brian W. Kernigham, 1988, PHI.
- C Programming – A modern approach by K.N. King, 1996, WW Norton & Co.

Reference Books:

- Information technology, Dennis P. Curtin, Kim Foley, Kunal Sen, Cathleen Morin, 1998, TMH
- Theory and problem of programming with C, Byron C Gottfried, TMH
- Teach yourself all about computers by Barry Press and Marcia Press, 2000, IDG Books India.
- Using Computers and Information by Jack B. Rochester, 1996, Que Education & Training.

Note: 8 questions will be set by the examiner (at least 2 questions from unit-1 to 4, 2 each from unit -5& 6, and one from unit-7). The students will be required to attempt 5 questions in all.

ME- 101 E ELEMENTS OF MECHANICAL ENGINEERING

L
3

T
1

P
-

Total Credits: 3.5

Unit I Properties of Steam & Boilers:

Formation of steam at constant pressure, Thermodynamics properties of steam, Condition of steam, Steam tables, Measurement of dryness fraction by throttling calorimeter, Classification of boilers, Comparison of water and fire tube boilers mounting and accessories with their functions, Constructional and operational details of Cochran and Babcock and Wilcox boilers, Problems.

Unit II Steam Turbines and Condensers:

Classification of turbines, Working principle of impulse and reaction turbine, Compounding of impulse turbine, Comparison of impulse and reaction turbines, Types of condensers, Cooling ponds and cooling towers, Condenser and vacuum efficiencies.

Unit III I.C. Engines and Gas Turbines:

Introduction, Classification, Constructional details and working of two-stroke and four-stroke diesel and petrol engines, Otto, Diesel and Dual cycles, Working principle of gas turbine, Constant pressure gas turbine cycle.

Unit IV Water Turbines, Pumps and Hydraulic Devices:

Introduction, Classification, Construction details and working of Pelton, Francis and Kaplan turbines, Specific speed and selection of turbines, Classification of water pumps and their working, Hydraulic jack and lift.

Unit V Simple Lifting Machines:

Definition of machine, Velocity ratio, Mechanical advantage, Efficiency, Laws of machines, Reversibility of machine, Wheel and axle, Differential pulley block, Single, double and triple start worm and worm wheel, Single and double purchase winch crabs, Simple and compound screw jacks. Problems.

Unit VI Power Transmission Methods and Devices:

Introduction to Power transmission, Belt drive, Rope drive, Chain drive, Pulley, Gear drive, Types of gears, Gear train, Clutches, Types and function of clutches, Types and function of brakes, Power measurement by dynamometer, Types of dynamometers.

Unit VII Stresses and Strains:

Introduction, Concept & types of Stresses and strains, Poisson's ratio, stresses and strains in simple and compound bars under axial loading, Stress-strain diagrams, Hooke's law, Elastic constants & their relationships, Principle stresses & strains and principal- planes, Mohr's circle of stresses. Numerical problems.

Unit VIII Bending Moment & Shear Force:

Definitions, SF and BM diagrams for cantilever and simply supported beam. Calculation of maximum SF, BM and point of contraflexure under the loads of (i) concentrated load (ii) uniformly distributed load (iii) combination of concentrated and uniformly distributed loads. Problems.

Text Books:

1. Strength of Materials - G.H. Ryder, Pub.- ELBS.
2. Hydraulic and Fluid Mechanics – Modi and Seth, Pub. – Standard Book House, New Delhi
3. Engineering Thermodynamics – C.P. Arora, Pub. - TMH, New Delhi
4. Thermal Engineering – A.S. Sarad, Pub. - Satya Prakashan, New Delhi.
5. Engineering Mechanics – K.L. Kumar, Pub. - TMH, New Delhi.
6. Theory of Machines – S.S. Rattan, Pub. – TMH, New Delhi.

Reference Books:

1. Strength of Materials – Popov, Pub. - PHI, New Delhi.
2. Hydraulic Machines – Jagdish Lal, Pub.- Metropolitan, Allahbad.
3. Thermal Science and Engineering – D.S. Kumar, Pub. – Kateria & Sons, New Delhi.

NOTE: In the semester examination, the examiner will set eight questions, at least one question from each unit. The students will be required to attend only 5 questions.

PHY-103-E : PHYSICS LAB.-I

(COMMON FOR ALL BRANCHES)

L T P
- - 2

Total Credits: 1

LIST OF EXPERIMENTS

The experiments in Ist semester will be based mainly upon optics, electrostatics, wave and oscillations which are the parts of the theory syllabus of Ist semester.

1. To find the wavelength of sodium light by Newton's rings experiment.
2. To find the wavelength of sodium light by Fresnel's biprism experiment.
3. To find the wavelength of various colours of white light with the help of a plane transmission diffraction grating.
4. To find the refractive index and cauchy's constants of a prism by using spectrometer.
5. To find the wavelength of sodium light by Michelson interferometer.
6. To find the resolving power of a telescope.
7. To find the pitch of a screw using He-Ne laser.
8. To find the specific rotation of sugar solution by using a polarimeter.
9. To compare the capacitances of two capacitors by De'sauty bridge and hence to find the dielectric constant of a medium.
10. To find the flashing and quenching potentials of Argon and also to find the capacitance of unknown capacitor.
11. To study the photoconducting cell and hence to verify the inverse square law.
12. To find the temperature co-efficient of resistance by using platinum resistance thermometer and Callender and Griffith

bridge.

13. To find the frequency of A.C. mains by using sonometer.
14. To find the velocity of ultrasonic waves in non-conducting medium by piezo-electric method.

RECOMMENDED BOOKS :

1. Advanced Practical Physics - B.L. Worshnop and H.T. Flint (KPH)
2. Practical Physics - S.L.Gupta & V.Kumar (Pragati Prakashan).
3. Advanced Practical Physics Vol.I & II - Chauhan & Singh (Pragati Prakashan).

Note : Students will be required to perform atleast 10 experiments out of the list in a semester.

ME- 107 E

WORKSHOP PRACTICE

L T P
- - 4

Total Credits: 2

List of Experiments / Jobs

1. To study different types of measuring tools used in metrology and determine least counts of vernier calipers, micrometers and vernier height gauges.
2. To study different types of machine tools (lathe, shape or planer or slotter, milling, drilling machines)
3. To prepare a job on a lathe involving facing, outside turning, taper turning, step turning, radius making and parting-off.
4. To study different types of fitting tools and marking tools used in fitting practice.
5. To prepare lay out on a metal sheet by making and prepare rectangular tray, pipe shaped components e.g. funnel.
6. To prepare joints for welding suitable for butt welding and lap welding.
7. To perform pipe welding.
8. To study various types of carpentry tools and prepare simple types of at least two wooden joints.
9. To prepare simple engineering components/ shapes by forging.
10. To prepare mold and core assembly, to put metal in the mold and fettle the casting.
11. To prepare horizontal surface/ vertical surface/ curved surface/ slots or V-grooves on a shaper/ planner.

12. To prepare a job involving side and face milling on a milling machine.

NOTE : 1. At least ten experiments/ jobs are to be performed/ prepared by students in the semester.

2. At least 8 experiments/ jobs should be performed / prepared from the above list, remaining two may either be performed/ prepared from the above list or designed & set by the concerned institution as per the scope of the syllabus of Manufacturing Processes and facilities available in the Institute.

		CSE -103 E	C Programming Lab.	
L	T	P		Total Credits: 1
-	-	2		

Representative programming problems:-

1. Write a program to find the largest of three numbers. (if-then-else)
2. Write a program to find the largest number out of ten numbers (for-statement)
3. Write a program to find the average male height & average female heights in the class (input is in form of sex code, height).
4. Write a program to find roots of quadratic equation using functions and switch statements.
5. Write a program using arrays to find the largest and second largest no. out of given 50 nos.
6. Write a program to multiply two matrices
7. Write a program to read a string and write it in reverse order
8. Write a program to concatenate two strings
9. Write a program to sort numbers using the Quicksort Algorithm.
10. Represent a deck of playing cards using arrays.
11. Write a program to check that the input string is a palindrome or not.

Note: At least 5 to 10 more exercises to be given by the teacher concerned.

ME- 109 E ELEMENTS OF MECHANICAL ENGINEERING LAB.

L	T	P
-	-	2

Total Credits: 1

LIST OF EXPERIMENTS

1. To study Cochran & Babcock & Wilcox boilers.
2. To study the working & function of mountings & accessories in boilers.
3. To study 2-Stroke & 4-Stroke diesel engines.
4. To study 2-Stroke & 4-Stroke petrol engines.
5. To calculate the V.R., M.A. & efficiency of single, double & triple start worm & worm wheel.
6. To calculate the V.R., M.A. & efficiency of single & double purchase winch crabs.
7. To find the percentage error between observed and calculated values of stresses in the members of a Jib crane.
8. To draw the SF & BM diagrams of a simply supported beam with concentrated loads.
9. To study the simple & compound screw jacks and find their MA, VR & efficiency.
10. To study the various types of dynamometers.
11. To the constructional features & working of Pelton/Kaplan/Francis.
12. To prepare stress-strain diagram for mild steel & cast iron specimens under tension and compression respectively on a Universal testing machine.
13. To determine the Rockwell / Brinell /Vickers hardness no. of a given specimen on the respective machines.

Note: 1. Total ten experiments are to be performed in the Semester.

2. At least seven experiments should be performed from the above list. Remaining three experiments should be performed as designed & set by the concerned Institution as per the scope of the syllabus.

GURU JAMBHESHWAR UNIVERSITY, HISAR
SCHEME OF STUDIES AND EXAMINATIONS

B. Tech. E.C.E. 1- YEAR

SEMESTER- II

Course No.	Course Title	Teaching Schedule			
		L	T	P	Total credits
HUM-102-E	COMMUNICATION SKILLS IN ENGLISH	3	1	-	3.5
MATH-102-E	MATHEMATICS- II	3	2	-	4
PHY-102-E	PHYSICS- II	3	1	-	3.5
CH-101-E	CHEMISTRY	3	1	-	3.5
EE-101-E	ELECTRICAL TECHNOLOGY	3	1	-	3.5
ME-105-E	ENGINEERING GRAPHICS AND DRAWING	1	-	4	3
PHY-104-E	PHYSICS LAB- II	-	-	2	1
CH-103-E	CHEMISTRY LAB	-	-	2	1
EE-103-E	ELECTRICAL TECHNOLOGY LAB	-	-	2	1
TOTAL		16	6	10	24

HUM-102-E

COMMUNICATION SKILLS IN ENGLISH

B.E. Semester-II

(COMMON FOR ALL BRANCHES)

L T P
3 1 -

Total Credits: 3.5

This course is designed for the students of Engineering and Technology who need English for specific purposes in specific situations. It aims at imparting the communication skills that are needed in their academic and professional pursuits. This is achieved through an amalgamation of traditional lecture-oriented approach of teaching with the task based skill oriented methodology of learning.

COURSE CONTENT:

Unit-I

Communicative Grammar: Spotting the errors pertaining to nouns, pronouns, adjective and adverbs; Concord - grammatical concord, notional concord and the principle of proximity between subject and verb.

Unit-II

Lexis: Idioms and phrases; Words often confused; One-Word Substitutes; Formation of words (suffixes, prefixes and derivatives); Foreign Words (A selected list)

Unit-III

Oral Communication:

Part-A: Introduction to principal components of spoken English - Word-stress patterns, Intonation, Weak forms in English

Part-B: Developing listening and speaking skills through various activities, such as (a) role play activities, (b) Practising short dialogues (c) Group discussion (d) Debates (e) Speeches (f) Listening to news bulletins (g) Viewing and reviewing T.V. programmes etc.

Unit-IV

Written Communication:

Developing reading and writing skills through such tasks/activities as developing outlines, key expressions, situations, slogan writing and theme building exercises

Reading verbal and non-verbal texts-like cartoons, Graphs and tabulated data etc.

Unit-V (For Internal Evaluation Only):

Book Review - Herein the students will be required to read and submit a review of a book (Literary or non-literary) of their own choice. This will be followed by a presentation of the same in the class

Unit-VI

Technical Writing:

- (a) Business Letters, Format of Business letters and Business letter writing
- (b) E-mail writing
- (c) Reports, Types of Reports and Format of Formal Reports
- (d) Press Report Writing

SUGGESTED READING:

1. *Language in Use (Upper intermediate Level)*, Adrian Doff Christopher Jones, Cambridge University Press
2. *Common Errors in English*, Abul Hashem, Ramesh Publishing House, new Delhi.
3. *Objective English*, Tata Mc. Graw Hill Publishing Company Ltd., New Delhi.
4. *Spoken English for India*, R.K. Bansal & J.B. Harrison, Orient Longman, Delhi.
5. *The sounds of English*, Veena Kumar, Makaav Educational Software, New Delhi.
6. *English Phonetics & Phonology*, P. Roach, Cambridge University Press, London.
7. *English for Engineers and Technologists: A Skill Approach*, Vol. 2, Orient Longman, Delhi.
8. *Business Communication*, M.S. Ramesh and C.C. Pattanshetti, R.Chand and Company, Delhi
9. *Group Discussion*, Sudha Publications/Ramesh Publishing House, New Delhi.

SCHEME OF EXAMINATION:

All questions will be compulsory and will cover all the aspects of the syllabus **except unit V**. There will be sufficient internal choice.

Unit-I: 20 Marks

Questions No. 1 will require the students to carefully read the sentences given and trace the errors, if any, and then supply the correct alternatives/answers.

Unit-II: 20 Marks

Question No. 2 may have four or five parts testing knowledge of different items of vocabulary.

Unit-III: 20 Marks

Question No. 3 will have two parts of 10 marks each from part A and B of the unit. Part A will have content words, form words and sentences for stress marking, transcription and intonation marking respectively. Part B will test students' speaking skills through various oral tasks and activities - debate, group discussion and speech - in written form only.

Note: Speaking and listening skills will primarily be tested orally through internal assessment.

Unit-IV: 20 Marks

Question No. 4 may have many parts. The questions will be framed to test students' composition skills on the elements prescribed in the unit. For example, the students may be required to develop a hypothetical situation in a dialogue form, or to develop an outline, key expression, graph etc.

Unit-V is for internal assessment only.

Unit-VI: 20 Marks

Question No. 5 may have two parts. While the one part may require the students to frame either a press/news report for the print media or write the given business letter, or e-mail a message, the second part will have a theory question on the format of formal report and business letter.

MATH-102-E

MATHEMATICS-II

(COMMON FOR ALL BRANCHES)

L	T	P
3	2	-

Total Credits: 4

Part-A

Matrices & its Applications : Rank of a matrix, elementary transformations, elementary matrices, inverse using elementary transformations, normal form of a matrix, linear dependence and independence of vectors, consistency of linear system of equations, linear and orthogonal transformations, eigen values and eigen vectors, properties of eigen values, Cayley - Hamilton theorem and its applications.

Part-B

Ordinary Differential Equations & its Applications : Exact differential equations. Equations reducible to exact differential equations. Applications of Differential equations of first order & first degree to simple electric circuits, Newton's law of cooling, heat flow and orthogonal trajectories.

Linear differential equations of second and higher order. Complete solution, complementary function and particular integral, method of variation of parameters to find particular Integral, Cauchy's and Legendre's linear equations, simultaneous linear equations with constant co-efficients. Applications of linear differential equations to simple pendulum, oscillatory electric circuits.

Part-C

Laplace Transforms and its Applications : Laplace transforms of elementary functions, properties of Laplace transforms, existence conditions, transforms of derivatives, transforms of integrals, multiplication by t^n , division by t . Evaluation of integrals by Laplace transforms. Laplace transform of Unit step function, unit impulse function and periodic function. Inverse transforms, convolution theorem, application to linear differential equations and simultaneous linear differential equations with constant coefficients.

Partial Differential Equations and Its Applications : Formation of partial differential equations, Lagrange's linear partial differential equation, First order non-linear partial differential equation, Charpit's method. Method of separation of variables and its applications to wave equation and one dimensional heat equation, two dimensional heat flow, steady state solutions only.

TEXT BOOKS :

1. Advanced Engg. Mathematics F Kreyszig
2. Higher Engg. Mathematics B.S. Grewal

REFERENCE BOOKS :

1. Differential Equations - H.T.H. Piaggio.
2. Elements of Partial Differential Equations - I.N. Sneddon.
3. Advanced Engineering Mathematics - R.K. Jain, S.R.K. Iyengar.
4. Advanced Engg. Mathematics - Michael D. Greenberg.

Note: Examiner will set eight questions, taking two from Part-A, three from Part-B and three from Part-C. Students will be required to attempt five question taking atleast one from each part.

PHY-102-E : PHYSICS-II (COMMON FOR ALL BRANCHES)

L T P
3 1 -

Total Credits: 3.5

PART-A

CRYSTAL STRUCTURE

Space Lattice, unit cell and translation vectors, Miller indices, simple crystal structure, Bonding in solids, Experimental x-ray diffraction method, Laue method, powder Method, Point defects in solids, Elementary idea of quarks and gluons.

QUANTUM PHYSICS

Difficulties with Classical physics, Introduction to quantum mechanics-simple concepts, discovery of Planck's constant, Group velocity and phase velocity, Schrodinger wave equations - time dependant and time independent Schrodinger equations, Elementary ideas of quantum statistics.

FREE ELECTION THEORY

Elements of classical free electron theory and its limitations, Drude's Theory of Conduction, quantum theory of free electrons, Fermi level, Density of states, Fermi-Dirac distribution function, Thermionic emission, Richardson's equation.

PART-B

BAND THEORY OF SOLIDS

Origin of energy bands, Kronig, Penney Model (qualitative), E-K diagrams, Brillouin Zones, Concept of effective mass and holes, Classification of solids into metals, Semiconductors and insulators, Fermi energy and its variation with temperature. Hall effect and its Applications.

PHOTOCONDUCTIVITY AND PHOTOVOLTAICS:

Photoconductivity in insulating crystals, variation with illumination, effect of traps, applications of photoconductivity, photovoltaic cells and their characteristics.

MAGNETIC PROPERTIES OF SOLIDS

Atomic magnetic moments, orbital diamagnetism, Classical theory of paramagnetism, ferro magnetism - molecular fields and domains.

SUPER CONDUCTIVITY

Introduction (experimental survey), Meissner effect, London equation.

TEXT BOOKS :

1. Introduction to Solid State Physics (VII Ed.) - Charles Kittel (John Wiley).
2. Quantum Mechanics - Powell and Crasemann (Oxford & IBH)
3. Fundamentals of Solid State Physics - B.S.Saxena, R.C.Gupta and P.N.Saxena (Pragati Prakashan).

REFERENCE BOOKS :

1. Solid State Physics - Pillai (New Age).
2. A text book of Engg. Physics - Avadhanulu and Kshirsagar (S.Chand)
3. Quantum Mechanics - Ghatak & Loknathan.

Note: The Examiners will set eight questions, taking four from each part. The students will be required to attempt five questions in all selecting at least two from each part. All questions will carry equal marks.

B.E. I/II Semester

CH-101-E : CHEMISTRY (COMMON FOR ALL BRANCHES)

L T P
3 1 -

Total Credits: 3.5

Unit-1 :

Thermodynamics - Second law, concept of Entropy, Entropy change for an ideal gas, free energy and work functions, Free energy change, Chemical Potential, Gibb's Helmholtz equation, Clausius - Clapeyron equation, Related numerical problems with above topics.

Unit-2 :

Phase-Rule - Terminology, Derivation of Gibb's Phase Rule Equation, One Component System (H_2O System), Two Components systems, Eutectic system (Pb-Ag), system with congruent m.pt. (Zn-Mg), systems with incongruent m.pt. (Na-K), Applications of above Systems.

Unit-3 :

Water & its treatment : Part I - Sources of water, impurities in water, hardness of water and its determination, units of hardness, alkalinity of water and its determination, Related numerical problems, scale and sludge formation (composition properties and methods of prevention).

Unit-4 :

Water and its treatment : Part II - Treatment of water for domestic use, coagulation, sedimentation, filtration and disinfection, water softening, Ion-exchange process, mixed bed demineralisation, Desalination (reverse osmosis) (electrodialysis).

Unit-5 :

Corrosion and its prevention - Galvanic & concentration cell, Dry and wet corrosion, Electrochemical theory of corrosion, Galvanic corrosion, pitting corrosion, water-

line corrosion, differential aeration corrosion, stress corrosion, factors affecting corrosion, Preventive measures (proper design, Cathodic protection, protective coatings).

Unit-6 :

Lubrication and Lubricants - Friction, mechanism of lubrication, classification and properties of lubricants, Additives for lubricants, synthetic lubricants, Greases - Preparation & properties (consistency, drop point) and uses.

Unit-7 :

Polymers and Polymerization - Organic polymers, polymerisation, various types of polymerisation, effect of structure on properties of polymers, preparation properties and technical applications of thermo-plastics (PVC,PVA), thermosets (PF,UF), and elastomers (SBR,GR-N), Silicones, Introduction to polymeric compsites.

Unit-8 :

Analytical Methods - Thermal methods, Principle, method and application of Thermogravimetric analysis, Differential thermal analysis and Differential scanning calorimetry , (Experimental details are excluded), Spectroscopic methods, Spectrophotometry, interaction of E.M. radiations with a molecule and origin of spectrum, spectroscopic, techniques-vibrational and electronic spectroscopy (Experimental details are excluded), conductometric titration, elementary discussion on Flame-photometry.

NOTE : Eight questions are to be set with a fair weightage of all the units. The candidates will be required to attempt five questions in all.

TEXT BOOKS :

1. Engineering Chemistry, P.C. Jain, Monica Jain (Dhanpat Rai & Co.).

2. Chemistry in Engineering & Tech., Vol.I & II, Rajaram, Kuriacose (TMH).

REFERENCE BOOKS :

1. Instrumental methods of Chemical Analysis, MERITT & WILLARD (East-West Press).
2. Physical Chemistry, P.W. Atkin (ELBS, Oxford Press).
3. Physical Chemistry, W.J. Moore (Orient-Longman).

EE-101-E

ELECTRICAL TECHNOLOGY

L T P
3 1 0

Total Credits: 3.5

UNIT1. D.C. CIRCUITS :

Ohm's Law, Kirchoff's Laws, D.C. Circuits, Nodal and Loop methods of analysis.

UNIT2.

a) A.C. CIRCUITS :

Sinusoidal signal, instantaneous and peak values, RMS and average values, phase angle, polar & rectangular, exponential and trigonometric representations; R,L and C components, behaviors of these components in A.C. circuits. Concept of complex power, power factor.

b) TRANSIENT RESPONSE :

Transient response of RL, RC and RLC Circuits with step input.

UNIT3. NETWORK THEOREMS :

Thevenin's theorem, Norton's theorem, superposition theorem, maximum power transfer theorem, Reciprocity theorem, Tellegen's theorem, Milman's theorem. Star to Delta & Delta to Star transformation.

UNIT4. SERIES AND PARALLEL A.C. CIRCUITS :

Series and parallel A.C. circuits, series and parallel resonance, Q factor, cut-off frequencies and bandwidth.

UNIT5. THREE PHASE CIRCUITS :

Phase and line voltages and currents, balanced star and delta circuits, power equation, measurement of power by two wattmeter method, Importance of earthing.

UNIT6. TRANSFORMERS :

Principle, construction & working of transformer, Efficiency and regulation.

UNIT7. ELECTRICAL MACHINES :

Introduction to D.C. Machines, Induction motor, Synchronous machines.

UNIT8. MEASURING INSTRUMENTS :

Voltmeter, Ammeter, Watt meter, Energy meter.

TEXT BOOKS:

1. Basic Electrical Engg (2nd Edition) : Kothari & Nagarath, TMH
2. Electrical Technology (Vol-I) : B.L Theraja & A K Theraja, S.Chand

REFERENCE BOOKS:

1. Electrical Engineering Fundamentals : Deltoro, PHI
2. Network Analysis :Valkenburg, PHI

NOTE : Eight questions are to be set in all by the examiner taking at least one question from each unit. Students will be required to attempt five questions in all.

ME-105 E ENGINEERING GRAPHICS AND DRAWING

L **T** **P**
1 **-** **4**

Total Credits: 3

- Unit I** Various types of projections, First and Third angle systems of orthographic projections. Projection of Points in different quadrants.
- Unit II** Projections of Straight Lines – parallel to one or both reference planes, contained by one or both planes, perpendicular to one of the planes, inclined to one plane but parallel to the other planes, inclined to both the planes, true length of a line and its inclination with reference planes, traces of a line.
- Unit III** Projections of Planes – parallel to one reference plane, inclined to one plane but perpendicular to the other, inclined to both reference planes.
- Unit IV** Projections of Polyhedra Solids and Solids of Revolution - in simple positions with axis perpendicular to a plane, with axis parallel to both planes, with axis parallel to one plane and inclined to the other, Projections of sections of Prisms, Pyramids, Cylinders and Cones. True shape of section. Development of surfaces of various solids.
- Unit V** Isometric projections - introduction, isometric scale, Isometric views of plane figures, prisms, pyramids and cylinders.
- Unit VI** Orthographic drawings of Bolts and Nuts, Bolted Joints, Screw threads, Screwed Joints.
- Unit VII** Free Hand Sketching - Orthographic Views from Isometric, Views of Simple Machine Components such as Brackets, Bearing Blocks, Guiding Blocks and Simple Couplings.

Note : Some simple exercises may be attempted with AUTOCAD.

Text Book

1. Engineering Drawing Plane and Solid Geometry : N.D. Bhatt and V.M.Panchal, Forty-Fourth Edition 2002, Charotar Publishing House.

Reference Books

1. Engineering Graphics and Drafting : P.S. Gill, Millennium Edition, S.K. Kataria and Sons.
2. A Text Book of Engineering Drawing : S.B. Mathur, Second Revised and Enlarged Edition 2000, Vikas Publishing House.
3. Engineering Graphics using AUTOCAD 2000 : T. Jeyapoovan, First Edition 2002, Vikas Publishing House.

PHY-104-E : PHYSICS LAB.-II

(COMMON FOR ALL BRANCHES)

L T P
- - 2

Total Credits: 1

LIST OF EXPERIMENTS

The experiments in Second semester will be based upon electricity, Magnetism, Modern Physics and Solid State Physics which are the parts of theory syllabus.

1. To find the low resistance by Carey - Foster's bridge.
2. To find the resistance of a galvanometer by Thomson's constant deflection method using a post office box.
3. To find the value of high resistances by Substitution method.
4. To find the value of high resistances by Leakage method.
5. To study the characteristics of a solar cell and to find the fill factor.
6. To find the value of e/m for electrons by Helical method.
7. To find the ionisation potential of Argon/Mercury using a thyratron tube.
8. To study the variation of magnetic field with distance and to find the radius of coil by Stewart and Gee's apparatus.
9. To study the characteristics of (Cu-Fe, Cu-Constantan) thermo couple.
10. To find the value of Planck's constant by using a photo electric cell.
11. To find the value of co-efficient of self-inductance by using a Rayleigh bridge.
12. To find the value of Hall Co-efficient of semi-conductor.
13. To study the V-I characteristics of a p-n diode.
14. To find the band gap of intrinsic semi-conductor using four

probe method.

15. To calculate the hysteresis loss by tracing a B-H curve.

RECOMMENDED BOOKS :

1. Advanced Practical Physics - B.L. Worshnop and H.T. Flint
(KPH)
2. Practical Physics - S.L.Gupta & V.Kumar (Pragati Prakashan).
3. Advanced Practical Physics Vol.I & II - Chauhan & Singh
(Pragati Prakashan).

Note : Students will be required to perform atleast 10
experiments out of the list in a semester.

B.E. I/II Semester

CH-103-E : CHEMISTRY LAB. (COMMON FOR ALL BRANCHES)

L T P
- - 2

Total Credits: 1

LIST OF EXPERIMENTS

1. Determination of Ca^{++} and Mg^{++} hardness of water using EDTA solution.
2. Determination of alkalinity of water sample.
3. Determination of dissolved oxygen (DO) in the given water sample.
4. To find the melting & eutectic point for a two component system by using method of cooling curve.
5. Determination of viscosity of lubricant by Red Wood viscometer (No. 1 & No. 2).
6. To determine flash point & fire point of an oil by Pensky - Marten's flash point apparatus.
7. To prepare Phenol-formaldehyde and Urea formaldehyde resin.
8. To find out saponification No. of an oil.
9. Estimation of calcium in lime stone and dolomite.
10. Determination of concentration of KMnO_4 solution spectrophotometrically.
11. Determination of strength of HCl solution by titrating it against NaOH solution conductometrically.

12. To determine amount of sodium and potassium in a, given water sample by flame photometer.

13. Estimation of total iron in an iron alloy.

Note : At least ten experiments are to be performed by the students.

SUGGESTED BOOKS :

1. A Text Book on Experimental and Calculation - Engineering Chemistry, S.S. Dara, S. Chand & Company (Ltd.)
2. Essential of Experimental Engineering Chemistry, Shashi Chawla, Dhanpat Rai Publishing Company.
3. Theory & Practice Applied Chemistry - O.P. Virmani, A.K. Narula (New Age)

EE-103-E

ELECTRICAL TECHNOLOGY LAB

L T P
0 0 2

Total Credits: 1

LIST OF EXPERIMENTS

1. To verify KCL and KVL.
2. To verify Thevenin's & Norton's Theorems.
3. To Verify maximum power transfer theorem in D.C. Circuit & A.C circuit.
4. To verify reciprocity & Superposition theorems.
5. To study frequency response of a series R-L-C circuit and determine resonant frequency & Q- factor for various Values of R,L,C.
6. To study frequency response of a parallel R-L-C circuit and determine resonant frequency & Q -Factor for various values of R,L,C.
7. To perform direct load test of a transformer and plot efficiency Vs load characteristic.
8. To perform direct load test of a D.C. shunt generator and plot load voltage Vs load current curve.
9. To plot V-curve of a synchronous motor.
10. To perform O.C. and S.C. tests of a three phase induction motor.
11. To study various type of meters.
12. Measurement of power by 3 voltmeter / 3 ammeter method.
13. Measurement of power in a 3 phase system by two watt meter method.

NOTE: 1. At least 10 experiments are to be performed by students in the semester.

2. At least 7 experiments should be performed from the above list, remaining three experiments may either be performed from the above list or designed and set by the concerned institution as per the scope of the syllabus of EE-101-E.

GURU JAMBHESHWAR UNIVERSITY, HISAR
SCHEME OF STUDIES AND EXAMINATIONS

B. Tech. E.C.E. II- YEAR

SEMESTER- III

Course No.	Course Title	Teaching Schedule			
		L	T	P	Total credits
HUM-201-E	ECONOMICS	3	1	-	3.5
MATH-201-E	MATHEMATICS- III	3	2	-	4
EE-201-E	ELECTRICAL ENGINEERING MATERIALS & SEMICONDUCTOR DEVICES (EL, ELI, & C, EE)	3	1	-	3.5
EE-203-E	NETWORK THEORY(EL,ELI&C,EE)	3	1	-	3.5
EE-205-E	ELECTROMECHANICAL ENERGY CONVERSION (EL, ELI & C)	3	1	-	3.5
CSE-201-E	DATA STRUCTURES & ALGORITHMS (CSE, ELI & IT)	3	1	-	3.5
EE-221-E	ELECTRICAL ENGINEERING MATERIALS & SEMICONDUCTOR DEVICES LAB (EL, ELI & C)	-	-	2	1
EE-223-E	NETWORK THEORY LAB	-	-	2	1

	(EL, ELI & C, EE)				
EE-235-E	Computer Hardware and Maintenance lab	-	-	3	1.5
EE-231-E	ELECTRICAL WORKSHOP (EL, ELI & C, EE)	-	-	2	1
TOTAL		18	7	9	26

HUM-201-E

**ECONOMICS
(COMMON FOR ALL BRANCHES)**

L T P
3 1 -

Total Credits: 3.5

COURSE OBJECTIVE : The purpose of this course is to :

1. Acquaint the student in the basic economic concepts and their operational significance and
2. Stimulate him to think systematically and objectively about contemporary economic problems.

UNIT-I

Definition of Economics - various definitions, Nature of Economic problem, Production possibility curve Economic laws and their nature. Relation between Science, Engineering, Technology and Economics.

UNIT-II

Concepts and measurement of utility, Law of Diminishing Marginal Utility, Law of equi-marginal utility - its practical application and importance.

UNIT-III

Meaning of Demand, Individual and Market demand schedule, Law of demand, shape of demand curve, Elasticity of demand, measurement of elasticity of demand, factors effecting elasticity of demand, practical importance & applications of the concept of elasticity of demand.

UNIT-IV

Meaning of production and factors of production; Law of variable proportions, Returns to scale, Internal and External economics and diseconomies of scale.

Various concepts of cost - Fixed cost, variable cost, average cost, marginal cost, money cost, real cost opportunity cost. Shape of average cost, marginal cost, total cost etc. in short run and long run.

UNIT-V

Meaning of Market, Types of Market - Perfect Competition, Monopoly, Oligopoly, Monoplistic Competition (Main features of these markets)

Supply and Law of Supply, Role of Demand & Supply in Price Determination and effect of changes in demand and supply on prices.

UNIT-VI

Nature and characteristics of Indian economy (brief and elementary introduction), Privatization - meaning, merits and demerits. Globalisation of Indian economy - merits and demerits. Elementary Concepts of VAT, WTO, GATT & TRIPS agreement.

Books Recommended :

TEXT BOOKS :

1. Principles of Economics : P.N. Chopra (Kalyani Publishers).

2. Modern Economic Theory – K.K. Dewett (S.Chand)

REFERENCE BOOKS :

1. A Text Book of Economic Theory Stonier and Hague (Longman's Landon)

2. Micro Economic Theory – M.L. Jhingan (S.Chand)

3. Micro Economic Theory - H.L. Ahuja (S.Chand)

4. Modern Micro Economics : S.K. Mishra (Pragati Publications)

5. Economic Theory - A.B.N. Kulkarni & A.B. Kalkundrikar (R.Chand & Co.)

6. Indian Economy : Rudar Dutt & K.P.M. Sundhram

NOTE: Eight questions are to be set atleast one question from each unit and the students will have to attempt five questions in all.

MATH-201-E

MATHEMATICS-III

(COMMON FOR ALL BRANCHES)

L T P
3 2 -

Total Credits: 4

Part-A

Fourier Series and Fourier Transforms : Euler's formulae, conditions for a Fourier expansion, change of interval, Fourier expansion of odd and even functions, Fourier expansion of square wave, rectangular wave, saw-toothed wave, half and full rectified wave, half range sine and cosine series.

Fourier integrals, Fourier transforms, Shifting theorem (both on time and frequency axes), Fourier transforms of derivatives, Fourier transforms of integrals, Convolution theorem, Fourier transform of Dirac-delta function.

Part-B

Functions of Complex Variable : Definition, Exponential function, Trigonometric and Hyperbolic functions, Logarithmic functions. Limit and Continuity of a function, Differentiability and Analyticity.

Cauchy-Riemann equations, necessary and sufficient conditions for a function to be analytic, polar form of the Cauchy-Riemann equations. Harmonic functions, application to flow problems. Integration of complex functions. Cauchy-Integral theorem and formula.

Power series, radius and circle of convergence, Taylor's Maclaurin's and Laurent's series. Zeros and singularities of complex functions, Residues. Evaluation of real integrals using residues (around unit and semi circle only).

Part-C

Probability Distributions and Hypothesis Testing : Conditional probability, Bayes theorem and its applications, expected value of a random variable. Properties and application of Binomial, Poisson and Normal distributions.

Testing of a hypothesis, tests of significance for large samples, Student's t-distribution (applications only), Chi-square test of goodness of fit.

Linear Programming : Linear programming problems formulation, Solving linear programming problems using (i) Graphical method (ii) Simplex method (iii) Dual simplex method.

TEXT BOOKS :

1. Advanced Engg. Mathematics : F Kreyszig.
2. Higher Engg. Mathematics : B.S. Grewal.

REFERENCE BOOKS :

1. Advance Engg. Mathematics : R.K. Jain, S.R.K.Iyenger.
2. Advanced Engg. Mathematics : Michael D. Greenberg.
3. Operation Research : H.A. Taha.
4. Probability and statistics for Engineers : Johnson. PHI.

Note: Examiner will set eight questions, taking two from Part-A, three from Part-B and three from Part-C. Students will be required to attempt five question taking atleast one from each part.

EE-201-E

ELECTRICAL ENGINEERING MATERIALS AND SEMICONDUCTOR DEVICES

L T P
3-1-0

Total Credits: 3.5

UNIT 1: INTRINSIC SEMICONDUCTORS AND CHARACTERISTICS

Force on charge in electric field-Motion of Charge in uniform and time varying electric fields, Forces on a moving charge in a magnetic field-calculation of cyclotron frequency-calculation of electrostatic and magnetic deflection sensitivity, Energy band structure of conductors, semiconductors and insulators-Density distribution of available energy states in semiconductors-Fermi-Diac probability distribution function at different temperature, Thermal generation of carriers-calculation of electron and hole densities in intrinsic semiconductors-intrinsic concentration-Mass Action Law,

UNIT 2: EXTRINSIC SEMICONDUCTOR AND PN JUNCTIONS

N and P type semiconductors and their energy band structures-Law of electrical neutrality-calculation of location of Fermi level and free electron and hole densities in extrinsic semiconductors-Mobility, drift current and conductivity-Difusion current-Continuity equation-Hall effect, Band structure of PN junction-Current Component in a PN junction-Derivation of diode equation-Temperature dependance of diode characteristics,

UNIT 3: CHARACTERISTICS OF PN JUNCTION AND DIODES

Calculation of transition and diffusion capacitance -Varactor diode-charge control description of diode switching characteristics of diode-Mechanism of avalanche and Zener breakdown-Temperature dependance of breakdown voltages-Backward diode-Tunneling effect in thin barriers, Tunnel diode-photo diode-Light emitting diodes,

UNIT 4: BIPOLAR JUNCTION TRANSISTORS AND FIELD EFFECT TRANSISTORS

Construction of PNP and NPN transistors-BJT current components-Emitter to collector and base to collector current gains-Base width modulation CB and CE characteristics-Breakdown

characteristics-Eber-Moll model-Transistor switching times, Construction and characteristics fo JFET ,Relation between Pinch off voltage and drain current Derivation,MOSFETS-Enhancement and depletion types.

UNIT 5: METAL SEMICONDUCTOR CONTACTS AND POWER CONTROL DEVICES

Metal Semiconductor Contacts-Energy band diagram of metal semiconductor junction Schottk, diode and ohmic contacts, Power control devices, Characteristics and equivalent circuit of UJT-intrinsic stand of ration, PNP diode-Tow transistor model, SCR, Triac, Diac,

TEXT BOOK

1. Jacob Millman & Christos C,Halkias,"Electronic Devices and Circuits"Tata McGraw Hill,1991,

REFERENCES

1. Donald A,Neaman,"Semiconductor Physics and Devices" 3rd Edition,Tata McGraw Hill
2. S,M,Sze,Semiconductor Devices-Physics and Technology-2nd Edition-John Wiley
3. Ben G,Streetman and Sanjay Banerjee,Solid State Electronic Devices,Pearson Education

EE-203-E

NETWORK THEORY

L T P
3 1 0

Total Credits: 3.5

UNIT I TRANSIENT RESPONSE :

Transient Response of RC, RL, RLC Circuits to various excitation signals such as step, ramp, impulse and sinusoidal excitations using laplace transform.

UNIT 2 NETWORK FUNCTIONS :

Terminal pairs or Ports, Network functions for one-port and two-port networks, poles and zeros of Network functions, Restrictions on pole and zero Locations for driving point functions and transfer functions, Time domain behavior from the pole-zero plot.

UNIT 3 CHARACTERISTICS AND PARAMETERS OF TWO PORT NETWORKS :

Relationship of two-port variables, short-circuit Admittance parameters, open circuit impedance, parameters, Transmission parameters, hybrid parameters, relationships between parameter sets, Inter-connection of two port networks.

UNIT 4 TOPOLOGY :

Principles of network topology , graph matrices, network analysis using graph theory.

UNIT 5 TYPES OF FILTERS AND THEIR CHARACTERISTICS :

Filter fundamentals, high-pass, low-pass, band-pass, and band-reject Filters.

UNIT 6 NETWORK SYNTHESIS :

Positive real functions, synthesis of one port and two port networks, elementary ideas of Active networks.

TEXT BOOKS:

1. Network Analysis & Synthesis : Umesh Sinha; Satya Prakash Pub.
2. Network Analysis & Synthesis : F.F.Kuo; John Wiley & Sons Inc.

REFERENCE BOOKS:

1. Introduction to modern Network Synthesis : Van Valkenburg; John Wiley
2. Network Analysis: Van Valkenburg; PHI
3. Basic circuit theory:Dasoer Kuh; McGraw Hill.
4. A Course in Electrical Circuit Analysis by Soni & Gupta; Dhanpat Rai Publication.
5. Circuit Analysis : G.K. Mithal; Khanna Publication.
6. Networks and Systems : D.Roy Choudhury; New Age International.

NOTE: Eight questions are to be set in all by the examiner taking at least one question from each unit. Students will be required to attempt five questions in all.

EE-205-E

ELECTROMECHANICAL ENERGY CONVERSION

L T P
3 1 0

Total Credits: 3.5

UNIT 1 MAGNETIC CIRCUITS AND INDUCTION:

Magnetic Circuits, Magnetic Materials and their properties, static and dynamic emfs and force on current carrying conductor, AC operation of Magnetic Circuits, Hysteresis and Eddy current losses.

UNIT 2 PRINCIPLES OF ELECTROMECHANICAL ENERGY CONVERSION:

Force and torque in magnetic field system, energy balance, energy and force in singly excited magnetic field system, concept of co-energy, forces and torques in system with permanent magnets, dynamic equation.

UNIT 3 TRANSFORMERS :

Basic theory, construction, operation at no-load and full-load, equivalent circuit, phasor diagram, O.C. and S.C. tests for parameters determination, efficiency and regulation, auto-transformer, introduction to three-phase transformer ; Current and Potential Transformers : Principle, construction, analysis and applications.

UNIT 4 DC MACHINES :

Basic theory of DC generator, brief idea of construction, emf equation, load characteristics, basic theory of DC motor, concept of back emf, torque and power equations, load characteristics, starting and speed control of DC motors, applications.

UNIT 5 INDUCTION MOTOR:

Basic theory, construction, Phasor diagram, Equivalent circuit, Torque equation, Load characteristics, starting and speed control of induction motor, Introduction to single phase Induction motor and its applications, Fractional H.P. Motors, Introduction to stepper, servo reluctance and universal motors.

UNIT 6 SYNCHRONOUS MACHINES:

Construction and basic theory of synchronous generator, emf equation, model of generator, Phasor diagram, Regulation, Basic theory of synchronous motor, v-curves, synchronous condenser, applications.

TEXT BOOK:

1. Electrical Machines: Nagarath and Kothari; TMH

REFERENCE BOOKS:

1. Electrical Machines :P.S. Bimbhra; Khanna
2. Electrical Machines: Mukherjee and Chakravorti; Dhanpat Rai & Sons
3. Electrical Technology (Vol-II) : B.L Theraja; S. Chand.

NOTE: Eight questions are to be set in all by the examiner taking at least one question from each unit. Students will be required to attempt five questions in all.

CSE-201 E

Data Structures & Algorithms

L T P
3 1 -

Total Credits: 3.5

Unit-1: Introduction to Data Structures: Definition of data structures and abstract data types, Static and Dynamic implementations, Examples and real life applications; The Stacks : Definition, Array based implementation of stacks, Linked List based implementation of stacks, Examples : Infix, postfix, prefix representation, Conversions, Applications.

Unit-2: Queues and Lists: Definition, Array based implementation of Queues / Lists, Linked List implementation of Queues / Lists, Circular implementation of Queues and Singly linked Lists, Straight / circular implementation of doubly linked Queues / Lists, Priority Queues, Applications.

Unit-3: Trees: Definition of trees and Binary trees, Properties of Binary trees and Implementation, Binary Traversal pre-order, post order, In- order traversal, Binary Search Trees, Implementations, Threaded trees, Balanced multi way search trees, AVL Trees, Implementations

Unit-4: Graphs: Definition of Undirected and Directed Graphs and Networks, The Array based implementation of graphs, Adjacency matrix, path matrix implementation, The Linked List representation of graphs, Shortest path Algorithm, Graph Traversal – Breadth first Traversal, Depth first Traversal, Tables : Definition, Hash function, Implementations and Applications.

Unit-5: Running time: Time Complexity, Big – Oh - notation, Running Times, Best Case, Worst Case, Average Case, Factors depends on running time, Introduction to Recursion, Divide and Conquer Algorithm, Evaluating time Complexity.

Unit-6: Sorting Algorithms : Introduction, Sorting by exchange, selection, insertions : Bubble sort, Straight selection sort, Efficiency of above algorithms,; Shell sort, Performance of shell sort, Merge sort, Merging of sorted arrays& Algorithms; Quick sort Algorithm analysis,

Heap sort: Heap Construction, Heap sort, bottom – up, Top – down Heap sort approach;

Searching Algorithms: Straight Sequential Search, Binary Search (recursive & non–recursive Algorithms)

Text Book:

Data Structures using C by A. M. Tenenbaum, Langsam, Moshe J. Augentem, PHI Pub.

Reference Books:

- Data Structures and Algorithms by A.V. Aho, J.E. Hopcroft and T.D. Ullman, Original edition, Addison-Wesley, 1999, Low Priced Edition.

- Fundamentals of Data structures by Ellis Horowitz & Sartaj Sahni, Pub, 1983,AW
- Fundamentals of computer algorithms by Horowitz Sahni and Rajasekaran.
- Data Structures and Program Design in C By Robert Kruse, PHI,
- Theory & Problems of Data Structures by Jr. Seymour Lipschetz, Schaum's outline by TMH
- Introduction to Computers Science -An algorithms approach , Jean Paul Tremblay, Richard B. Bunt, 2002, T.M.H.
- Data Structure and the Standard Template library – Willam J. Collins, 2003, T.M.H

Note: Eight questions will be set in all by the examiners taking at least one question from each unit. Students will be required to attempt five questions in all.

EE-221-E ELECTRICAL ENGINEERING MATERIALS AND SEMICONDUCTOR DEVICES LAB

L T P
0 0 2

Total Credits: 1

LIST OF EXPERIMENTS :

1. To study V-I characteristics of diode, and its use as a capacitance.
2. Study of the characteristics of transistor in Common Base configuration.
3. Study of the characteristics of transistor in Common Emitter configuration.
4. Study of V-I characteristics of a photo-voltaic cell.
5. Study of characteristics of MOSFET/JFET in CS configuration.
6. To plot characteristics of thyristor.
7. To plot characteristics of UJT .
8. To plot characteristics of diac & Triac.
9. Study of loss factor in a dielectric by an impedance bridge.
10. Study of photo-resist in metal pattern for planar technology/PCB technology.

NOTE : Ten experiments are to be performed, out of which at least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus.

EE-223-E

NETWORK THEORY LAB

L T P
0 0 2

Total Credits: 1

LIST OF EXPERIMENTS :

1. Transient response of RC circuit.
2. Transient response of RL circuit.
3. To find the resonance frequency, Band width of RLC series circuit.
4. To calculate and verify "Z" parameters of a two port network.
5. To calculate and verify "Y" parameters of a two port network.
6. To determine equivalent parameter of parallel connections of two port network.
7. To plot the frequency response of low pass filter and determine half-power frequency.
8. To plot the frequency response of high pass filter and determine the half-power frequency.
9. To plot the frequency response of band-pass filter and determine the band-width.
10. To calculate and verify "ABCD" parameters of a two port network.
11. To synthesize a network of a given network function and verify its response.

12. Introduction of P-Spice

NOTE : Ten experiments are to be performed, out of which at least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus.

EE-235-E

Computer Hardware and Maintenance Lab

L T P
0 0 3

Total Credits: 1.5

NOTE: Ten experiments are to be performed, based of computer hardware maintenance, PCB designing and trouble shooting of computer parts. Experiment can set by the concerned institution as per the scope and requirement of the syllabus.

EE-231-E

ELECTRICAL WORKSHOP

L T P
0 0 2

Total Credits: 1

LIST OF EXPERIMENTS:

1. Introduction of tools, electrical materials, symbols and abbreviations.
2. To study stair case wiring.
3. To study house wiring i.e., batten, cleat, casing-caping and conduit wirings.
4. To study fluorescent tube light.
5. To study high pressure mercury vapour lamp (H.P.M.V).
6. To study Sodium lamp.
7. To study repairing of home appliances such as heater, electric iron, fans etc.
8. To study construction of moving iron, moving coil, electro-dynamics & induction type meters.
9. To design & fabricate single phase transformer.
10. To study fuses, relays, contactors, MCBs and circuit breakers.
11. Insulation testing of electrical equipments.

12. To design, fabricate a PCB for a circuit, wire-up and test.

NOTE: Ten experiments are to be performed, out of which at least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution.

GURU JAMBHESHWAR UNIVERSITY, HISAR
SCHEME OF STUDIES AND EXAMINATIONS

B. Tech. E.C.E. II- YEAR SEMESTER- IV

Course No.	Course Title	Teaching Schedule			
		L	T	P	Total credits
HUM-202-E	FUNDAMENTALS OF MANAGERMENTS	3	1	-	3.5
MATH-202-E	NUMERICAL METHODS	3	1	-	3.5
EE-202-E	ANALOG ELECTRONICS (EL, ELI & C, EE)	3	1	-	3.5
EE-204-E	DIGITAL ELECTRONICS (EL, ELI & C, EE)	3	1	-	3.5
EE-206-E	COMMUNICATION SYSTEMS (EL & EE)	3	1	-	3.5
EE-208-E	ELECTRO MAGNETIC THEORY (EL, ELI & C)	3	1	-	3.5
EE-222-E	ANALOG ELECTRONICS LAB (EL, ELI & C, EE)	-	-	2	1
EE-224-E	DIGITAL ELECTRONICS LAB (EL, ELI & C, EE)	-	-	2	1
EE-226-E	COMMUNICATION SYSTEMS LAB (EL & EE)	-	-	2	1
MATH-204-E	NUMERICAL METHODS LAB	-	-	2	1

CH-451-E	Env. Sc. & Engg. (Only qualifying and Audit course)	3	-	-	-
TOTAL		18	6	8	25

Non credit Compulsory subject of Environmental Science will taught in 4th semester.
NOTE:-Practical training of 6 weeks duration during summer vacation. Evaluation in V Sem.

HUM-202-E

FUNDAMENTALS OF MANAGEMENT

L T P
3 1 -

Total Credits: 3.5

UNIT-I

Meaning of management, Definitions of Management, Characteristics of management, Management Vs. Administration. Management-Art, Science and Profession. Importance of Management. Development of Management thoughts. Principles of Management. The Management Functions, Inter-relationship of Managerial functions.

UNIT-II

Nature and Significance of staffing, Personnel management, Functions of personnel management, Manpower planning, Process of manpower planning, Recruitment, Selection; Promotion - Seniority Vs. Merit. Training - objectives and types of training.

UNIT-III

Production Management : Definition, Objectives, Functions and Scope, Production Planning and Control; its significance, stages in production planning and control. Brief introduction to the concepts of material management, inventory control; its importance and various methods.

UNIT-IV

Marketing Management - Definition of marketing, Marketing concept, objectives & Functions of marketing. Marketing Research - Meaning; Definition; objectives; Importance; Limitations; Process. Advertising - meaning of advertising, objectives, functions, criticism.

UNIT-V

Introduction of Financial Management, Objectives of Financial Management, Functions and Importance of Financial Management. Brief Introduction to the concept of capital structure and various sources of finance.

BOOKS RECOMMENDED :

TEXT BOOKS :

1. Principles and Practice of Management - R.S. Gupta, B.D.Sharma, N.S. Bhalla. (Kalyani Publishers)

2. Organisation and Management - R.D. Aggarwal (Tata Mc Graw Hill)

REFERENCE BOOKS :

1. Principles & Practices of Management – L.M. Prasad (Sultan Chand & Sons)
2. Management – Harold, Koontz and Cyrilo Donell (Mc.Graw Hill).
3. Marketing Management – S.A. Sherlikar (Himalaya Publishing House, Bombay).
4. Financial Management - I.M. Pandey (Vikas Publishing House, New Delhi)
5. Management - James A.F. Stoner & R.Edward Freeman, PHI.

NOTE: Eight questions are to be set atleast one question from each unit and the students will have to attempt five questions in all.

MATH-202-E

NUMERICAL METHODS

(COMMON FOR EE,EL,CHE,EI,IC & ELECTIVE FOR CSE,IT IN 8th SEM.)

L T P
3 1 -

Total Credits: 3.5

Part-A

Interpolation and curve fitting : Interpolation problem, Lagrangian polynomials, Divided differences, Interpolating with a cubic spline, Bezier curves and B-spline curves, Least square approximations.

Non-Linear Equations : Bisection method, Linear Interpolation methods, Newton's method, Muller's method, fixed-point method.

Simultaneous Linear Equations : Elimination method, Gauss and Gauss-Jordan method, Jacobi's method, Gauss-Seidal method, Relaxation method.

Numerical Differentiation and Integration : Derivatives from differences tables, Higher order derivatives, Extrapolation techniques, Newton-cotes integration formula, Trapezoidal rule, Simpson's rules, Boole's rule and Weddle's rule, Romberg's Integration.

Part-B

Numerical Solution of Ordinary Differential Equations : Taylor series method, Euler and modified Euler method, Runge-Kutta methods, Milne's method, Adams-Moulton method, Power method for Eigen values by iteration.

Numerial Solution of Partial Differential Equations : Finite difference approximations of partial derivatives, solution of Laplace equation (Standard 5-point formula only), one-dimensional heat equation (Schmidt method, Crank-Nicolson method, Dufort and Frankel method) and wave equation.

TEXT BOOKS :

1. Applied Numerical Analysis : Curtis F. Gerald and Patrick G. Wheatley-Pearson, Education Ltd.
2. Numerical Method : E. Balagurusamy T.M.H.

REFERENCE BOOKS :

1. Numerical Methods for Scientific and Engg. Computations :
M.K. Jain, S.R.K. Iyenger and R.K. Jain-Wiley Eastern Ltd.
2. Introductory Methods of Numerical Analysis S.S. Sastry,
P.H.I.
3. Numerical Methods in Engg. & Science : B.S. Grewal.

Note: Examiner will set eight questions, taking four from Part-A and four from Part-B.
Students will be required to attempt five questions taking atleast two from each part.

EE-202-E

ANALOG ELECTRONICS

L T P
3 1 0

Total Credits: 3.5

UNIT 1 SEMICONDUCTOR DIODE :

P-N junction and its V-I Characteristics, P-N junction as a rectifier, Switching characteristics of Diode.

UNIT 2 DIODE CIRCUITS :

Diode as a circuit element, the load-line concept, half-wave and full wave rectifiers, clipping circuits, clamping circuits, filter circuits, peak to peak detector and voltage multiplier circuits.

UNIT 3 TRANSISTOR AT LOW FREQUENCIES:

Bipolar junction transistor : operation, characteristics, Ebers-moll model of transistor, hybrid model, h-parameters (CE, CB, CC configurations), analysis of a transistor amplifier circuits using h-parameters, emitter follower, Miller's Theorem , frequency response of R-C coupled amplifier.

UNIT 4 TRANSISTOR BIASING :

Operating point, bias stability, collector to base bias, self-bias, emitter bias, bias compensation, thermistor & sensistor compensation.

UNIT 5 TRANSISTOR AT HIGH FREQUENCIES:

Hybrid P model, CE short circuit current gain, frequency response, alpha, cutoff frequency, gain bandwidth product, emitter follower at high frequencies.

UNIT 6 FIELD EFFECT TRANSISTORS :

Junction field effect transistor, pinch off voltage, volt-ampere characteristics, small signal model, MOSFET Enhancement & Depletion mode, V-MOSFET. Common source amplifier, source follower, biasing of FET, applications of FET as a voltage variable resistor (V V R).

UNIT 7 REGULATED POWER SUPPLIES :

Series and shunt voltage regulators, power supply parameters, three terminal IC regulators, SMPS.

TEXT BOOK :

1. Integrated Electronics: Millman & Halkias ; McGrawHill
2. Electronic circuit analysis and design (Second edition): D.A.Neamen; TMH

REFERENCE BOOKS:

1. Electronics Principles: Malvino ; McGrawHill
2. Electronics Circuits: Donald L. Schilling & Charles Belove ; McGrawHill
3. Electronics Devices & Circuits: Boylestad & Nashelsky ; Pearson.

NOTE: Eight questions are to be set in all by the examiner taking at least one question from each unit. Students will be required to attempt five questions in all.

EE-204-E

DIGITAL ELECTRONICS

L T P
3 1 0

Total Credits: 3.5

UNIT 1 FUNDAMENTALS OF DIGITAL TECHNIQUES :

Digital signal, logic gates: AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR, Boolean algebra. Review of Number systems. Binary codes: BCD, Excess-3, Gray, EBCDIC, ASCII, Error detection and correction codes.

UNIT 2 COMBINATIONAL DESIGN USING GATES:

Design using gates, Karnaugh map and Quine Mcluskey methods of simplification.

UNIT 3 COMBINATIONAL DESIGN USING MSI DEVICES

Multiplexers and Demultiplexers and their use as logic elements, Decoders, Adders / Subtractors, BCD arithmetic circuits, Encoders, Decoders / Drivers for display devices.

UNIT 4 SEQUENTIAL CIRCUITS:

Flip Flops : S-R, J-K, T, D, master-slave, edge triggered, shift registers, sequence generators, Counters, Asynchronous and Synchronous Ring counters and Johnson Counter, Design of Synchronous and Asynchronous sequential circuits.

UNIT 5 DIGITAL LOGIC FAMILIES:

Switching mode operation of p-n junction, bipolar and MOS. devices. Bipolar logic families:RTL, DTL, DCTL, HTL, TTL, ECL, MOS, and CMOS logic families. Tristate logic, Interfacing of CMOS and TTL families.

UNIT 6 A/D AND D/A CONVERTERS:

Sample and hold circuit, weighted resistor and R -2 R ladder D/A Converters, specifications for D/A converters. A/D converters : Quantization, parallel -comparator, successive approximation, counting type, dual-slope ADC, specifications of ADCs.

UNIT 7 PROGRAMMABLE LOGIC DEVICES:
ROM, PLA, PAL, FPGA and CPLDs.

TEXT BOOK :

1. Modern Digital Electronics(Edition III) : R. P. Jain; TMH

REFERENCE BOOKS :

1. Digital Integrated Electronics : Taub & Schilling; MGH

2. Digital Principles and Applications : Malvino & Leach; McGraw Hill.

3. Digital Design : Morris Mano; PHI.

NOTE : Eight questions are to be set in all by the examiner taking at least one question from each unit. Students will be required to attempt five questions in all.

EE-206-E

COMMUNICATION SYSTEMS

L T P
3 1 0

Total Credits: 3.5

UNIT 1. INTRODUCTION TO COMMUNICATION SYSTEMS :

The essentials of a Communication system, modes and media's of Communication, Classification of signals and systems , Fourier Analysis of signals.

UNIT 2. AMPLITUDE MODULATION :

Amplitude modulation, Generation of AM waves, Demodulation of AM waves, DSBSC, Generation of DSBSC waves, Coherent detection of DSBSC waves, single side band modulation, generation of SSB waves, demodulation of SSB waves, vestigial sideband modulation (VSB).

UNIT 3. ANGLE MODULATION :

Basic definitions: Phase modulation (PM) & frequency modulation(FM), narrow band frequency modulation, wideband frequency modulation, generation of FM waves, Demodulation of FM waves.

UNIT 4. PULSE ANALOG MODULATION :

Sampling theory, time division (TDM) and frequency division (FDM) multiplexing, pulse amplitude modulation (PAM), pulse time modulation.

UNIT 5. PULSE DIGITAL MODULATION :

Elements of pulse code modulation, noise in PCM systems, Measure of information, channel capacity, channel capacity of a PCM system, differential pulse code modulation (DPCM). Delta modulation (DM)

UNIT 6. DIGITAL MODULATION TECHNIQUES:

ASK, FSK, BPSK, QPSK, M-ary PSK.

UNIT 7. INTRODUCTION TO NOISE:

External noise, Internal noise, S/N ratio, noise figure.

TEXT BOOKS :

1. Communication systems (4th edn.) : Simon Haykins; John Wiley & Sons.
2. Communication systems: Singh & Sapre; TMH.

REFERENCE BOOKS :

1. Electronic Communication systems : Kennedy; TMH.
2. Communication Electronics : Frenzel; TMH.
3. Communication system : Taub & Schilling; TMH.
4. Communication systems : Bruce Carlson.

NOTE: Eight questions are to be set in all by the examiner taking at least one question from each unit. Students will be required to attempt five questions in all.

EE-208-E

ELECTROMAGNETIC THEORY

L T P
3 1 0

Total Credits: 3.5

UNIT1.STATIC ELECTRIC FIELDS:

Coulomb's Law, Gauss's Law, potential function, field due to a continuous distribution of charge, equi-potential surfaces, Gauss's Theorem, Poisson's equation, Laplace's equation, method of electrical images, capacitance, electro-static energy, boundary conditions, the electro-static uniqueness theorem for field of a charge distribution, Dirac-Delta representation for a point charge and an infinitesimal dipole.

UNIT2. STEADY MAGNETIC FIELDS :

Faraday Induction law, Ampere's Work law in the differential vector form, Ampere's law for a current element, magnetic field due to volume distribution of current and the Dirac-delta function, Ampere's Force Law, magnetic vector potential, vector potential (Alternative derivation), far field of a current distribution, equation of continuity.

UNIT3. TIME VARYING FIELDS :

Equation of continuity for time varying fields, inconsistency of Ampere's law, Maxwell's field equations and their interpretation, solution for free space conditions, electromagnetic waves in a homogeneous medium, propagation of uniform plane-wave, relation between E & H in a uniform plane-wave, wave equations for conducting medium, Maxwell's equations using phasor notation, wave propagation in a conducting medium, conductors, dielectrics, wave propagation in good conductor and good dielectric, depth of penetration, polarization, linear, circular and elliptical,

UNIT4. REFLECTION AND REFRACTION OF E M WAVES:

Reflection and refraction of plane waves at the surface of a perfect conductor & perfect dielectric (both normal incidence as well as oblique incidence), Brewster's angle and total internal reflection, reflection at the surfaces of a conductive medium, surface impedance, transmission-line analogy, Poynting theorem, interpretation of $\mathbf{E} \times \mathbf{H}$, power loss in a plane conductor.

UNIT5.TRASMISSION LINE THEORY :

Transmission line as a distributed circuit, transmission line equation, travelling ,standing waves , characteristic impedance, input impedance of terminated line, reflection coefficient, VSWR, Smith's chart and its applications.

TEXT BOOK :

1. Electro-magnetic Waves and Radiating System : Jordan & Balmain, PHI.

Refrence Books:

1. Engineering Electromagnetics : Hayt; TMH

2. Electro-Magnetics : Krauss J.DF; Mc Graw Hill.

NOTE: 8 questions are to be set –atleast one from each unit. Students have to attempt any five questions.

EE-222-E

ANALOG ELECTRONICS-LAB

L T P
0 0 2

Total Credits: 1

LIST OF EXPERIMENTS:

1. Study of Half wave & full wave rectifiers.
2. Study of power supply filters.
3. Study of Diode as clipper & clamper.
4. Study of Zener diode as a voltage regulator.
5. Study of CE amplifier for voltage, current & Power gains and input, output impedances..
6. Study of CC amplifier as a buffer.
7. To study the frequency response of RC coupled amplifier.
8. Study of 3-terminal IC regulator.
9. Study of transistor as a constant current source in CE configuration.
10. Study of FET common source amplifier.
11. Study of FET common Drain amplifier.

12. Graphical determination of small signal hybrid parameters of bipolar junction transistor.

13. Study & design of a d.c. voltage doubler.

NOTE : At least ten experiments are to be performed, atleast seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus.

EE-224-E

DIGITAL ELECTRONICS LAB

L T P
0 0 2

Total Credits: 1

LIST OF EXPERIMENTS:

1. Study of TTL gates – AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR.
2. Design & realize a given function using K-maps and verify its performance.
3. To verify the operation of multiplexer & Demultiplexer.
4. To verify the operation of comparator.
5. To verify the truth tables of S-R, J-K, T & D type flip flops.
6. To verify the operation of bi-directional shift register.
7. To design & verify the operation of 3-bit synchronous counter.
8. To design and verify the operation of synchronous UP/DOWN decade counter using J K flip-flops & drive a seven-segment display using the same.
9. To design and verify the operation of asynchronous UP/DOWN decade counter using J K flip-flops & drive a seven-segment display using the same.
10. To design & realize a sequence generator for a given sequence using J-K flip-flops.

11. Study of CMOS NAND & NOR gates and interfacing between TTL and CMOS gates.

12. Design a 4-bit shift-register and verify its operation . Verify the operation of a ring counter and a Johnson counter.

NOTE : At least ten experiments are to be performed, atleast seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus.

EE-226-E

COMMUNICATION SYSTEMS LAB

L T P
0 0 2

Total Credits: 1

LIST OF EXPERIMENTS:

1. Study of Amplitude Modulation and determination of Modulation index.
2. Study of Frequency Modulation and determination of Modulation index.
3. Study of Phase Modulation.
4. Study of Pulse Amplitude Modulation.
5. Study of Pulse Width Modulation.
6. Study of Pulse Frequency Modulation.
7. Study of Pulse Code Modulation.
8. Study of frequency Shift Keying.
9. Study of ASK and QASK.
10. Study of PSK and QPSK.
11. Project related to the scope of the course.

NOTE: Atleast ten experiments are to be performed , atleast seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus.

MATH-204-E

NUMERICAL METHODS LAB.

(COMMON FOR EE,EL,CHE,EI)

L T P
- - 2

Total Credits: 1

WRITE DOWN AND EXECUTE THE FOLLOWING PROGRAMS USING C/C++/MATLAB

1. To find the roots of non-linear equation using Bisection method.
2. To find the roots of non-linear equation using Newton's method.
3. Curve fitting by least - square approximations.
4. To solve the system of linear equations using Gauss-Elimination method.
5. To solve the system of linear equations using Gauss-Seidal iteration method.
6. To solve the system of linear equations using Gauss-Jorden method.
7. To Integrate numerically using Trapezoidal rule.
8. To Integrate numerically using Simpson's rules.
9. To find the largest eigen value of a matrix by power-method.
10. To find numerical solution of ordinary differential equations by Euler's method.
11. To find numerical solution of ordinary differential equations by Runge-Kutta method.
12. To find numerical solution of ordinary differential equations by Milne's method.
13. To find the numerical solution of Laplace equation.
14. To find numerical solution of wave equation.
15. To find numerical solution of heat equation.

BOOKS SUGGESTED :

1. Applied Numerical Analysis by Curtis F. Gerald and Patrick G. Wheatley-Pearson, Education Ltd.
2. Numerical Methods : E. Balagurusamy T.M.H.

Note: Ten experiments are to be performed out of which at least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed by the concerned institution as per the scope of the syllabus.

CH-451-E

ENVIRONMENTAL SCIENCE & ENGINEERING

L T P
3 - -

Only Qualifying and Audit Course

Environment & Ecology :

Introduction, component of environment, factors affecting environment objectives of environment management, segments of environment, atmosphere lithosphere, hydrosphere, biosphere, environmental pollution, classification of pollutants, types of pollutants. Ecology - Principle of ecology, environment and eco-factors (Medium & Biotic), Types of eco-system, ecological pyramids, Biogeochemical cycles in environment (sulphur cycle, phosphorus cycle, oxygen cycle, hydrological cycle-H cycle, Nitrogen cycle).

Waste Water & Its treatment processes :

Waste-water characteristics, effluent standards, primary treatment, secondary treatment – aerobic (activated sludge, aerated lagoons, trickling filter, roughing filter, rotating biological contactor) anaerobic (contact process, UASB)

Air pollution :

Classification of air pollutants

Particulates: Physical characteristics, mode of formation, settling properties, Control measures

Hydrocarbons: Nature, sources, control

Carbon Monoxide: Source, harmful effects on human health, control measures.

Oxides of Sulphur and Nitrogen : Sources, effects on human health and plants, control measures.

Solid Waste: Types, sources and properties of solid waste, solid waste management – Generation, Collection and techniques for ultimate disposal, Elementary discussion on resource and energy recovery.

BOOKS SUGGESTED:

1. Environmental Engg: by Howard S. Peavy & others, MGH International
2. Metcaf - EDDY-Waste-water engineering revised by George

Teholonobus (TMH)

3. Environmental Chemistry by B.K.Sharma, Goel Publishing , Meerut.
4. Environmental Chemistry, A.K.DE, Wiley Eastern.

Note: Eight questions will be set and students will be required to attempt five questions in all.

GURU JAMBHESHWAR UNIVERSITY, HISAR
SCHEME OF STUDIES AND EXAMINATIONS

B. Tech. E.C.E. III- YEAR SEMESTER- V

Course No.	Course Title	Teaching Schedule			
		L	T	P	Total credits
EE-301-E	COMMUNICATION ENGINEERING	3	1	-	3.5
EE-303-E	ELECTRONIC MEASUREMENT AND INSTRUMENTATION (EL,ELI & C)	3	1	-	3.5
EE-305-E	ANALOG ELECTRONIC CIRCUITS (EL,ELI & C)	3	1	-	3.5
EE-307-E	ANTENNA & WAVE PROPAGATION	3	1	-	3.5
CSE-210-E	COMPUTER ARCHITECTURE AND ORGANISATION (COMMON WITH IV-SEM CSE, IT)	3	1	-	3.5
EE-395-E	CONTROL SYSTEM ENGG.(EL, EE)	3	1	-	3.5
EE-323-E	ELECTRONIC MEASUREMENT AND INSTRUMENTATION LAB- EL,ELI&C	-	-	2	1
EE-325-E	ANALOG ELECTRONIC CIRCUITS LAB (EL,ELI & C)	-	-	2	1

EE-397-E	CONTROL SYSTEMS ENGG. LAB. (EL, EE)	-	-	2	1
EE-331-E	ELECTRONIC CIRCUIT SIMULATION LAB (COMMON WITH VI SEM. – ELI & C)	-	-	2	1
EE-335-E	PRACTICAL TRAINING- I	-	-	2	1
TOTAL		18	6	10	26

NOTE:- 1.Assessment of Practical Training-I will be based on seminar, viva-voce, report and certificate for the practical training taken at the end of the Semester.
2. Students will be allowed to use the scientific calculator only, however sharing of calculator will not be permitted.

EE-301-E

COMMUNICATION ENGINEERING

L T P
3 1 0

Total Credits: 3.5

UNIT 1 SPECTRAL ANALYSIS :

Fourier Series, Fourier transforms, Convolution Theorem, Correlation, Cross-Correlation and autocorrelation.

UNIT 2 INFORMATION THEORY :

Introduction to information and entropy, channel capacity for discrete and continuous channels, Shannon's Theorem, Shannon-Hartley Theorem, Noisy channels, coding theory : Shannon-Fano coding, minimum redundancy coding, maximization of entropy of a continuous message transmission rate, effect of medium on the information, selection of channels ,effect of noise and its minimization.

UNIT 3 RANDOM SIGNAL THEORY :

Representation of random signals, concept of probability, probability of joint occurrence, conditional probability, discrete probability theory, continuous random variables, probability distribution function, probability density function, joint probability density functions. Statistical average and moments, Ergodic processes, correlation function, power spectral density, central limit theory, response of linear system to random signals. Error function, regularity, covariance relation among the spectral densities of the two input-output random processes. Cross spectral densities, optimum filters.

TEXT BOOK :

1. Principles of Communication Systems : Taub Schilling; TMH

REFERENCE BOOKS.

1. Communication Systems : Singh and Sapre ; TMH
2. Communication Systems : A Bruce Carlson; TMH

NOTE: Eight questions are to be set, at least two from each unit. Students have to attempt five questions in all.

EE-303-E

ELECTRONIC MEASUREMENT AND INSTRUMENTATION

L T P
3 1 0

Total Credits: 3.5

UNIT 1. OSCILLOSCOPE:

Block diagram, study of various stages in brief, high frequency CRO considerations. Sampling and storage oscilloscope.

UNIT 2. ELECTRONIC INSTRUMENTS:

Instruments for measurement of voltage, current & other circuit parameters, Q-meters, R.F. power measurements, introduction to digital meters.

UNIT 3. GENERATION & ANALYSIS OF WAVEFORMS:

Block diagram of pulse generators, signal generators, function generators wave analysers, distortion analysers, spectrum analyser, Harmonic analyser, introduction to power analyser.

UNIT 4. FREQUENCY & TIME MEASUREMENT:

Study of decade counting Assembly(DCA), frequency measurements, period measurements, universal counter, introduction to digital meters.

UNIT 5. DISPLAY DEVICES:

Nixie tubes, LED's LCD's, discharge devices.

UNIT 6 TRANSDUCERS:

Classification, Transducers of types: RLC photocell, thermocouples etc. basic schemes of measurement of displacement, velocity, acceleration, strain, pressure, liquid level & temperature.

UNIT 7 INTRODUCTION TO SIGNAL CONDITIONING:

DC signal conditioning system, AC signal conditioning system, data acquisition and conversion system

TEXT BOOK:

1. A course in Electrical & Electronics Measurements & Instrumentation : A.K.Sawhney; Dhanpat Rai & Sons.

REFERENCE BOOKS.

1. Electronics Instrumentation & Measurement Techniques : Cooper; PHI.

NOTE: Eight questions are to be set – at least one from each unit. Students have to attempt five questions in all.

EE-305-E

ANALOG ELECTRONIC CIRCUITS

L T P
3 1 0

Total Credits: 3.5

UNIT1. SINGLE AND MULTISTAGE AMPLIFIERS:

Classification of amplifiers, distortion in amplifiers, frequency response of an amplifier, step response of an amplifier, pass-band of cascaded stages, RC-coupled amplifier, low frequency response of RC coupled stage, effect of an emitter bypass capacitor on low Frequency response, multistage CE amplifier .

UNIT2. FEEDBACK AMPLIFIERS :

Feedback concept, transfer gain with feedback, general characteristics of negative feedback amplifiers, input resistance, output resistance, voltage series feedback, current series feedback, current shunt feedback, voltage shunt feedback.

UNIT3. OSCILLATORS:

Sinusoidal oscillators, Barkhausen criteria, R-C phase shift oscillator, generalform of oscillator circuit, wien-bridge oscillator, crystal oscillator.

UNIT4. POWER AMPLIFIERS:

Class A, B, and C operations; Class A large signal amplifiers, higher order harmonic distortion, efficiency, transformer coupled power amplifier, class B amplifier : efficiency & distortion; class A and class B push-pull amplifiers; class C power amplifier.

UNIT5. OPERATIONAL AMPLIFIERS :

Ideal and practical operational amplifiers, inverting and non-inverting amplifier, differential amplifier, emitter coupled differential amplifier, transfer characteristics of a differential amplifier, offset error : voltage and current, common mode rejection ratio (CMRR) .

UNIT6. LINEAR APPLICATIONS OF OPERATIONAL AMPLIFIERS :

Scale changer, phase shifter, adder, voltage to current converter, current to voltage converter, DC voltage follower, Bridge amplifier, AC coupled amplifier, AC voltage follower, Integrator, differentiator.

UNIT7. NON-LINEAR APPLICATIONS OF OPERATIONAL AMPLIFIERS :

Comparators, sample & hold circuits, Logarithmic amplifier, anti-log amplifier, logarithmic multiplier, waveform generators , Miller & Bootstrap sweep generators, regenerative comparator (Schmitt Trigger), multivibrators, ADC.

TEXT BOOK:

1. Integrated Electronics: Milman Halkias, TMH.
2. Microelectronic Circuits : Sedra & Smith.

REFERENCE BOOKS:

1. Operational Amplifiers:Gaikwad
2. Electronic Circuit Analysis and Design (Second edition) : D.A.Neamen; TMH

NOTE: Eight questions are to be set – at least one from each unit. Students have to attempt five questions.

EE-307-E

ANTENNA AND WAVE PROPOGATION

L T P
3 1 0

Total Credits: 3.5

UNIT 1. RADIATION OF ELECTROMAGNETIC WAVES :

Retarded potential, field of short dipole, Antenna pattern & antenna parameters.

UNIT 2. ANTENNA PARAMETERS :

Antenna pattern, Gain, Directivity, Radiation resistance, Aperture, Beam-width etc, Reciprocity theorem for antenna.

UNIT 3. ELEMENTAL ANTENNA:

Wave equation for radiated fields from current and voltage sources in terms of electric scalar potential and magnetic vector potential .Fields and pattern of an infinitesimal dipole. Definition of various potentials used in antenna theory .

UNIT 4. PRACTICAL LINEAR ANTENNAS:

Relation between current distribution and field pattern of an antenna, linear antenna, half wave dipole, Antenna impedance, Directivity, Radiation resistance, Directional properties, Effect of ground on antenna pattern, Input impedance Broad band matching. Mutual impedance .

UNIT 5. ANTENNA ARRAYS :

Two element array, broad side, End fired pattern, Beam width pattern multiplication, multi element array and their properties, Synthesis of an array.

UNIT 6. VARIOUS TYPES OF ANTENNA :

parabolic feeds, conical, helix, log periodic, horn, Microwave antenna .

UNIT 7. PROPAGATION :

Ground waves, Space waves, Effect of Earth, Duct formation, Ionosphere, and sky waves.

TEXT BOOKS : 1. Antennas by J.D.Kraus, TMH.
2. Antenna & Wave Propagation by K.D Prasad.

REF. BOOKS : 1. Antenna & Radiowave Propagation by Collin, TMH
2. Electromagnetic Waves & Radiating Systems by Jordan & Balman, PHI.

NOTE : Eight questions are to be set - at least one question from each unit. Students have to attempt five question in all.

CSE- 210 E

Computer Architecture & Organization

L T P
3 1 -

Total Credits: 3.5

Unit-1: Basic Principles: Boolean algebra and Logic gates, Combinational logic blocks(Adders, Multiplexers, Encoders, de-coder), Sequential logic blocks(Latches, Flip-Flops, Registers, Counters)

Unit-2: General System Architecture: Store program control concept, Flynn's classification of computers (SISD, MISD, MIMD); Multilevel viewpoint of a machine: digital logic, micro architecture, ISA, operating systems, high level language; structured organization; CPU, caches, main memory, secondary memory units & I/O; Performance metrics; MIPS, MFLOPS.

Unit-3: Instruction Set Architecture: Instruction set based classification of processors (RISC, CISC, and their comparison); addressing modes: register, immediate, direct, indirect, indexed; Operations in the instruction set; Arithmetic and Logical, Data Transfer, Control Flow; Instruction set formats (fixed, variable, hybrid); Language of the machine: 8086 ; simulation using MSAM.

Unit-4: Basic non pipelined CPU Architecture: CPU Architecture types (accumulator, register, stack, memory/ register) detailed data path of a typical register based CPU, Fetch-Decode-Execute cycle (typically 3 to 5 stage); microinstruction sequencing, implementation of control unit, Enhancing performance with pipelining.

Unit-5: Memory Hierarchy & I/O Techniques: The need for a memory hierarchy (Locality of reference principle, Memory hierarchy in practice: Cache, main memory and secondary memory, Memory parameters: access/ cycle time, cost per bit); Main memory (Semiconductor RAM & ROM organization, memory expansion, Static & dynamic memory types); Cache memory (Associative & direct mapped cache organizations).

Unit-6: Introduction to Parallelism: Goals of parallelism (Exploitation of concurrency, throughput enhancement); Amdahl's law; Instruction level parallelism (pipelining, super scaling –basic features); Processor level parallelism (Multiprocessor systems overview).

Unit-7: Computer Organization [80x86]: Instruction codes, computer register, computer instructions, timing and control, instruction cycle, type of instructions, memory reference, register reference. I/O reference, Basics of Logic Design, accumulator logic, Control memory, address sequencing, micro-instruction formats, micro-program sequencer, Stack Organization, Instruction Formats, Types of interrupts; Memory Hierarchy.

Text Books:

- Computer Organization and Design, 2nd Ed., by David A. Patterson and John L. Hennessy, Morgan 1997, Kauffmann.
- Computer Architecture and Organization, 3rd Edi, by John P. Hayes, 1998, TMH.

Reference Books:

- Operating Systems Internals and Design Principles by William Stallings,4th edition, 2001, Prentice-Hall Upper Saddle River, New Jersey

- Computer Organization, 5th Edi, by Carl Hamacher, Zvonko Vranesic,2002, Safwat Zaky.
- Structured Computer Organisation by A.S. Tanenbaum, 4th edition, Prentice-Hall of India, 1999, Eastern Economic Edition.
- Computer Organisation & Architecture: Designing for performance by W. Stallings, 4th edition, 1996, Prentice-Hall International edition.
- Computer System Architecture by M. Mano, 2001, Prentice-Hall.
- Computer Architecture- Nicholas Carter, 2002, T.M.H.

Note: Eight questions will be set in all by the examiners taking at least one question from each unit. Students will be required to attempt five questions in all.

EE-395-E

CONTROL SYSTEM ENGINEERING

L T P
3 1 0

Total Credits: 3.5

UNIT1. INTRODUCTORY CONCEPTS :

System/Plant model, types of models, illustrative examples of plants and their inputs and outputs, controller, servomechanism, regulating system, linear time-invariant (LTI) system, time-varying system, causal system, open loop control system, closed loop control system, illustrative examples of open-loop and feedback control systems, continuous time and sampled data control systems. Effects of feedback on sensitivity (to parameter variations), stability, external disturbance (noise), overall gain etc. Introductory remarks about non-linear control systems.

UNIT2. MATHEMATICAL MODELLING :

Concept of transfer function, relationship between transfer function and impulse response, order of a system, block diagram algebra, signal flow graphs : Mason's gain formula & its application, characteristic equation, derivation of transfer functions of electrical and electromechanical systems. Transfer functions of cascaded and non-loading cascaded elements. Introduction to state variable analysis and design.

UNIT3. TIME DOMAIN ANALYSIS :

Typical test signals, time response of first order systems to various standard inputs, time response of 2nd order system to step input, relationship between location of roots of characteristics equation, ω and ω_n , time domain specifications of a general and an under-damped 2nd order system, steady state error and error constants, dominant closed loop poles, concept of stability, pole zero configuration and stability, necessary and sufficient conditions for stability, Hurwitz stability criterion, Routh stability criterion and relative stability.

UNIT4. ROOT LOCUS TECHNIQUE :

Root locus concept, development of root loci for various systems, stability considerations.

UNIT5. FREQUENCY DOMAIN ANALYSIS :

Relationship between frequency response and time-response for 2nd order system, polar, Nyquist, Bode plots, stability, Gain-margin and Phase Margin, relative stability, frequency response specifications.

UNIT6. COMPENSATION :

Necessity of compensation, compensation networks, application of lag and lead compensation, basic modes of feedback control, proportional, integral and derivative controllers, illustrative examples.

UNIT7. CONTROL COMPONENTS : Synchros, AC and DC techno-generators, servomotors, stepper motors, & their applications, magnetic amplifier.

TEXT BOOK :

1. Control System Engineering : I.J.Nagrath & M.Gopal; New Age

REFERENCE BOOKS :

1. Automatic Control Systems : B.C.Kuo, PHI.
2. Modern Control Engg : K.Ogata; PHI.
3. Control Systems - Principles & Design : Madan Gopal; Tata Mc Graw Hill.
4. Modern Control Engineering.R.C.Dorl & Bishop; Addison-Wesley

NOTE: Eight questions are to be set - at least one from each unit. Students have to attempt five questions.

L T P
0 0 2

Total Credits: 1

LIST OF EXPERIMENTS:

1. Measurement of displacement using LVDT.
2. Measurement of distance using LDR.
3. Measurement of temperature using R.T.D.
4. Measurement of temperature using Thermocouple.
5. Measurement of pressure using Strain Guage.
6. Measurement of pressure using Piezo-Electric Pick up.
7. Measurement of distance using Capacitive Pick up.
8. Measurement of distance using Inductive Pick up.
9. Measurement of speed of DC Motor using Magnetic Pick up.
10. Measurement of speed of DC Motor using Photo Electric Pick up.

NOTE : 1. At least ten experiments have to be performed in the semester.
2. At least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus of EE-303-C.

EE-325-E

ANALOG ELECTRONIC CIRCUITS LAB

L T P
0 0 2

Total Credits: 1

LIST OF EXPERIMENTS:

1. Design & measure the frequency response of an RC coupled amplifier using discrete components.
2. Design a two stage RC coupled amplifier and determine the effect of cascading on gain and bandwidth
3. Study the effect of voltage series, current series, voltage shunt, and current shunt feed-back on amplifier using discrete components.
4. Design & realize inverting amplifier, non-inverting and buffer amplifier using 741 Op Amp.
5. Verify the operation of a differentiator circuit using 741 op amp and show that it acts as a high pass filter.
6. Verify the operation of an integrator circuit using 741 op amp and show that it acts as a low pass filter.
7. Design and verify the operations of op amp adder and subtractor circuits.
8. Plot frequency response of AC coupled amplifier using op amp 741 and study the effect of negative feedback on the bandwidth and gain of the amplifier.
9. Design & realize using op amp 741, Wein -bridge oscillator.
10. To design & realize using op amp 741, square wave generator.

11.To design & realize using op amp 741, logarithmic amplifier & VCCS.

NOTE: At least ten experiments are to be performed. Seven experiments should be performed from the above list and the remaining three experiments can be either from the above list or set by the concerned institution as per the scope of the syllabus of EE-305-C.

EE-397-E

CONTROL SYSTEM LAB

L T P
0 0 2

Total Credits: 1

LIST OF EXPERIMENTS :

1. To study A.C. servo motor and to plot its torque speed characteristics.
2. To study D.C. servo motor and to plot its torque speed characteristics.
3. To study the magnetic amplifier and to plot its load current v/s control current characteristics for :
(a) series connected mode
(b) parallel connected mode.
4. To plot the load current v/s control current characteristics for self excited mode of the magnetic amplifier.
5. To study the synchro & to:
(a) Use the synchro pair (synchro transmitter & control transformer) as an error detector.
(b) Plot stator voltage v/s rotor angle for synchro transmitter i.e. to use the synchro transmitter as position transducer.
6. To use the synchro pair (synchro transmitter & synchro motor) as a torque transmitter.
7. (a) To demonstrate simple motor driven closed loop position control system.
(b) To study and demonstrate simple closed loop speed control system.
8. To study the lead, lag, lead-lag compensators and to draw their magnitude and phase plots .

9. To study a stepper motor & to execute microprocessor or computer-based control of the same by changing number of steps, direction of rotation & speed.
10. To implement a PID controller for level control of a pilot plant.
11. To implement a PID controller for temperature control of a pilot plant.
12. To study the MATLAB package for simulation of control system design.

NOTE : At least ten experiments have to be performed in the semester, at least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus of EE-395-C.

L T P
0 0 2**Total Credits: 1****LIST OF EXPERIMENTS:**

1. Simulate and study half-wave, full-wave, and bridge-rectifier using PSPICE windows
2. Simulate and study diode clipper and clamper circuits using PSPICE windows
3. Simulate and study emitter bias and fixed bias BJT and JFET circuits using PSPICE windows, and determine quiescent conditions.
4. Simulate a common emitter amplifier using self biasing and study the effect of variation in emitter resistor on voltage gain , input and output impedance using PSPICE windows .
5. Determine the frequency response of V_o/V_s for CE BJT amplifier using PSPICE windows. Study the effect of cascading of two stages on band width.
6. Simulate and study Darlington pair amplifier circuit using PSPICE windows and determine dc bias and output ac voltage .
7. Study an operational amplifier using PSPICE windows and find out: CMMR, gain band width product, slew rate, 3-db frequency, and input offset voltage.
8. Simulate and study active low pass, high pass, and band pass filters using PSPICE windows.
9. Simulate and study class A, B, C, and AB amplifier using PSPICE windows.
10. Study the operation of 555 timer oscillator using PSPICE.
11. Simulate logic expression.....and determine its truth table.
12. Simulate logic expression of full adder circuit and determine its truth table.
13. Simulate a synchronous 4-bit counter and determine its count sequence.
14. Simulate a master-slave flip-flop using NAND gates and study its operation. Study the operation of asynchronous preset and clear .

NOTE : At least ten experiments have to be performed in the semester; out of which at least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution.

GURU JAMBHESHWAR UNIVERSITY, HISAR
SCHEME OF STUDIES AND

EXAMINATIONS

B. Tech. E.C.E. III- YEAR

SEMESTER- VI

Course No.	Course Title	Teaching Schedule			
		L	T	P	Total credits
EE-302-E	MICROWAVE AND RADAR ENGINEERING	3	1	-	3.5
EE-394-E	MICROPROCESSORS & INTERFACING	3	1	-	3.5
EE-306-E	MOS IC'S AND TECHNOLOGY	3	1	-	3.5
ECE-312-E	COMPUTER NETWORK	3	1	-	3.5
EE-308-E	TV ENGINEERING	3	1	-	3.5
EE-310-E	DIGITAL SYSTEM DESIGN (EL,ELI & C, EE, CSE)	3	1	-	3.5
EE-396-E	MICROPROCESSORS & INTERFACING LAB	-	-	2	1
ECE-324-E	COMPUTER NETWORK LAB.	-	-	2	1
EE-330-E	DIGITAL SYSTEM DESIGN LAB. (EL,ELI & C, EE, CSE)	-	-	2	1
EE-322-E	MICROWAVE LAB	-	-	2	1
TOTAL		18	6	8	25

NOTE:-1. Practical Training – II of 6 weeks duration during summer vacation. Evaluation in VII Semester.

2. Students will be allowed to use the scientific calculator only, however sharing of calculator will not be permitted.

EE-302-E

MICROWAVE AND RADAR ENGINEERING

L T P
3 1 0

Total Credits: 3.5

UNIT1. WAVEGUIDES:

Introduction, comparison with transmission lines, propagation in TE & TM mode, rectangular wave guide, TEM mode in rectangular wave guide, characteristic impedance, introduction to circular waveguides and planar transmission lines.

UNIT2 . MICROWAVE COMPONENTS:

Directional couplers, tees, hybrid ring, S-parameters, attenuators, cavity resonators ,mixers & detectors, matched Load, phase shifter ,wave meter, Ferrite devices: Isolators, circulators.

UNIT3. MICROWAVE TUBES:

Limitation of conventional tubes; Construction, operation and properties of Klystron amplifier, reflex Klystron, magnetron, TWT , BWO , crossed field amplifiers.

UNIT4. MICROWAVE SOLID STATE DEVICES :

Varactor diode, Tunnel diode, Schottky diode, GUNN diode, IMPATT, TRAPATT and PIN diodes. MASER, parametric amplifiers.

UNIT5. MICROWAVE MEASUREMENTS :

Power measurement using calorimeter & bolometers, measurement of SWR, frequency , wavelength and impedance. Microwave bridges.

UNIT6. INTRODUCTION TO RADAR :

Block Diagram and operation, Radar Frequencies, Simple form of Radar Equation, Prediction of Range Performance, Pulse Repetition frequency and Range Ambiguities, Applications of Radar

TEXT BOOKS:

1. Microwave devices and circuits :Samuel Liao;PHI
2. Microwave devices & Radar Engg :M .Kulkarni;Umesh

REFERENCE BOOK :

1. Microwaves and Radar : A.K. Maini; Khanna

NOTE : Eight questions are to be set –atleast one from each unit. Students have to attempt any five questions

EE-306-E

MOS ICs AND TECHNOLOGY

L T P
3 1 0

Total Credits: 3.5

UNIT1. REVIEW OF MOS TECHNOLOGY :

Introduction to IC technology, MOS Transistor enhancement mode and depletion mode operations, fabrication of NMOS, CMOS and BiCMOS devices. Equivalent circuit for MOSFET and CMOS.

UNIT2. MOS TRANSISTOR THEORY:

MOS device design equations, MOS transistor, Evaluation aspects of MOS transistor, threshold voltage, MOS transistor transconductance & output conductance, figure of merit, determination of pull-up to pull-down ratio for an n-MOS inverter driven by another n-MOS inverter & by one or more pass transistor, alternative forms of pull-up, CMOS and BiCMOS-inverters. Latch up in CMOS circuitry and BiCMOS Latch up susceptibility.

UNIT3. MOS CIRCUITS AND LOGIC DESIGN :

Basic physical design of simple logic gates using n-MOS, p-MOS and CMOS, CMOS logic gate design considerations, CMOS logic structures, clocking strategies.

UNIT4. CIRCUIT CHARACTERIZATION AND PERFORMANCE ESTIMATION :

Resistance estimation, capacitance estimation, inductance, switching characteristics, CMOS gate transistor sizing, power dissipation.

UNIT5. VLSI FABRICATION :

Crystal growth, wafer preparation, epitaxy, oxidation, lithography, etching, diffusion, dielectric and poly-silicon film deposition, ion implantation, yield and reliability, metalization.

UNIT6. DESIGN EXAMPLE USING CMOS :

Incrementer / decrementer, left/right shift serial/parallel register, comparator for two n-bit number, a two-phase non-overlapping clock generator with buffered output on both phases, design of an event driven element for EDL system

TEXT BOOKS :

1. Introduction to Digital Integrated Circuits : Rabaey, Chandrakasan & Nikolic.
2. Principles of CMOS VLSI Design : Neil H.E. Weste and Kamran Eshraghian; Pearson.

REFERENCE BOOKS :

1. Introduction to Digital Circuits : Rabaey andLPE (PH)
2.: S.K.Gandhi.
3. VLSI Technology: S.M. Sze; McGraw-Hill.
4. Integrated Circuits: K.R. Botkar; Khanna

NOTE: Eight questions are to be set –atleast one from each unit. Students have to attempt any five questions

EE-308-E

TELEVISION ENGINEERING

L T P
3 1 0

Total Credits: 3.5

UNIT1 ELEMENTS OF A TELEVISION SYSTEM :

Picture transmission, sound transmission, picture reception, sound reception synchronization, receiver controls, color television.

Analysis and Synthesis of Television Pictures: Gross structure, image continuity, no. of scanning lines, flicker, fine structure, tonal gradation.

UNIT2. COMPOSITE VIDEO SIGNAL :

Video signal dimensions, horizontal sync details, vertical sync details, scanning sequence details, functions of vertical pulse train, sync details of 525 line system.

UNIT3. SIGNAL TRANSMISSION AND CHANNEL BANDWIDTH :

Amplitude Modulation, channel bandwidth, vestigial side band transmission, Transmission efficiency, complete channel bandwidth, reception of vestigial side band signals, frequency modulation, FM channel bandwidth, channel bandwidth for color transmission, allocation of frequency bands for television signal transmission, television standards.

UNIT4. THE PICTURE TUBE :

Monochrome picture tube, Beam deflection, screen phosphor, face plate, picture tube characteristics, picture tube circuit controls. Television Camera Tubes: Basic principal, Image orthicon, Vidicon.

UNIT5. BASIC TELEVISION BROADCASTING:

Television transmitter, positive & negative modulation.

Television Receiver: Receiver sections, vestigial side band correction, choice of intermediate frequencies, picture tube circuitry & controls, sound signal separation, sound section, Sync processing & AFC circuit, vertical Deflection circuit, Horizontal deflection circuit.

Television Signal propagation & Antennas: Television Transmission antennas , television receiver antennas, color television antennas.

UNIT6. ESSENTIALS OF COLOR TELEVISION:

Compatibility, natural light, color perception, three color television camera, the luminance signal, values of Luminance & color difference signals on Colors, color television display tubes (Delta gun, PIL, Trinitron).

UNIT7. COLOR SIGNAL TRANSMISSION AND RECEPTION :

Color signal transmission, bandwidth for color signal transmission.

UNIT8. TELEVISION APPLICATIONS:

Cable television, CCTV, picture phone & facsimile, television via satellite, Remote Control (Electronic control system), Introduction to Digital TV Technology and their merits , HDTV.

TEXT BOOK:

Monochrome and Color Television : R.R.Gulati ; New Age.

REFERENCE BOOK :

TV and Video Engineering : Dhake ; TMH.

NOTE: Eight questions are to be set – one from each unit. Students have to attempt five questions.

EE-310-E

DIGITAL SYSTEM DESIGN

L T P
3 1 0

Total Credits: 3.5

UNIT 1. INTRODUCTION :

Introduction to Computer-aided design tools for digital systems. Hardware description languages; introduction to VHDL, data objects, classes and data types, Operators, Overloading, logical operators. Types of delays Entity and Architecture declaration. Introduction to behavioural, dataflow and structural models.

UNIT 2. VHDL STATEMENTS :

Assignment statements, sequential statements and process, conditional statements, case statement Array and loops, resolution functions, Packages and Libraries, concurrent statements.

Subprograms: Application of Functions and Procedures, Structural Modelling, component declaration, structural layout and generics.

UNIT 3. COMBINATIONAL CIRCUIT DESIGN:

VHDL Models and Simulation of combinational circuits such as Multiplexers, Demultiplexers, encoders, decoders, code converters, comparators, implementation of Boolean functions etc.

UNIT 4. SEQUENTIAL CIRCUITS DESIGN :

VHDL Models and Simulation of Sequential Circuits
Shift Registers, Counters etc.

UNIT 5. DESIGN OF MICROCOMPUTER :

Basic components of a computer, specifications, architecture of a simple microcomputer system, implementation of a simple microcomputer system using VHDL

UNIT 6. DESIGN WITH CPLDs AND FPGAs :

Programmable logic devices : ROM, PLAs, PALs, GAL, PEEL, CPLDs and FPGA. Design implementation using CPLDs and FPGAs

REFERENCE BOOKS:

1. IEEE Standard VHDL Language Reference Manual (1993).
2. Digital Design and Modelling with VHDL and Synthesis : KC Chang; IEEE Computer Society Press.
3. "A VHDL Primer" : Bhasker; Prentice Hall 1995.
4. "Digital System Design using VHDL" : Charles. H.Roth ; PWS (1998).
5. "VHDL-Analysis & Modelling of Digital Systems" : Navabi Z; McGraw Hill.
6. VHDL-IV Edition :Perry; TMH (2002)
7. "Introduction to Digital Systems" : Ercegovac. Lang & Moreno; John Wiley (1999).
8. Fundamentals of Digital Logic with VHDL Design : Brown and Vranesic; TMH (2000)
9. Modern Digital Electronics- III Edition: R.P Jain; TMH (2003).

NOTE : Eight questions are to be set - at least one question from each unit. Students will be required to attempt five questions in all.

EE-394-E

MICROPROCESSORS AND INTERFACING

L T P
3 1 0

Total Credits: 3.5

PART A

UNIT1. THE 8085 PROCESSOR :

Introduction to microprocessor, 8085 microprocessor : Architecture, instruction set, interrupt structure, and assembly language programming.

UNIT2. THE 8086 MICROPROCESSOR ARCHITECTURE :

Architecture, block diagram of 8086, details of sub-blocks such as EU, BIU; memory segmentation and physical address computations, program relocation, addressing modes, instruction formats, pin diagram and description of various signals.

UNIT3. INSTRUCTION SET OF 8086 :

Instruction execution timing, assembler instruction format, data transfer instructions, arithmetic instructions, branch instructions, looping instructions, NOP and HLT instructions, flag manipulation instructions, logical instructions, shift and rotate instructions, directives and operators, programming examples.

PART B

UNIT4. INTERFACING DEVICE :

The 8255 PPI chip: Architecture, control words, modes and examples.

UNIT 5. DMA :

Introduction to DMA process, 8237 DMA controller,

UNIT6. INTERRUPT AND TIMER :

8259 Programmable interrupt controller, Programmable interval timer chips.

TEXT BOOKS :

1. Microprocessor Architecture, Programming & Applications with 8085 : Ramesh S Gaonkar; Wiley Eastern Ltd.
2. The Intel Microprocessors 8086- Pentium processor : Brey; PHI

REFERENCE BOOKS:

1. Microprocessors and interfacing : Hall; TMH
2. The 8088 & 8086 Microprocessors-Programming, interfacing,Hardware & Applications :Triebel & Singh; PHI
3. Microcomputer systems: the 8086/8088 Family: architecture, Programming & Design : Yu-Chang Liu & Glenn A Gibson; PHI.
4. Advanced Microprocessors and Interfacing : Badri Ram; TMH

NOTE : 8 questions are to be set selecting FIVE questions from PART A and THREE questions from PART B. Students have to attempt any five questions.

EE-396-E

MICROPROCESSORS AND INTERFACING LAB

L T P

Total Credits: 1

0 0 2

LIST OF EXPERIMENTS:

1. Study of 8085 Microprocessor kit.
2. Write a program using 8085 and verify for :
 - a. Addition of two 8-bit numbers.
 - b. Addition of two 8-bit numbers (with carry).
3. Write a program using 8085 and verify for :
 - a. 8-bit subtraction (display borrow)
 - b. 16-bit subtraction (display borrow)
4. Write a program using 8085 for multiplication of two 8- bit numbers by repeated addition method. Check for minimum number of additions and test for typical data.
5. Write a program using 8085 for multiplication of two 8- bit numbers by bit rotation method and verify.
6. Write a program using 8085 for division of two 8- bit numbers by repeated subtraction method and test for typical data.
7. Write a program using 8085 for dividing two 8- bit numbers by bit rotation method and test for typical data.
8. Study of 8086 microprocessor kit
9. Write a program using 8086 for division of a defined double word (stored in a data segment) by another double Word division and verify.

10. Write a program using 8086 for finding the square root of a given number and verify.
11. Write a program using 8086 for copying 12 bytes of data from source to destination and verify.
12. Write a program using 8086 and verify for:
 - a. Finding the largest number from an array.
 - b. Finding the smallest number from an array.
13. Write a program using 8086 for arranging an array of numbers in descending order and verify.
14. Write a program using 8086 for arranging an array of numbers in ascending order and verify.
15. Write a program for finding square of a number using look-up table and verify. .
16. Write a program to interface a two digit number using seven-segment LEDs. Use 8085/8086 microprocessor and 8255 PPI.
17. Write a program to control the operation of stepper motor using 8085/8086 microprocessor and 8255 PPI.

NOTE: At least ten experiments have to be performed in the semester out of which seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus of EE-394-C.

IT-209

E

Computer Network Lab. (Common with IT IVth Semester)

L	T	P
-	-	2

Total Credits: 1

Exercises involving various networking protocols based on the contents of theory.

Note: At least 10 exercise to be given by the teacher concerned.

EE-330-E

DIGITAL SYSTEM DESIGN LAB

L T P
0 0 2

Total Credits: 1

LIST OF EXPERIMENTS:

1. Design all gates using VHDL.
2. Write VHDL programs for the following circuits, check the wave forms and the hardware generated
 - a. half adder
 - b. full adder
3. Write VHDL programs for the following circuits, check the wave forms and the hardware generated
 - a. multiplexer
 - b. demultiplexer
4. Write VHDL programs for the following circuits, check the wave forms and the hardware generated
 - a. decoder
 - b. encoder
5. Write a VHDL program for a comparator and check the wave forms and the hardware generated
6. Write a VHDL program for a code converter and check the wave forms and the hardware generated
7. Write a VHDL program for a FLIP-FLOP and check the wave forms and the hardware generated
8. Write a VHDL program for a counter and check the wave forms and the hardware generated

9. Write VHDL programs for the following circuits, check the wave forms and the hardware generated

- a. register
- b. shift register

10. Implement any three (given above) on FPGA/CPLD kit

NOTE : Ten experiments are to be performed out of which at least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus.

EE-322-E

MICROWAVE LAB

L T P
0 0 2

Total Credits: 1

LIST OF EXPERIMENTS :

1. Study of wave guide components.
2. To study the characteristics of reflex Klystron and determine its timing range.
3. To measure frequency of microwave source and demonstrate relationship among guide dimensions, free space wave length and guide wavelength.
4. To measure VSWR of unknown load and determine its impedance using a smith chart.
5. To match impedance for maximum power transfer using slide screw tuner.
6. To measure VSWR, insertion losses and attenuation of a fixed and variable attenuator.
7. To measure coupling and directivity of direction couplers.
8. To measure insertion loss, isolation of a three port circulator.
9. To measure the Q of a resonant cavity.
10. To study the V-I characteristics of GUNN diode.

NOTE : Ten experiments have to be performed in the semester. At least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus of EE-302-C.

GURU JAMBHESHWAR UNIVERSITY, HISAR
SCHEME OF STUDIES AND EXAMINATIONS

B. Tech. E.C.E. IV - YEAR

SEMESTER- VII

Course No.	Course Title	Teaching Schedule			
EE-401-E	DATA COMMUNICATION (EL, EE)	3	1	-	3.5
EE-403-E	MULTI – MEDIA SYSTEMS	3	1	-	3.5
EE-405-E	OPTICAL COMMUNICATION SYSTEM	3	1	-	3.5
EE-407-E	DIGITAL SIGNAL PROCESSING (EL, ELI & C, EE)	3	1	-	3.5
	ELECTIVE – I	4	-	-	4
EE-421-E	DATA COMMUNICATION LAB (EL, EE)	-	-	2	1
EE-423-E	MULTI – MEDIA SYSTEMS LAB	-	-	2	1
EE-427-E	DIGITAL SIGNAL PROCESSING LAB (EL, ELI & C, EE)	-	-	2	1
EE-431-E	PROJECT	-	-	6	3
EE-435-E	PRACTICAL TRAINING – II	-	-	2	1
TOTAL		16	4	12	24

NOTE: 1.Project load will be treated as 2 hours for project co-ordinator and 1 hour for each participating teacher.

2.Project course will commence in seventh semester where the students will identify the project problems, complete the design/ procure the materials/ start the fabrication/ complete the survey etc. depending upon the nature of the problem.

The project will be completed in VIIIth sem. And its examination will be held in VIII semester.

3. Students will be allowed to use the scientific calculator only, however sharing of calculator will not be permitted.

4. Assessment of practical training – II will be based on seminar, viva-voce, report and certificate for the practical training taken at the end of VI semester.

EE-401-E

DATA COMMUNICATION

L T P
3 1 0

Total Credits: 3.5

UNIT 1 DIGITAL COMMUNICATION :

Introduction, digital communication, Shannon limit for information capacity, digital radio, digital amplitude modulation, frequency shift keying (FSK), phase shift keying (PSK), quadrature amplitude modulation (QAM), band width efficiency, carrier recovery, differential phase shift keying,(DPSK), clock recovery, probability of error & bit error rate, trellis encoding.

UNIT 2 DATA COMMUNICATIONS:

Introduction, history of data communication, standard organization for data communication, data communication circuits, data communication codes, error control, synchronization, data communications hardware, serial interfaces: RS-232, RS-449 & RS-530, CCITT X.21, parallel interfaces: centronics parallel interfaces. the telephone network: DDD network, private- line service, the telephone circuit, data modems: synchronous modems, asynchronous modems, modem synchronization.

UNIT 3 DATA COMMUNICATIONS PROTOCOLS AND NETWORK CONFIGURATIONS :

Introduction, open system interconnection (OSI), data transmission mode, asynchronous protocols, synchronous protocols, public data network, integrated services digital network (ISDN), local area networks, token pass ring, Ethernet.

UNIT 4 MULTIPLEXING :

Introduction, time division multiplexing, T1 digital carrier system, CCITT time division multiplexed carrier systems, CODECS, COMBO chips, line encoding, T-CARRIERS, frame synchronization, bit interleaving VS word interleaving, frequency division multiplexing, AT&T's FDM hierarchy, composite base band signal, formation of a master group.

UNIT 5 INTERNET AND TCP/IP:

Introduction, history, use of Internet, accessing the Internet, Internet addresses, security on the internet, authentication, firewalls, intranet and extranet, TCP/IP reference model, domain name service, world wide web.

TEXT BOOK:

1. Electronic Communications Systems (4th Ed.) : Wayne Tomasi; Pearson
2. Data Communication and Networking (2nd -edition): Forauzan;

NOTE Eight questions are to be set at-least one from each unit. Students have to attempt any five questions

EE-403-E

MULTI-MEDIA SYSTEMS

L T P
3 1 0

Total Credits: 3.5

UNIT 1. MULTIMEDIA :

Definitions, CD-ROM and the multimedia highway, Uses of multimedia, Introduction to making multimedia -the stages of projects, Requirements to make good multimedia, multimedia skills and training – the Multimedia Team, Training opportunities in multimedia.

UNIT 2. MULTIMEDIA HARDWARE :

Macintosh and windows production platforms, Hardware Peripherals-Connections, Memory & Storage Devices, Input / Output Hardware devices, Communication Devices, Media Software-Basic tools, Making instant multimedia, Multimedia authoring tools.

UNIT 3. MULTIMEDIA BUILDING BLOCKS :

Text, Sound, Images, Animation, Video.

UNIT 4. ASSEMBLING AND DELIVERING A PROJECT :

Planning and costing, Designing and producing, Content & talent, Data Compression Testing and Delivering, CD-ROM technology.

UNIT 5. MULTIMEDIA AND THE INTERNET :

History, Internet working, Connections, Internet Services, The world-wide Web, Tools for the WWW- web servers, Web browsers, Web Page makers & editors, Plug – Ins & Delivery Vehicles, HTML, VRML, Designing for the WWW- working on the Web, Text for the Web.

UNIT 6. MULTIMEDIA APPLICATIONS :

Media communication, Media consumption, Media entertainment, Multimedia games.

TEXT BOOK :

1. Multimedia: Making it Work IIIrd edition: Tay Vaughan; TMH

REFERENCE BOOKS :

1. Multimedia Systems-Design: K. Thakkar; PHI
2. Multimedia: Computing, Communications & Applications: Ralf Stein Metz & Klara Nahrstedt; Pearson
3. Advanced Multimedia Programming: Steve Rimmer; MBI

NOTE: Eight questions are to be set at-least one from each unit. Students have to attempt any five questions

EE-405-E

OPTICAL COMMUNICATION SYSTEMS

L T P
3 1 0

Total Credits: 3.5

UNIT1 INTRODUCTION TO OPTICAL COMMUNICATION SYSTEMS :

Electromagnetic spectrum used for optical communication, block diagram of optical communication system. Basics of transmission of light rays. Advantages of optical fiber communication.

UNIT2 OPTICAL FIBERS:

Optical fibers structures and their types, fiber characteristics : attenuation, scattering, absorption, fiber bend loss, dispersion; fiber couplers and connectors

UNIT3. LED LIGHT SOURCE :

Light emitting diode : recombination processes, the spectrum of recombination radiation, LED characteristics, internal quantum efficiency, external quantum efficiency, LED structure, lens coupling to fiber, behavior at high frequencies.

UNIT4. LASER LIGHT SOURCE :

Basic principles of laser action in semi -conductors, optical gain, lasing threshold, laser structures and characteristics, laser to fiber coupling, comparison with LED source.

UNIT5 . AVALANCHE AND PIN PHOTODETECTORS:

Principles of optical detection, quantum efficiency, responsivity, general principles of PIN photodetector, intrinsic absorption, materials and designs for PIN photodiodes, impulse and frequency response of PIN photodiodes, noise in PIN Photodiodes, multiplication process, APD Design, APD bandwidth, APD noise.

TEXT BOOK:

Optical Fiber Communications: John M Senior; PHI.

REFERENCE BOOKS :

1. Optical Communication Systems : John Gowar; PHI.
2. Optical Fiber Communications : Gerd Keiser; TMH
3. Optical fiber Communication : Selvarajan, Kar, Srinivas; TMH.

NOTE: Eight questions are to be set at least one question from each unit. Students have to attempt five question in all.

EE-407-E

DIGITAL SIGNAL PROCESSING

L T P
3 1 0

Total Credits: 3.5

UNIT1. DISCRETE-TIME SIGNALS:

Signal classifications, frequency domain representation, time domain representation, representation of sequences by Fourier transform, properties of Fourier transform, discrete time random signals, energy and power theorems.

UNIT2. DISCRETE-TIME SYSTEMS : Classification, properties, time invariant system, finite impulse Response (FIR) system, infinite impulse response (IIR) system.

UNIT3. SAMPLING OF TIME SIGNALS:

Sampling theorem, application, frequency domain representation of sampling, reconstruction of band limited signal from its samples. discrete time processing of continuous time signals, changing the sampling rate using discrete time processing.

UNIT4. Z-TRANSFORM :

Introduction, properties of the region of convergence, properties of the Z-transform, inversion of the Z-transform, applications of Z-transform.

UNIT5. BASICS OF DIGITAL FILTERS : Fundamentals of digital filtering, various types of digital filters, design techniques of digital filters : window technique for FIR, bi-linear transformation and backward difference methods for IIR filter design, analysis of finite word length effects in DSP, DSP algorithm implementation consideration. Applications of DSP.

UNIT6. MULTIRATE DIGITAL SIGNAL PROCESSING:

Introduction to multirate digital signal processing, sampling rate conversion, filter structures, multistage decimator and interpolators, digital filter banks.

TEXT BOOKS :

1. Digital Signal Processing : Proakis and Manolakis; PHI
2. Digital Signal Processing: Salivahanan, Vallavaraj and Gnanapriya;TMH

REFERENCE BOOKS:

1. Digital Signal Processing: Alon V. Oppenheim;PHI
2. Digital Signal processing(II-Edition): Mitra, TMH

NOTE: Eight questions are to be set - at least one from each unit. Students have to attempt five questions.

EE-421-E

DATA COMMUNICATION LAB

L T P
0 0 2

Total Credits: 1

LIST OF EXPERIMENTS:

- 1) To study different types of transmission media
- 2) To study Quadrature Phase Shift Keying Modulation.
- 3) To study Quadrature Amplitude Modulation.
- 4) To Study !6 Quadrature Amplitude Multiplexing.
- 5) To Study Serial Interface RS-232 and its applications.
- 6) To study the Parallel Interface Centronics and its applications.
- 7) To configure the modem of a computer.
- 8) To make inter-connections in cables for data communication in LAN.
- 9) To install LAN using Tree topology.
- 10) To install LAN using STAR topology.
- 11) To install LAN using Bus topology.
- 12) To install LAN using Token-Ring topology
- 13) To install WIN NT
- 14) To cofigure a HUB/Switch.

NOTE : 1. At least ten experiments have to be performed in the semester; At least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus .

L T P
0 0 2**Total Credits: 1****LIST OF EXPERIMENTS:**

1. Write a program to justify a text entered by the user on both the left and right hand side For example, the text “ An architect may have a graphics program to draw an entire building but be interested in only ground floor”, can be justified in 30 columns as shown below. An architect may have a Graphics programs draw an Entire building but be interested in only ground floor.
2. Study the notes of a piano and stimulate them using the key board and store them in a file.
3. Write a program to read a paragraph and store it to a file name suggested by the author.
4. Devise a routine to produce the animation effect of a square transforming to a triangle and then to a circle.
5. Write a program to show a bitmap image on your computer screen.
6. Create a web page for a clothing company which contains all the details of that company and at-least five links to other web pages.
7. Write a program by which we can split mpeg video into smaller pieces for the purpose of sending it over the web or by small capacity floppy diskettes and then joining them at the destination.
8. Write a program to simulate the game of pool table.
9. Write a program to simulate the game Mine Sweeper.
10. Write a program to play “wave” or “midi” format sound files.

NOTE : 1. At least ten experiments have to be performed in the semester; At least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus EE-----D.

EE-427-E

DIGITAL SIGNAL PROCESSING LAB

L T P
0 0 2

Total Credits: 1

LIST OF EXPERIMENTS:

Perform the experiments using MATLAB:

1. To represent basic signals (Unit step, unit impulse, ramp, exponential, sine and cosine).
2. To develop program for discrete convolution.
3. To develop program for discrete correlation.
4. To understand stability test.
5. To understand sampling theorem.
6. To design analog filter(low-pass, high pass, band-pass, band-stop).
7. To design digital IIR filters(low-pass, high pass, band-pass, band-stop).
8. To design FIR filters using windows technique.
9. To design a program to compare direct realization values of IIR digital filter
10. To develop a program for computing parallel realization values of IIR digital filter.
11. To develop a program for computing cascade realization values of IIR digital filter
12. To develop a program for computing inverse Z-transform of a rational transfer function.]

NOTE: At least ten experiments have to be performed in the semester; out of which at least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution.

GURU JAMBHESHWAR UNIVERSITY, HISAR
SCHEME OF STUDIES AND EXAMINATIONS

B. Tech. E.C.E. IV - YEAR

SEMESTER- VIII

Course No.	Course Title	Teaching Schedule			
		L	T	P	Total credits
EE-402-E	WIRELESS COMMUNICATION (Common with VI Sem.- CSE, IT)	3	1	-	3.5
EE-404-E	SATELITE COMMUNICATION ENGINEERING	3	1	-	3.5
	ELECTIVE – II	4	-	-	4
	ELECTIVE – III	4	-	-	4
EE-424-E	SATELITE COMMUNICATION LAB	-	-	2	1
EE-431-E	PROJECT	-	-	6	3
EE-422-E	SEMINAR	-	-	4	2
GFEE-402-E	GENERAL FITNESS FOR THE PROFESSION	-	-	-	1
TOTAL		17	2	12	22

NOTE : 1. Project load will be treated as 2 hours for the project co-ordinator and 1 hour for each participating teacher.
 2. Students will be allowed to use the scientific calculator only, however sharing of calculator will not be permitted.

EE-402-E

WIRELESS COMMUNICATION

L T P
3 1 0

Total Credits: 3.5

UNIT 1. INTRODUCTION TO WIRELESS COMMUNICATION SYSTEMS:

Evolution of mobile radio communications, examples of wireless comm. systems, paging systems, Cordless telephone systems, comparison of various wireless systems.

UNIT 2. MODERN WIRELESS COMMUNICATION SYSTEMS:

Second generation cellular networks, third generation wireless networks, wireless in local loop, wireless local area networks, Blue tooth and Personal Area networks.

UNIT 3. INTRODUCTION TO CELLULAR MOBILE SYSTEMS:

Spectrum Allocation, basic Cellular Systems, performance Criteria, Operation of cellular systems, analog cellular systems, digital Cellular Systems.

UNIT 4. CELLULAR SYSTEM DESIGN FUNDAMENTALS:

Frequency Reuse, channel assignment strategies, handoff Strategies, Interference and system capacity, tracking and grade off service, improving coverage and capacity.

UNIT 5. MULTIPLE ACCESS TECHNIQUES FOR WIRELESS COMMUNICATION:

Introduction to Multiple Access, FDMA, TDMA, Spread Spectrum multiple Access, space division multiple access, packet ratio, capacity of a cellular systems.

UNIT 6. WIRELESS NETWORKING:

Difference between wireless and fixed telephone networks, development of wireless networks, fixed network transmission hierarchy, traffic routing in wireless networks, wireless data services, common channel signaling, ISDN (Integrated Services digital Networks), advanced intelligent networks.

UNIT 7. INTELLIGENT CELL CONCEPT AND APPLICATION:

Intelligent cell concept, applications of intelligent micro-cell Systems, in-Building Communication, CDMA cellular Radio Networks.

TEXT BOOKS:

1. Wireless Communications: Theodore S. Rappaport; Pearsons.
2. Mobile Cellular Telecommunication: W.C.Y.Lee; McGraw Hill

REFERENCE BOOK:

1. Mobile Communications: Jochen Schiller; Pearson

NOTE: Eight questions are to be set -one question from each unit. Students have to attempt any five question.

EE-404-E

SATELLITE COMMUNICATION ENGG.

L T P
3 1 0

Total Credits: 3.5

UNIT1. PRINCIPLES OF SATELLITE COMMUNICATION :

Evolution & growth of communication satellite, Synchronous satellite, Satellite frequency allocation & Band spectrum, Advantages of satellite communication, Active & Passive satellite, Modem & Codec. Applications of satellite communication.

UNIT2. COMMUNICATION SATELLITE LINK DESIGN:

Introduction, General link design equations, System noise temperature, C/N & G/T ratio, Atmospheric & Ionospheric effects on link design, Complete link design, Earth station parameters.

UNIT3. ANALOG SATELLITE COMMUNICATION :

Introduction, Baseband analog(Voice) signal, FDM techniques, S/N & C/N ratio in frequency modulation in satellite link, S/N ratio in FM with multiplexed telephone signal in satellite link, Single channel per carrier(SCPC) systems, Companded single sideband (CSSB) systems, Analog FM/FDM TV satellite link, Intermodulation products & their effects in FM/FDM systems, Energy disposal in FM/FDM systems.

UNIT4. DIGITAL SATELLITE COMMUNICATION :

Advantages of digital communication, Elements of digital satellite communication systems, Digital baseband signals, Digital modulation techniques, Satellite digital link design, Time Division Multiplexing.

UNIT5. MULTIPLE ACCESS TECHNIQUES: Introduction, TDMA, TDMA-Frame structure, TDMA-Burst structure, TDMA-Frame efficiency, TDMA-superframe, TDMA-Frame acquisition & Synchronization, TDMA compared to FDMA, TDMA Burst Time Plan, Multiple Beam (Satellite switched) TDMA satellite system, Beam Hopping(Transponder Hopping) TDMA, CDMA & hybrid access techniques.

UNIT6. SATELLITE ORBITS:

Introduction, Synchronous orbit, Orbital parameters, Satellite location with respect to earth, Look angles, Earth coverage & slant range, Eclipse effect, Satellite placement in geostationary orbit, station keeping, Satellite stabilization.

UNIT7. SPECIAL PURPOSE COMMUNICATION SATELLITES :

BDS, INMARSAT, INTELSAT, VSAT(data broadband satellite), MSAT(Mobile Satellite Communication technique), Sarsat(Search & Rescue satellite) & LEOs (Lower earth orbit satellite), Satellite communication with respect to Fiber Optic Communication, LANDSAT, Defense satellite.

UNIT8. LASER SATELLITE COMMUNICATION:

Introduction, Link analysis, Optical satellite link transmitter, Optical satellite link receiver, Satellite Beam Acquisition, Tracking & Positioning, Deep Space Optical Communication Link.

TEXT BOOK:

1. Satellite Communication : D.C. Aggarwal ; Khanna.

REFERENCE BOOK :

1. Satellite Communication :Gagliardi ; CBS

NOTE: Eight questions are to be set - one question from each unit. Students have to attempt any five question.

EE-424-E

SATELLITE COMMUNICATION LAB

L T P
0 0 2

Total Credits: 1

LIST OF EXPERIMENTS:

1. To set up a active and passive satellite communication link and study their difference.
2. To measure the base-band analog (voice) signal parameters in the satellite link.
3. To measure C/N ratio.
4. To transmit and receive the function generator waveforms through a Sat.Com. link.
5. To measure the digital baseband signal parameters in Sat.Com. link.
6. To send telecommand and receive the telemetry data.
7. To set a PC to PC Sat. Com. Link using RS-232 ports.
8. To measure the propagation delay of signal in a Sat. Com. Link.
9. To measure fading of a received signal.
10. To measure the parameters in an analog FM/FDM TV Sat.Com. link.
11. To measure the S/N ratio.
12. To calculate the figure of merit and FM deviation.

NOTE: At least ten experiments are to be performed , atleast seven experiments are to be taken from the above list and the remaining three based on the syllabus of EE-404-C (Satellite Communication Engineering) be developed at the institution level. The students will be required to perform at least eight experiments in the semester.

ELECTRONICS & COMMUNICATION ENGG.
LIST OF ELECTIVES

ELECTIVE-I

HUM-451-E	Language Skills for Engineers
IT-471-E	Management Information System
IC-451-E	Intelligent Instrumentation
CSE-303-E	Computer Graphics
IC-403-E	Embedded System Design
HUM-455-E	Entrepreneurship
MATH-451-E	Combinatorics & Graph Theory
HUM-453-E	Oral Communication Competence
MATH-455-E	Linear Algebra
PHY-451-E	Non-Conventional Energy & Conversion Technology
HUM-457-E	Organisational Behaviour & Human Resource Management

ELECTIVE-II

MATH-402-E	Operation Research
IC-404-E	Fuzzy Control System
ME-484-E	Robotics Engineering
CSE-304-E	Intelligence System
PHY-452-E	Laser Technology
CSE-202-E	Data Base Management System
CSE-302-E	Principles of Software Engg.
HUM-452-E	Business Communication

HUM-454-E

Indian English Writing

ELECTIVE-III

EE-462-E

Genetic Algorithms & Applications

CSE-307-E

Web Development

EE-317-E

Power Electronics

EE-454-E

Radar and Sonar Engg.

CSE-414-E

Digital Image Processing

HUM-456-E

Marketing Management

MATH-454-E

Advanced Mathematics

EE-406-E

Advance Control System

ELECTIVE-I

HUM-451-E

LANGUAGE SKILLS FOR ENGINEERS

The real challenge before the students starts when they cross the threshold of the college after completing their degree. They, all of a sudden, find themselves competing for job/ P.G. Degrees, through various entrance tests and interviews. Verbal ability forms a major portion of these tests. Without sound language skills and its semantic-syntactic know-how, the students with engineering background find themselves almost under- prepared for such tests. With this difficulty of students in mind, this course is proposed to make them technically proficient in handling the language skills required in competitive exams. The course would expose students to almost all variety of items, the common run of such tests as CAT, GMAT etc. And in the context of LPG, this cutting edge competence becomes imperative, and no professional education can afford to overlook this aspect.

COURSE CONTENT:

UNIT I

Remedial English: Parts of speech; Gerunds, participles and infinitives; Clauses; Sentence-constructions (unity; avoidance of choppy and rambling sentences, logic and consistency, conciseness, sequencing of ideas); Sentence errors - agreement between verb and subject, pronoun and antecedents, sequence of tenses, problems involving modifiers (dangling and misplaced modifiers); Shifts in point of view - consistency of number and person, tense, mood, voice and subject; Parallelism; Omissions and mixed constructions.

UNIT II

Vocabulary: Methods of building vocabulary - etymological roots, prefixes and suffixes; Commonly used foreign words and phrases; spelling; words often confused; synonyms and homonyms; one word substitutes; verbal idioms.

UNIT III

Punctuation and Mechanics: End Punctuation; Internal Punctuation; Word Punctuation.

UNIT IV

Comprehension: Abstracting; Summarising; Observations, Findings and Conclusions; Illustration and Inductive Logic; Deduction and Analogy.

UNIT V

Presentation: Oral presentation - Extempore, discussion on topics of contemporary relevance, interviews.

SUGGESTED READING:

1. *Working with Words* by R.Gairns and S.Redman, Cambridge University Press, London.
2. *Meanings into Words - Upper Intermediate Students Book*, Doff/jones, Foundation Books (Cambridge university Press), Delhi.
3. *A Practical English Grammar* by A.J. Thomson and A.V. Martinet, OUP, Delhi.
4. *Examine your English* by Margaret M. Maison, Orient Longman, New Delhi.
5. *A Practical Guide to Colloquial Idiom* by W.J. Ball, Longman.
6. *A guide to Correct English* by L.A. Hill, Oxford.
7. *Structural Essentials of English* by H. Whitehall, Longman.
8. *Advanced English Practice* by B.D. Graver, OUP. Delhi.
9. *Public Speaking*, Sudha Publication Pvt. Ltd., New Delhi.
10. *Group Discussion*, Sudha Publication Pvt. Ltd., New Delhi.

SCHEME OF EXAMINATION:

(A) THEORETICAL:

The pattern of the exam would be more or less like the pattern of the competitive exams. (i.e., OBJECTIVE TYPE) like CAT G-MAT etc., as far as the units I, II, III and IV are concerned.

Unit-I, II, III: (30,20,10 Marks respectively)

The first section of the question paper will have 110 objective type questions with no choice at all. These 110(60+40+10) questions will cover all the first three units (I, II, III) of the syllabus and would carry 30,20 and 10 marks respectively. The questions may be in the form of multiple choices, fill-in-the-blank, supply the right word/choice, choose the right alternative, do as directed etc.

Unit-IV: 20 Marks

The question from this unit will test comprehension competence (in the form of various elements mentioned in the unit) of the text given.

(B) PRACTICAL (Presentation):

There will be an oral test carrying **20 marks**. The presentation part of the section i.e. Unit-V will be covered in this test. Hence, there is no need to include this unit in theory exam.

Three hours for a group of 15 students are required for this test. Test can be in the form of any of the activities mentioned in the Unit-V.

A panel of examiners appointed by the University will evaluate the presentation.

Unit-1: Foundation of Information System: Introduction to Information System and MIS, Decision support and decision making systems, systems approach, the systems view of business, MIS organization within company, Management information and the systems approach.

Unit-2: Information Technology: A manager's overview, managerial overviews, computer hardware & software, , DBMS, RDBMS and Telecommunication.

Unit-3: Conceptual system design: Define the problems, set systems objective, establish system constraints, determine information needs determine information sources, develop alternative conceptual design and select one document the system concept, prepare the conceptual design report.

Unit-4: Detailed system design: Inform and involve the organization, aim of detailed design, project management of MIS detailed design , identify dominant and trade of criteria, define the sub systems, sketch the detailed operating sub systems and information flow, determine the degree of automation of each operation, inform and involve the organization again, inputs outputs and processing, early system testing, software, hardware and tools propose an organization to operate the system, document the detailed design revisit the manager user.

Unit-5: Implementation evaluation and maintenance of the MIS: Plan the implementation, acquire floor space and plan space layouts, organize for implementation, develop procedures for implementation, train the operating personnel, computer related acquisitions, develop forms for data collection and information dissemination, develop the files test the system, cut-over, document the system, evaluate the MIS control and maintain the system. Pitfalls in MIS development .

Unit-6: Advanced Concepts in Information Systems: Enterprise Resources Management(ERP), Supply Chain Management, C R M , Procurement Management System.

Text Books:

- Management Information System by W. S. Jawadekar, 2002, Tata McGraw Hill.
- Information System for Modern Management (3rd edition)- Robert G. Murdick, Loel E. Ross & James R. Claggett. PHI

Reference books:

- Management Information System; O Brian; TMH
- Management Information System by Davis Olson Mac Graw Hill
- Management Information System by Stasllings,(Maxwell Mc Millman Publishers)
- Information System; a Management Perspective; Alter Addison Wesley
- Introduction to Information System; McGraw Hill

Note: Eight questions will be set in all by the examiners taking at least one question from each unit. Students will be required to attempt five questions in all.

IC-451-E

INTELLIGENT INSTRUMENTATION

UNIT 1. INTRODUCTION:

Definition of an intelligent instrumentation system; feature of intelligent instrumentation ; components of intelligent instrumentation; Block diagram of an intelligent instrumentation.

UNIT 2. INTERFACING INSTRUMENTS & COMPUTERS:

Basic issue of interfacing; Address decoding; Data transfer control; A/D converter; D/A converter; Other interface consideration.

UNIT 3. INSTRUMENTATION/ COMPUTER NETWORKS:

Serial & parallel interfaces; Serial communication lines; Parallel data bus; IEEE 488bus; Local area networks(LANs) : Star networks, Ring & bus networks, Fiber optic distributed networks, Field bus; Communication Protocols for very large systems: communication network rationalization.

UNIT 4. SOFTWARE FILTERS :

Description of Spike Filter, Low pass filter, High pass filter etc.

TEXT BOOK:

1. Principles of measurement & Instrumentation: Alan S. Moris ; PHI

NOTE: 8 questions are to be set –at least one from each unit. Students have to attempt any five questions.

CSE -303 E

Computer Graphics

Unit-1: Introduction to Computer Graphics: What is Computer Graphics, Computer Graphics Applications, Computer Graphics Hardware and software, Two dimensional Graphics Primitives: Points and Lines, Line drawing algorithms: DDA, Bresenham's; Circle drawing algorithms: Using polar coordinates, Bresenham's circle drawing, mid point circle drawing algorithm; Filled area algorithms: Scanline: Polygon filling algorithm, boundary filled algorithm.

Unit-2: Two/Three Dimensional Viewing: The 2-D viewing pipeline, windows, viewports, window to view port mapping; Clipping: point, clipping line (algorithms):- 4 bit code algorithm, Sutherland-cohen algorithm, parametric line clipping algorithm (Cyrus Beck).

Polygon clipping algorithm: Sutherland-Hodgeman polygon clipping algorithm. Two dimensional transformations: transformations, translation, scaling, rotation, reflection, composite transformation.

Three dimensional transformations: Three dimensional graphics concept, Matrix representation of 3-D Transformations, Composition of 3-D transformation.

Unit-3: Viewing in 3D: Projections, types of projections, the mathematics of planner geometric projections, coordinate systems.

Unit-4: Hidden surface removal: Introduction to hidden surface removal. The Z- buffer algorithm, scanline algorithm, area sub-division algorithm.

Unit-5: Representing Curves and Surfaces: Parametric representation of curves: Bezier curves, B-Spline curves. Parametric representation of surfaces; Interpolation method.

Unit-6: Illumination, shading, image manipulation: Illumination models, shading models for polygons, shadows, transparency. What is an image? Filtering, image processing, geometric transformation of images.

Text Books:

- Computer Graphics Principles and Practices second edition by James D. Foley, Andeies van Dam, Stevan K. Feiner and Johb F. Hughes, 2000, Addison Wesley.
- Computer Graphics by Donald Hearn and M.Pauline Baker, 2nd Edition, 1999, PHI

Reference Books:

- Procedural Elements for Computer Graphics – David F. Rogers, 2001, T.M.H Second Edition
- Fundamentals of 3Dimensional Computer Graphics by Alan Watt, 1999, Addison Wesley.
- Computer Graphics: Secrets and Solutions by Corrign John, BPB
- Graphics, GUI, Games & Multimedia Projects in C by Pilaiania & Mahendra, Standard Publ.
- Computer Graphics Secrets and solutions by Corrign John, 1994, BPV
- Introduction to Computer Graphics By N. Krishanmurthy T.M.H 2002

Note: Eight questions will be set in all by the examiners taking at least one question from each unit. Students will be required to attempt five questions in all.

IC-403-E

EMBEDDED SYSTEMS DESIGN

UNIT 1 : INTRODUCTION:

Different types of microcontrollers: Embedded microcontrollers, External memory microcontrollers; Processor Architectures: Harvard V/S Princeton , CISC V/S RISC; microcontrollers memory types; microcontrollers features : clocking, i/o pins, interrupts, timers, peripherals.

UNIT 2 : MICROCONTROLLER ARCHITECTURE:

Introduction to PIC microcontrollers, Architecture and pipelining, program memory considerations, Addressing modes, CPU registers, Instruction set, simple operations.

UNIT 3 : INTERRUPTS AND I/O PORTS:

Interrupt logic, Timer2 scalar initialization, IntService Interrupt service routine, loop time subroutine, External interrupts and timers, Synchronous serial port module, Serial peripheral device, O/p port Expansion, I/p port expansion, UART.

UNIT 4 : SOFTWARE:

Development tools/ environments, Assembly language programming style, Interpreters, High level languages, Intel hex format object files, Debugging.

UNIT 5 : PROGRAMMING WITH MICROCONTROLLERS:

Arithmetic operations, Bit addressing, Loop control, Stack operation, Subroutines, RAM direct addressing, state machines, Oscillators, Timer Interrupts, Memory mapped I/O.

UNIT 6 : DESIGNING USING MICROCONTROLLERS:

Music box, Mouse wheel turning, PWM motor control, Aircraft Demonstration, ultra sonic distance measuring, Temperature Sensor, Pressure Sensor, Magnetic Field Sensor.

TEXT BOOK:

1. Design with PIC Microcontrollers by John B. Peatman , Pearson.

REFERENCE BOOKS :

1. Programming and Customizing the 8051 Microcontroller : Predko ; TMH.

2. Designing Embedded Hardware : John Catsoulis ;SHROFF PUB. & DISTR. ND.
3. Programming Embedded Systems in C and C++ : Michael Barr; SHROFF PUB. & DISTR. ND.

HUM-455-E

ENTREPRENEURSHIP

UNIT-I : Promotion of Entrepreneurship

Meaning, definition and functions of an entrepreneur, qualities of a good entrepreneur; Role of Entrepreneur in economic development; Government measures for the promotion of small scale industries with special reference to Haryana; Cultural factors in developing entrepreneurship.

UNIT-II : Ownership and Location of Industrial Units

Different forms of Industrial Organisation.
Theories of Industrial location. Process of preparing project reports.

UNIT-III : Size of Firm and Pricing

Concept of optimum firm, factors determining
Optimum size. Technical, Managerial, Marketing Uncertainties and risk.
Pricing Methods, Policies and procedures.

UNIT-IV : Financing of Small Industries

Importance and need : Commercial Banks and term lending in India; Banks and under-writing of capital issues; Brief description about the role of other financial agencies viz; Industrial Finance Corporation of India. State Financial Corporation, Industrial Development Bank of India; Unit Trust of India.

UNIT-V : Problems Faced by Small Enterprises

Problems connected with Marketing, Management of New Products; Power; Finance; Raw Material; Under-utilization of capacity; Causes of under – utilization; Rehabilitation of Sick Mills.

UNIT-VI : Government and Business

- (a) Highlights of Industrial Policy and Licensing Policy.
- (b) International Marketing with special reference to export documentation.

Recommended Books :

1. Entrepreneurship of Small Scale Industries – Deshpande Manohar D. (Asian Publishers, New Delhi)
2. Environment and Entrepreneur – Tandon B.C. (Asian Publishers, New Delhi).
3. The Industrial Economy of India – Kuchhal S.C. (Chaitanya, Allahabad).
4. Emerging Trends in Entrepreneurship Development Theories & Practices – Singh P.Narendra (International Founder, New Delhi)
5. Entrepreneur, Banker & Small Scale Industries – Bhattacharya Hrisnikes.
6. Entrepreneurship & Growth of Enterprise in Industrial Estates – Rao Gangadhara N.

NOTE: Eight questions are to be set atleast one question from each unit and the students will have to attempt five questions in all.

Unit-I :

Permutations and combinations, Recurrence relations, Generating functions, decision trees.

Unit-II :

Graphs, incidence and degree, isomorphism, subgraphs, walks, paths and circuits, connected graphs, Disconnected graphs and component Euler's graph, operations on graphs, Hamiltonian paths and circuits, Travelling salesman problem.

Unit-III :

Trees, properties of trees, Pendant vertices in tree, Rooted and binary trees, Spanning trees, Fundamental circuits, Spanning trees in a weighted graph.

Unit-IV :

Cut-sets, properties of cut-sets, Fundamental circuits and cut-sets, connectivity and separability, Network flows, 1-isomorphism and 2-isomorphism.

Unit-V :

Planer graphs, Kuratowski's two graphs, different representation of a planer graph, Detection of planarity, vector space of graph.

Unit-VI :

Matrix representation of graphs, incidence matrix, submatrix of incidence matrix, Fundamental circuit matrix, cut-set matrix and relationship between all three above.

Unit-VII :

Colouring, chromatic number, chromatic polynomials, four color problem, Five color theorem.

Unit-VIII :

Directed graphs and their types, Binary relation, Directed paths and connectedness, Euler's digraph.

Books Recommended :

1. Graph Theory by Narsingh Deo, P.H.I.
2. Graph Theory by Harry P., Addison-Wesley.

Note : Examiner will set eight questions, taking one from each unit. Students will be required to attempt any five questions.

Oral communication forms the major chunk of social and professional interaction. It is not only the 'what' but the 'how' of knowledge communication that assumes utmost importance once the professional students enter the job market. S/he has to be well-versed with the nuances and complexities, not only of every day oral interaction but also with the situation based oral competence. This course is designed with this need of the professional students in mind. It is also helpful to those students who appear for TOEFL and IELTS.

COURSE CONTENT:**Unit I**

Oral Communication: Basic concepts, scope and significance.

UNIT II

Fundamental of Spoken English: Essentials of Good Speaking; Dialogues, Public Speaking and Formal Presentations.

Unit III

Listening Skills: Essentials of good listening; Listening for various purposes.

Unit IV

Reading Skills: Basic concepts; Reading for various purposes; Reading print and visual texts (Advertisements, Documentaries, Fiction/non-fiction, Movies).

UNIT V

Body language and Paralanguage: Gestures, postures, facial expressions, tone, pitch, rhythm etc.

UNIT VI:

Oral Skills for Specific Situations: Interviews, Meetings and Group Discussion.

SUGGESTED READING:

1. *Body Language* Sudha Publications pvt. Ltd., Delhi.
2. *Body Language at Work* by A. Furnham, University Press (India) Limited, Hyderabad.
3. *Listening Skills* by I. MacKay, University Press (India) Limited, Hyderabad.
4. *Presentation Skills* by S. Siddons, University Press (India) Limited, Hyderabad.
5. *Effective Presentation* by A. Jay and R. Jay, University Press (India) Limited, Hyderabad.
6. *Reading Between the Lines* by McRae, Foundation Books (Cambridge University Press), New Delhi.
7. *Better English Pronunciation* by J.D.O.'Connor, Cambridge Univ. Press., London.
8. *Cambridge practice Tests for IELTS 1 Book with 2 Cassettes* by Jakeman, Foundation Books (Cambridge University Press), New Delhi.
9. *Cambridge Preparation for the TOEFL Test* by Gear, Foundation Books (Cambridge University Press), New Delhi.
10. *Group Discussions/Interviews at a Glance*, Sudha Publications pvt. Ltd., Delhi

SCHEME OF EXAMINATION:

(A) THEORETICAL: 60 marks

There will be five questions of 20 marks each covering all the units **except unit V**. The students are required to attempt any three questions. The questions may be set on the theory part of the elements from the units or students may be given some mock situations to be worked on. For the unit on Reading Skills, they may be given a manageable short text to be reviewed, summarised or to be analysed.

(B) PRACTICAL: 40 Marks

There will be an oral test to evaluate the spoken skills of the students. Besides evaluating clarity, fluency and spontaneity of the language, this test will look for how well the components of body language and para-language are integrated with the linguistic means. The students may be evaluated through presentation/mock-meeting or Group Discussion. Also they can be asked to face interviews in mock Situations. The time duration for this exam for every batch of 15 students will be of 3 hrs.

A panel of examiners appointed by the University will evaluate the oral competence of the students.

MATH-455-E

LINEAR ALGEBRA

Unit-I & II :

Sets and examples of sets, operations on sets, relations, functions, binary operations, algebraic structures, operations on functions.

Unit-III & IV :

Vector spaces and their examples, subspaces, span of a set, linear dependence, linear independence, dimension and basis.

Unit-V :

Definition and examples of a linear transformation, range and kernel of a linear map, rank and nullity.

Unit-VI :

Inverse of a linear transformation, consequences of Rank nullity theorem, space $L(U,V)$, composition of linear maps, operator equations.

Unit-VII :

Matrix associated with a linear map, linear map associated with a matrix, linear operations in $M_{m,n}$ matrix multiplication, rank and nullity of a matrix.

Unit-VIII :

Transpose of a matrix and special types of matrices, elementary row operations, system of linear equations, matrix inversion.

Books Recommended :

1. An Introduction to Linear algebra by V. Krishnamurti et.al

(EWP).

2. Linear Algebra by Hoffman & Kunze (PHI).

Note : Examiner will set eight questions, taking one from each unit. Students will be required to attempt any five questions.

PHY-451-E NON CONVENTIONAL ENERGY & CONVERSION TECHNOLOGY

ENERGY SITUATION AND RENEWABLE ENERGY SOURCES :

Global energy scene, Indian Energy scene, Non Conventional renewable energy sources, potential of renewable energy sources.

SOLAR THERMAL POWER GENERATION :

Thermal and direct electricity generation, Major Sub systems of solar-thermal power plants, examples of installed systems, Concentration ratio, temperature and efficiency, Solar farm concept.

PHOTOVOLTAIC ENERGY CONVERSION :

Introduction, Fundamentals, Solar Cell Modules, Silicon Solar Cells, Copper Sulphide/Cadmium Sulphide Solar Cells, other materials.

WIND ENERGY :

Introduction, Origin of wind and general circulation system of earth, variables in wind energy system, wind turbine efficiency, power of a wind turbine for given incoming wind velocity.

HYDROGEN ENERGY :

Introduction, Applications of Hydrogen, production of hydrogen, storage & its utilization.

WAVE, TIDAL & OTEC :

Introduction, wave energy, Tidal energy, Ocean thermal energy conversion (OTEC).

ENERGY STRATEGIES :

Energy Management and energy conversion measures.

RECOMMENDED BOOKS :

1. Renewable energy sources & conversion technology - N.K. Bansal, M.Kleemann & Melis.
2. Energy Technology - S.Rao & B.B. Panenlekar.

Note : Eight questions will be set and students will be required to attempt any five questions in all. All questions will carry equal marks.

HUM-457-E

ORGANISATIONAL BEHAVIOUR & HUMAN RESOURCE MANAGEMENT

Unit-I : Understanding Organisational Behaviour

Definition, Goals of Organisational behaviour. Key forces affecting Organisational Behaviour. Fundamental Concepts of Organisational Behaviour.

Unit-II : Motivation

Meaning, Objectives and importance of motivation. Theories of Motivation, Maslow's theory, McGregor's Theory Herzberg's theory.

Morale : Meaning; Factors affecting morale, types of morale morale and productivity, Evaluation of morale, improving morale.

Unit-III : Communication

Definition & importance of Communication; Formal & informal communication, Barriers in communication.

Unit-IV : Leadership

Definition & importance, Nature of leadership various approaches to leadership styles.

Unit-V

Importance of human resources in industry, Definition of human resource management, mechanical approach towards personnel, Paternalism, Social system approach.

Unit-VI

Need for human resource planning, process of human resource planning, Methods of recruitment, Psychological tests and interviewing, Meaning and importance of placement, Meaning and techniques of induction. Training and development : Concepts of training and development, Importance of training and development, Management development its nature, purpose and method.

Unit-VII

Significant factors affecting compensation, Methods of wage payment, Wage differentials, Causes of difference in Wages, Types of wage differentials, Wage incentives, Meaning, Objectives, types of incentive plans.

Recommended Books :

Text Books :

1. Human Resource and Personnel Management - K. Aswathappa - Tata McGraw Hill Publishing Company Ltd.
2. Personnel Management : C.B. Mamoria, Himalaya Publishing House.
3. Organisational Behaviour - Dr. L.M. Prasad (Sultan Chand & Sons).

Reference Books :

1. Personnel Management & Industrial Relations : Dr. T.N. Bhagoliwal : Sahitya Bhawan Agra.
2. Personnel Management : V.G. Karnik, Jaico Publishing House.
3. Personnel management & Industrial Relation: Tripathi: Sultan Chand & Sons.
4. Personnel Management - Arun Monappa & Mirza Saiyadain - Tata McGraw Hill Publishing Co. Ltd.
5. Personnel Management and Industrial Relations - D.C. Sharma & R.C. Sharma S.J. Publications.
6. Principles of Personnel Management - Edwin B. Flippo (McGraw Hill).
7. Organisational Behaviour - K. Adwathappa.
8. Organizational Behaviour - John W. Newsstorn & Keith Davis, Tata McGraw - Hill Publishing Company Limited, New Delhi.

Note: Eight questions are to be set at least one question from each unit and the students will have to attempt five questions in all.

ELECTIVES-II

MATH-402-E

OPERATIONS RESEARCH

Unit-I :

The origin of OR, Phases of an O.R. study, Impact of OR, Formulation of Linear-programming model, Graphical solution. Converting the linear programming problem to standard form, Simplex method.

Unit-II :

Big-M method, Two-Phase method, Degeneracy, Alternate optima, unbounded and infeasible solution.

Unit-III :

Definition of the dual problem, primal-dual relationship, Dual Simplex method, Postoptimal and sensitivity analysis.

Unit-IV & V :

Assignment problem and its mathematical formulation, solution of assignment problem (Hungarian method), Transportation problem and its mathematical formulation, Initial basic feasible solution of transportation problem by North-West corner rule, Lowest-Cost Entry method and Vogel's Approximation method, Optimal solution of transportation problem.

Unit-VI :

Network models, Minimal spanning tree algorithm, Shortest-route problem (Floyd's Algorithm and Dijkstras algorithm), Maximal flow problem, Introduction to CPM & PERT.

Unit-VII :

Introduction to Dynamic Programming, General inventory Model, Static Economic Order Quantity (EOQ) Models.

Unit-VIII :

Elements of a Queuing model, Pure Birth & Death model, Generalized Poisson Queuing model, Specialized Poisson Queues.

Books Recommended :

1. Operations Research by Hamdy A. Taha.
2. Introduction to Operations Research by Hiller and Dieherman, TMH.
3. Optimization Theory and Application : S.S. Rao, John Wiley.

Note : Examiner will set eight questions, taking one from each unit. Students will be required to attempt any five questions.

IC-404-E

FUZZY CONTROL SYSTEM

UNIT 1 INTRODUCTION:

Fuzzy control from an industrial perspective, knowledge-based controllers, knowledge representation in KBC's.

UNIT 2 THE MATHEMATICS OF FUZZY CONTROL:

Vagueness, fuzzy logic versus probability theory, fuzzy sets, their properties & operations on fuzzy sets, fuzzy relations & operations on fuzzy relations, the Extension Principle, Fuzzy propositions, The Compositional Rule of Inference, Different implications, Representing a set of rules.

UNIT 3 FKBC DESIGN PARAMETERS:

The PKBC architecture, choice of variables & content of rules, Derivation of rules, choice of membership functions, choice of scaling factors, choice of fuzzification procedure, choice of defuzzification procedure, comparison and evaluation of defuzzification methods.

UNIT 4 NONLINEAR FUZZY CONTROL:

The Control Problem, The FKBC as a Non-Linear Transfer Element, Types of FKBC such as PID-like FKBC, Sliding Mode FKBC, Sugeno FKBC.

UNIT 5 ADAPTIVE FUZZY CONTROL:

Design & Performance Evaluation, Approaches to Design such as membership function tuning using gradient descent, membership function tuning using performance criteria, the self-organizing controller, model based controller.

UNIT 6 STABILITY OF FUZZY CONTROL SYSTEMS:

The State space approach, Stability and robustness indices, input-output stability, circle criterion, the conicity criterion.

TEXT BOOK:

An Introduction to Fuzzy Control: D.,Driankov, H.Hellendoorn and M.Reinfrank.; Narosa.

REFERENCE BOOKS:

Fuzzy Control Systems : Abraham Kandel and Gideon Imngholz; Narosa

NOTE : Eight question are to be set at least one from each unit. Students have to attempt five questions in all.

ME- 484 E ROBOTICS ENGINEERING

- Unit I** Robotic Manipulation: Automation and Robots; Robot Classification – Drive Technologies, Work-Envelope Geometries, Motion Control Methods, Applications; Robot Specifications – No. of Axes, Capacity and Speed, Reach and Stroke, Tool Orientation, Repeatability, Precision, Accuracy, Operating Environment, An Example; Rhino X-3.
- Unit II** Direct Kinematics: The Arm Equation Homogenous Co-ordinates – Frames, Translations and Rotations, Composite Homogenous Transformations; Screw Transformations; Link Co-ordinates; The Arm Equation; A Five-Axis Articulated Robot; A Four-Axis Scara Robot; A Six-Axis Articulated Robot; Problems.
- Unit III** Inverse Kinematics: Solving the Arm Equation: The Inverse Kinematics Problem; General Properties of Solutions; Tool Configuration; Inverse Kinematics of a Five-Axis Articulated Robot, Four-Axis Scara Robot, Six-Axis Articulated Robot and Three-Axis Planer Articulated Robot; A Robotic Work Cell; Problems.
- Unit IV** Work Space Analysis and Trajectory Planning : Work Space Analysis; Work Envelope of a Five-Axis Articulated Robot; Work Envelope of a Four Axis Scara Robot; Work Space Fixtures; The Pick and Place Operation; Continuous Path Motion; Interpolated Motion; Straight Line Motion; Problems.
- Unit V** Differential Motion and Statics : The Tool Configuration Jacobian Matrix; Joint – Space Singularity; Generalised Inverses; Resolved – Motion Rate Control; $n > 6$; Rate Control of Redundant Robots : $n > 6$; Rate Control using (1) – Inverses; The Manipulator Jacobian; Induced Joint Torques and Forces; Problems.
- Unit VI** Manipulator Dynamics : Lagrange's Equation; Kinetic & Potential Energy; Generalised Force; Lagrange – Euler Dynamic Model; Dynamic Models of a Two-Axis Planer Articulated Robot and A Three-Axis SCARA Robot; Direct & Inverse Dynamics; Recursive Newton - Euler Formulation; Dynamic Model of a One-Axis Robot; Problems.
- Unit VII** Robot Control : The Control Problems; State Equations; Constant Solutions; Linear Feedback Systems; Single-Axis PID Control; PD-Gravity Control; Computed –Torque Control; Variable-structure Control; Impedance Control; Problems.

Text Books:

1. Fundamental of Robotics (Analysis & Control) by Robert J.Schilling, Published by PHI, Pvt. Ltd., New Delhi.

2. Introduction to Robotics (Mechanics & Control) by John J. Craig, Published by Addition Wesley (Intl. Student Edition).

Reference Books:

1. Analytical Robotics & Mechatronics by Wolfram Stadler, Published by Mc-Graw Hill, Inc., New Delhi.
2. Industrial Robotics - Technology, Programming & Applications by Mikell P. Grover, Weiss, Nagel and Ordef , Published by Mc-Graw Hill International Edition.
3. A Robot Engg. Test Book - Mohsen Shahinpoor, Harper & Low, Publishing New York.
4. Robotic Engineering – An Integrated Approach : Richard D.Klafter, Thomas A. Chmielewski and Michael Negin PHI 1989.
5. Foundations of Robotics Analysis and Control - Tsuneo Yashikawa MIT Press 1990, Indian Reprint 1998.
6. Robots and Control - R.K.Mittal and I.J.Nagrath - Tata McGraw Hill 2003.

Note: In the semester examination, the examiner will set eight questions, at least one question from each unit. The students will be required to attempt only 5 questions.

CSE-304 E

Intelligent Systems

Unit-1: Foundational issues in intelligent systems: Foundation and history of AI, AI problems and techniques – AI programming languages, introduction to LISP and PROLOG- problem spaces and searches, blind search strategies, Breadth first- Depth first- heuristic search techniques Hill climbing: best first- A * algorithm AO* algorithm- game tree, Min max algorithms, game playing- alpha beta pruning.

Unit-2: Knowledge representation issues, predicate logic- logic programming, semantic nets- frames and inheritance, constraint propagation, representing knowledge using rules, rules based deduction systems.

Unit-3: Reasoning under uncertainty, review of probability, Baye's probabilistic interferences and Dempster shafer theory, Heuristic methods, symbolic reasoning under uncertainty, Statistical reasoning, Fuzzy reasoning, Temporal reasoning, Non monotonic reasoning.

Unit-4: Planning, planning in situational calculus, representation for planning, partial order planning algorithm, learning from examples, discovery as learning, Learning by analogy, explanation based learning, neural nets, genetic algorithms.

Unit-5: Principles of Natural language processing, rule based systems architecture, Expert systems, knowledge acquisition concepts, AI application to robotics, and current trends in intelligent systems.

Text Book:

- Artificial Intelligence: A Modern Approach,. Russell & Norvig. 1995, Prentice Hall.

Reference Books:

- Artificial Intelligence, Elaine Rich and Kevin Knight, 1991, TMH.
- Artificial Intelligence-A modern approach, Stuart Russel and Peter Norvig, 1998, PHI.
- Artificial intelligence, Patrick Henry Winston., 1992, Addison Wesley 3rd Ed.,

Note: Eight questions will be set in all by the examiners taking at least one question from each unit. Students will be required to attempt five questions in all.

PHY-452-E

LASER TECHNOLOGY

Conditions for Producing Laser, Concept of coherence - Spatial and temporal, Population Inversions, Einstein coefficient, Gain and Gain saturation, Saturation intensity, Development and Growth of a Laser Beam, Exponential Growth factor, Threshold Requirement for a Laser.

Inversions and two-level systems, steady-state inversions and three and four-level systems. Transient Population Inversions, Factors effecting population inversion, Laser Amplifiers.

Excitation or Pumping Threshold Requirements, Pumping Pathways, Specific Excitation Parameters Associated with Optical and particle Pumping.

Helium-Neon Laser, Co_2 Laser, Ruby Laser, Semiconductor Diode Laser.

RECOMMENDED BOOKS:

1. Laser Fundamentals by William T. Silfvast Cambridge University, Press.
2. Introductory University Optics by John Beynon, (PHI)
3. Laser - B.B. Laud.
4. Optics - A.K. Ghatak (TMH)

Note : Eight questions will be set and students will be required to attempt any five questions in all. All questions will carry equal marks.

CSE-202 E

Database Management Systems

Unit-1:Introduction Overview of database Management System; Various views of data, data Models, Introduction to Database Languages. Advantages of DBMS over file processing systems, Responsibility of Database Administrator,

Unit-2: Introduction to Client/Server architecture, Three levels architecture of Database Systems, E-R Diagram (Entity Relationship), mapping Constraints, Keys, Reduction of E-R diagram into tables.

Unit-3: File Organisation: Sequential Files, index sequential files, direct files, Hashing, B-trees Index files.

Unit-4: Relational Model, Relational Algebra & various operations, Relational and Tuple calculus.

Unit-5: Introduction to Query Languages :QLB , QBE, Structured query language – with special reference of (SQL of ORACLE), integrity constraints, functional dependencies & NORMALISATION – (up to 4th Normal forms), BCNF (Boyce – code normal forms)

Unit-6: Introduction to Distributed Data processing, parallel Databases, data mining & data warehousing, network model & hierarchical model, Introduction to Concurrency control and Recovery systems.

Text Books:

- Database System Concepts by A. Silberschatz, H.F. Korth and S. Sudarshan, 3rd edition, 1997, McGraw-Hill, International Edition.
- Introduction to Database Management system by Bipin Desai, 1991, Galgotia Pub.

Reference Books:

- Fundamentals of Database Systems by R. Elmasri and S.B. Navathe, 3rd edition, 2000, Addison-Wesley, Low Priced Edition.
- An Introduction to Database Systems by C.J. Date, 7th edition, Addison-Wesley, Low Priced Edition, 2000.
- Database Management and Design by G.W. Hansen and J.V. Hansen, 2nd edition, 1999, Prentice-Hall of India, Eastern Economy Edition.
- Database Management Systems by A.K. Majumdar and P. Bhattacharyya, 5th edition, 1999, Tata McGraw-Hill Publishing.

- A Guide to the SQL Standard, Date, C. and Darwen, H. 3rd edition, Reading, MA: 1994, Addison-Wesley.
- Data Management & file Structure by Looms, 1989, PHI

Note: Eight questions will be set in all by the examiners taking at least one question from each unit. Students will be required to attempt five questions in all.

CSE-302 E

Principles of Software Engineering

Unit-1: Introduction: The process, software products, emergence of software engineering, evolving role of software, software life cycle models, Software Characteristics, Applications, Software crisis.

Unit-2 : Software project management: Project management concepts, software process and project metrics Project planning, project size estimation metrics, project estimation Techniques, empirical estimation techniques, COCOMO- A Heuristic estimation techniques, staffing level estimation, team structures, staffing, risk analysis and management, project scheduling and tracking.

Unit-3 : Requirements Analysis and specification requirements engineering, system modeling and simulation Analysis principles modeling, partitioning Software, prototyping: , Prototyping methods and tools; Specification principles, Representation, the software requirements specification and reviews Analysis Modeling: Data Modeling, Functional modeling and information flow: Data flow diagrams, Behavioral Modeling; The mechanics of structured analysis: Creating entity/ relationship diagram, data flow model, control flow model, the control and process specification; The data dictionary; Other classical analysis methods.

Unit-4: System Design: Design concepts and principles: the design process: Design and software quality, design principles; Design concepts: Abstraction, refinement, modularity, software architecture, control hierarchy, structural partitioning, data structure, software procedure, information hiding; Effective modular design: Functional independence, Cohesion, Coupling; Design Heuristics for effective modularity; The design model; Design documentation.

Architectural Design: Software architecture, Data Design: Data modeling, data structures, databases and the data warehouse, Analyzing alternative Architectural Designs ,architectural complexity; Mapping requirements into a software architecture; Transform flow, Transaction flow; Transform mapping: Refining the architectural design.

Unit-5 : Testing and maintenance: Software Testing Techniques, software testing fundamentals: objectives, principles, testability; Test case design, white box testing, basis path testing: Control structure testing: Black box testing, testing for specialized environments ,architectures and applications. Software Testing Strategies: Verification and validation, Unit testing, Integration testing,; Validation testing, alpha and beta testing; System testing: Recovery testing, security testing, stress testing, performance testing; The art of debugging, the debugging process debugging approaches. Software re-engineering , reverse engineering ,restructuring, forward engineering.

Unit-6 : Software Reliability and Quality Assurance : Quality concepts, Software quality assurance , SQA activities; Software reviews: cost impact of software defects, defect amplification and removal; formal technical reviews: The review meeting, review reporting and record keeping, review guidelines; Formal approaches to SQA; Statistical software quality assurance; software reliability: Measures of reliability and availability ,The ISO 9000 Quality standards: The ISO approach to quality assurance systems, The ISO 9001 standard, Software Configuration Management.

Unit-7: Computer Aided software Engineering: CASE, building blocks, integrated case environments and architecture, repository.

Text Book:

- Software Engineering – A Practitioner’s Approach, Roger S. Pressman, 1996, MGH.

Reference Books:

- Fundamentals of software Engineering, Rajib Mall, PHI
- Software Engineering by Ian Sommerville, Pearson Edu, 5th edition, 1999, AW,
- Software Engineering – David Gustafson, 2002, T.M.H
- Software Engineering Fundamentals Oxford University, Ali Behforooz and Frederick J. Hudson 1995 JW&S,
- An Integrated Approach to software engineering by Pankaj Jalote, 1991 Narosa,

Note: Eight questions will be set in all by the examiners taking at least one question from each unit. Students will be required to attempt five questions in all.

HUM-452-E

**BUSINESS COMMUNICATION
SEMESTER VIII (ELECTIVE)**

The course proposes to help students develop business and technical communication competence. It focuses on writing skills and strategies for specific purposes. The inevitability of introducing this course to Engineering students is embodied in that it has comparatively a high concentration of certain complex writing techniques and procedures.

COURSE CONTENT:

Unit-I

Business correspondence: Characteristics and Formats of Business letter; Quotations, Orders, Tenders, Sales letters, claim and adjustment letters, Credit and Collection letters, Application Letters for vacant situations with emphasis on Resumes and Curriculum Vitae; E-mail and Netiquette - format, style and tone.

Unit-II

Business Reports and Proposals: Importance, Function, Pattern and formats of Reports, Typical Business Reports, Report Organisation and Presentation, and Formal Reports; Proposal Formats, Writing problem-Solving Proposals, Executive Summary Proposals and project Proposals.

Unit-III

Meetings: Writing of Memorandum, Notes, Agenda and Minutes of Meeting.

Unit-IV

Public Relations and Advertising Documents: Press Releases, Public Service Announcements, Advertising Strategy and its objective, Designing of Classified and Display Advertising copies.

SUGGESTED READING:

1. *Business Communication: Process & Product* by Hary Ellen Guffey, IV Edition, South-Western College Publishing, Cincinnati.

2. *Business Correspondence and Report Writing* by R.C. Sharma & Krishna Mohan, Tata Macgraw Hill Publication, New Delhi.
3. *Effective Business English and Correspondence* by M.S. Ramesh and C.C. Pattanshetti, R. Chand & Co., New Delhi.
4. *Effective Letters in Business by Robert* by C. Shrueter, Tata Macgraw Hill, New Delhi.

5. *English Business Letters* by F.W. Wing & D. Anncrey, Orient Longman.
6. *Written Communication in English* by Sarah Freeman, Orient Longman.
7. *International Business English* by Leo Jones & Richard Alexander, Cambridge University Press.
8. *General and Business English* by Sweet Stephen, Sir Issac Pitman & Sons Ltd., London.
9. *How to Write and Present Technical Information*, Charles H. Sides, Cambridge University Press, U.K.
10. *Strategies for Engineering communication*, Susan Stevenson/Steve Whitmore, John Wiley and Sons, Inc. Printed in India by Replika Press Pvt. Ltd., Delhi.

SCHEME OF EXAMINATION:

There will be six questions in all, covering all the units. All questions will be compulsory and will have enough internal choice.

Unit-I: 30 Marks

There will be two questions from this unit. One question will cover the theoretical aspect of business letter writing and will carry 10 marks. The other question will be on writing the letter in a proper format on a subject given and will be of 20 marks. There will be enough choice taking care of the justice to be given to both the aspects of the letter writing.

Unit-II: 35 Marks

There will be two questions from this unit. One question will cover the theoretical aspect of report/proposal writing and will carry 15 marks. The other question will be on preparing the report/proposal on a topic/subject given and will be of 20 marks. There will be enough choice taking care of the justice to be given to both the aspects of the report writing.

Unit-III: 15 Marks

There will be a question on theoretical aspects of the various items of this unit or students can be asked to draft a specimen of any of these from the material given in the exam. The question can be split into parts.

Unit-IV: 20 Marks

There will be one question having two parts. One part will be on theory and will be of 5marks and the other will require the drafting an advertisement copy of a product or service or a public announcement and will carry 15 marks.

HUM-454-E

INDIAN ENGLISH WRITING

Technological skills, devoid of human values, tend to turn professionals into mere automatons. It is imperative to sensitise them to social and human values.

This course, through formal exposure to literature, aims at achieving this much-needed holistic balance.

COURSE CONTENT:

English August by Upamanyu Chatterjee
Seven Steps in the Sky by Kundanika Kapaadia
Fire and Rain by Girish Karnard
Countdown by Amitav Ghosh

TEXTS BOOKS:

1. *English August* by Upamanyu Chatterjee, Penguin Books, Delhi/Faber&Faber, Delhi.
2. *Seven Steps in the Sky* by Kundanika Kapaadia, Penguin Books, Delhi.
3. *Fire and Rain* by Girish Karnard, OUP, Delhi.
4. *Countdown* by Amitav Ghosh, Ravi Dayal, Delhi.

SCHEME OF EXAMINATION:

The students will be required to attempt five questions in all. All questions will carry equal marks. Question no 1 will be compulsory. It will have four 'reference to context' type questions covering all the texts. Here students' first hand reading of the texts will be tested.

Besides the first, there will be eight more questions (covering all the four texts) out of which the students will be required to attempt any four, choosing at least one question from each text. The questions will be so framed as to evaluate the knowledge of the text for various social, political, cultural and human issues from readers' point of view. No question will be based on literary theory.

ELECTIVES-III

EE- 462-E GENETIC ALGORITHMS & APPLICATIONS

1. **Introduction:** Overview, History of evolutionary computation: Search spaces & fitness landscapes, elements of genetic algorithms, comparison of Gas and tradition search methods.
2. **Fundamental Concepts of Gas:** Typical examples to illustrate how Gas work. Simple computer exercises.
3. **Problem Solving Using Gas:** Evolving computer programs, data analysis & prediction, evolving neural networks, simple computer exercises.
4. **Implementation of Gas:** Suitability of GA for typical problems, encoding a problem for a GA, adapting the encoding, selection methods, Genetic operators, Parameters for Gas.

Text Books: 1. Davis L,"Handbook of Genetic Algorithms
2. Goldberg D.E.,"Genetic Algorithms in Search optimization & Machine Learning."
3. Michalewicz, Z.,"Genetic Algorithms & Data Structures = Evolution Programs

Note: 8 questions are to be set –at least one from each unit. Students have to attempt any five questions in all .

Unit-1: Introduction to the Internet, The world wide web: The idea of hypertext and hyper media; How the web works-HTTP, HTML and URLs; How the browser works-MIME types, plugins and helper applications; The standards-HTML, XML, XHTML and the W3C.

Hypertext markup language: The anatomy of an HTML document; Marking up for structure and style: basic page markup, absolute and relative links, ordered and unordered lists, embedding images and controlling appearance, table creation and use, frames, nesting and targeting.

Descriptive markup: Meta tags for common tasks, semantic tags for aiding search, the doubling code and RDF.

Unit-2: Separating style from structure with style sheets: Internal style specifications within HTML, External linked style specification using CSS, page and site design considerations.

Client side programming: Introduction to the JavaScript syntax, the JavaScript object model, Event handling, Output in JavaScript, Forms handling, miscellaneous topics such as cookies, hidden fields, and images; Applications.

Unit-3: Server side programming: Introduction to Server Side Technologies CGI/ASP/JSP., Programming languages for server Side Scripting, Configuring the server to support CGI, applications; Input/ output operations on the WWW, Forms processing, (using PERL/VBSCRIPT/JavaSCRIPT)

Unit-4: Other dynamic content technologies: introduction to ASP & JSP, Delivering multimedia over web pages, The VRML idea, The Java phenomenon-applets and servelets, issues and web development.

Unit-5: Introduction to Microsoft .NET Technology and its comparison with the competing Technologies.

Text books:

- Beginning XHTML by Frank Boumpery, Cassandra Greer, Dave Raggett, Jenny Raggett, Sebastian Schnitzenbaumer & ted Wugofski, 2000, WROX press (Indian Shroff Publ. SPD) 1st edition

- HTML & XHTML: The Definitive Guide by Chuck Musciano, Bill Kennedy, 2000, 4th Edi.

Reference books:

- XHTML Black Book by Steven Holzner, 2000
- CGI Programming on the World Wide Web. O'Reilly Associates.
- Web Technologies By Achyut S Godbole , Atul Kahate, 2003, T.M.H
- Scott Guelich, Shishir Gundararam, Gunther Birzniek; CGI Programing with Perl 2/e O'Reilly.
- Doug Tidwell, James Snell, Pavel Kulchenko; Programing Web services, O'Reilly.
- Intranets by James D.Cimino, 1997, Jaico Publ.
- Internet and Web Technologies – Raj Kamal, 2002, T.M.H

Note: Eight questions will be set in all by the examiners taking at least one question from each unit. Students will be required to attempt five questions in all.

UNIT1. INTRODUCTION :

Role of power electronics, review of construction and characteristics of power diode, Shottky diode, power transistor, power MOSFET, SCR, DIAC, Triac, GTO, IGBT & SIT.

UNIT2. SCR:

Ratings and protections, series and parallel connections, R, RC and UJT firing circuit and other firing circuits based on ICs and microprocessors; pulse transformer and opto-coupler, commutation techniques.

UNIT3. AC REGULATORS:

Types of regulator, equation of load current, calculation of extinction angle, output voltage equation, harmonics in load voltage and synchronous tap changer, three phase regulator.

UNIT4. CONVERTERS :

One, two, three, six and twelve pulse converters, fully and half controlled converters, load voltage waveforms, output voltage equation, continuous and discontinuous modes of operation, input power factor of converter, reactive power demand, effect of source inductance, introduction to four quadrant / dual converter, power factor improvement techniques, forced commutated converter, MOSFET and transistor based converters.

UNIT5. INVERTERS :

Basic circuit, 120 degree mode and 180 degree mode conduction schemes, modified McMurray half bridge and full bridge inverters, McMurray -Bedford half bridge and bridge inverters, brief description of parallel and series inverters, current source inverter (CSI), transistor and MOSFET based inverters.

UNIT6. CHOPPERS :

Basic scheme, output voltage control techniques, one, two, and four quadrant choppers, step up chopper, voltage commutated chopper, current commutated chopper, MOSFET and transistor based choppers.

UNIT7. CYCLOCONVERTERS :

Basic principle of frequency conversion, types of cycloconverter, non-circulating and circulating types of cycloconverters.

UNIT8. DRIVES:

Introduction to electric drives: DC drives – converter and chopper fed dc drives, ac drives - stator voltage control, V/f control, rotor resistance control, static Scherbius system and static Kramer systems.

TEXT BOOK:

1. Power Electronics : MH Rashid; PHI

REFERENCE BOOKS :

1. Power Electronics : PC Sen; TMH

2. Power Electronics : HC Rai; Galgotia

3. Thyristorised Power Controllers : GK Dubey, PHI

4. Power Electronics and Introduction to Drives : A.K.Gupta and L.P.Singh;Dhanpat Rai

5. Power Electronics: P.S Bhimra.

NOTE : Eight questions are to be set –one from each unit. Students have to attempt any five questions.

EE-454-E

RADAR AND SONAR ENGINEERING

UNIT 1. INTRODUCTION TO RADAR:

Radar Block Diagram & operation, Radar Frequencies, Radar development, Application of Radar.

UNIT 2. RADAR EQUATION:

Simple form of Radar Equation, Prediction of Range performance, Minimum detectable signal, Receiver noise, Signal to Noise ratio, Transmitter Power, Pulse repetition frequency & range ambiguities, System losses, Propagation effects.

UNIT 3. CW & FREQUENCY MODULATED RADAR:

The Doppler effect, CW Radar, Frequency-modulated CW Radar, Multiple Frequency CW Radar.

UNIT 4. MTI & PULSE DOPPLER RADAR:

Introduction, Delay Line Cancellers, Multiple or staggered, Pulse repetition frequencies, range-Gated Doppler Filters, Digital Signal Processing, Other MTI delay line, Limitation of MTI performance, Noncoherent MTI, Pulse Doppler Radar, MTI from a moving platform.

UNIT 5. TRACKING RADAR:

Tracking with Radar, Sequential Lobbing, Conical Scan, Monopulse Tracking Radar, Tracking in range, Acquisition.

UNIT 6. RECEIVERS, DISPLAYS & DUPLEXERS:

Radar Receivers, Noise Figure, Mixer, Low-noise Front ends, Displays, Duplexer, Receiver protectors.

UNIT 7. INTRODUCTION TO SONAR

TEXT BOOK:

1. Introduction to Radar Systems: Merrill I. Skolnik, ; MGH

REFERENCE BOOK:

1. Electronic Communication Systems : Kennedy; TMH

NOTE: 8 questions are to be set –at least one from each unit. Students have to attempt any five Questions.

CSE-414E

Digital Image Processing

Unit-1: Introduction and Fundamental to Digital Image Processing: What is Digital Image Processing, Origin of Digital Image Processing, Examples that use Digital Image Processing, Fundamental steps in Digital Image Processing, Components of Digital Image Processing System, Image sensing and acquisition, Image sampling, quantization and representation, Basic relationship between pixels.

Unit-2: Image Enhancement in the Spatial Domain & Frequency domain: Background, Basic gray level transformation, Histogram processing, Basics of spatial filtering, Smoothing and Sharpening Spatial filters, Introduction to Fourier Transform and the Frequency Domain, Discrete Fourier Transform. Smoothing and Sharpening Frequency-Domain filters.

Unit-3: Image Restoration: Image Degradation/Restoration Process, Noise models, Restoration in presence of noise, Inverse Filtering, Minimum Mean Square Filtering, Geometric mean filter, Geometric transformations.

Unit-4: Color Image Processing: Color Fundamentals, Color models, Basis of full color image processing, Color transformations.

Unit-5: Image Compression: Fundamentals, Image compression models, Error free compression, Lossy compression.

Unit-6: Image Segmentation: Detection of Discontinuities, Edge linking and boundary detection, Thresholding, Region oriented segmentation.

Unit-7: Representation, Description and Recognition: Representation-chain codes, polygonal approximation and skeletons, Boundary descriptors-simple descriptors, shape numbers, Regional descriptors- simple, topological descriptors, Pattern and Pattern classes-Recognition based on matching techniques.

Unit-8: Recognition: Pattern and pattern Classes, Decision-Theoretic Methods.

Text Book:

- Digital Image Processing by Rafael C.Gonzalez & Richard E. Woods –2002, Pearson Education

Reference Book:

- Digital Image Processing by A.K. Jain, 1995,-PHI

Note: Eight questions will be set in all by the examiners taking at least one question from each unit. Students will be required to attempt five questions in all.

Unit-I

Definition of Marketing and Marketing Management-Nature, scope and importance of Marketing. The Evolution of concepts in Marketing- The Production concept, The Selling concept, The modern Marketing Concept. The Societal concept. The Marketing System.

Unit-II

Elements of marketing mix. Market segmentation-Meaning, importance and basis of market segmentation. Target marketing, market segmentation Vs target marketing.

Unit-III

Product-concepts and types. Product life cycle, New Product development and its process. Branding, packaging and trademark decisions.

Unit-IV

Pricing-Objectives and importance, strategies. Pricing practices and methods.

Unit-V

Distribution-Process of distribution, types, marketing channel decisions and their importance.

Unit-VI

Marketing Promotion-Meaning, Marketing communication, Advertising, Sales Promotion, Publicity-their concepts and relative importance. Selection of media. Salesmanship - importance, duties, responsibilities, Training & methods of training.

Unit-VII

Marketing Information System-Meaning, techniques and importance. Marketing Research-Meaning, Objective and its process.

Text Books :

1. Introduction to Marketing & Salesmanship - J.C. Sinha - R.Chandra & Co.
2. Modern Marketing management - C.J. George, K.C. Nair, J.John - Himalya Publishing House.
3. Modern Marketing Management - Rustam S. Dawar - Universal Book Stall.

Reference Books :

1. Modern Marketing - R.S.N. Pillai & V. Bagvati - S. Chandra & Co.
2. Marketing Management - Philip Kotler - Prentice Hall of India Pvt. Ltd.
3. Marketing Management - T.N. Chhabra, S.K. Grover - Dhanpat Rai & Co.
4. Marketing Management - S.A. Sherlekar - Himalaya Publishing House, Bombay
5. Basic Marketing - Cundiff and Still - PHI India.

Note:Eight questions are to be set atleast one question from each unit and the students will have to attempt five questions in all.

Unit-I : Series solution of differential equations :

Series solution and its validity, General method, Forms of series solution.

Unit-II & III : Special Functions :

Bessel's equation, Recurrence formulae for $J_n(x)$, Expansion for J_0 and J_1 , Value of $J_{1/2}$, Generating function for $J_n(x)$, Orthogonality of Bessel function, Legendre's equation, Rodrigues formula, Legendre polynomials, Generating function for $P_n(x)$, Recurrence formulae for $P_n(x)$, Orthogonality of Legendre polynomials.

Unit-IV : Calculus of Variations :

Introduction, Euler's equation and its solution, Isoperimetric problems, Approximate solution of boundary value problems by (a) Rayleigh Ritz method (b) Galerkin's method. The variations including more general case. Hamilton's Principle and formation of Hamilton's function.

Unit-V & VI : Integral Equations :

Definition, Conversion of a linear differential equation to an integral equation and vice versa, Conversion of boundary value problem to integral equations using Green's function, solution of an integral equation, Integro - equations of the convolution type, Abel's integral equation, Integral differential equations, Integral equation with separable kernels, Solution of Fredholms and Volterra equations by the method of successive approximations.

Unit VII & VIII : Tensor Analysis :

Introduction, Summation, Convention, Transformation of coordinates, Tensor of order zero, Kronecker delta, Contravariant vector, covariant vectors, Tensors of higher order, symmetric and skew symmetric tensors, Inner product of two tensors, Quotient law, Riemannian Space, Metric tensor, Conjugate tensor, Associated tensors, Length of a vector, Angle between two vectors, Christoffel symbols, Transformation of Christoffel symbols, Covariant differentiation of a covariant vector, Covariant differentiation of a contravariant vector, Gradient, divergence, curl.

Books Recommended :

1. Advanced Engineering Mathematics - F. Kreyszig.
2. Higher Engineering Mathematics : B.S. Grewal.

Note : Examiner will set eight questions, taking one from each unit. Students will be required to attempt any five questions.

UNIT 1. STATE VARIABLE TECHNIQUES: State variable representation of systems by various methods. Solution of state equations-state transition matrix. Transfer function from state variable model. Controllability & observability of state variable model.

UNIT 2. SECOND ORDER SYSTEMS & STATE PLANE: Phase portrait of linear second systems. Method of isoclines, phase portrait of second order system with non-linearities, limit cycle, singular points.

UNIT 3. DESCRIBING FUNCTION ANALYSIS: Definition, limitations, use of describing function for stability analysis , describing function of ideal relay, relay with hysteresis & dead zone, saturation/coulomb friction & backlash,

UNIT 4. LINEAR APPROXIMATION OF NONLINEAR SYSTEMS: Taylor series, Liapunov's 2nd method.

UNIT 5. SAMPLED DATA SYSTEMS: Sampling process, impulse modulation, mathematical analysis of sampling process, application of Laplace transform, Shannon's theorem, reconstruction of sampled signal zero order & first order hold, Z-transform, definition, evaluation of Z-transform, Inverse Z-transform, pulse transfer function, limitations of Z-transform, state variable formulation of discrete time systems. Solution of discrete time state equations, stability, definition, the Schur-Cohn stability criterion, Jury's test of stability of extension of Routh-Hurwitz criterion to discrete time systems.

TEXT BOOKS:

1. Digital Control & State Variable Methods : M.Gopal ; TMH.

REFERENCE BOOKS :

1. Modern Control Theory : M.Gopal ; Wiley International.
2. Discrete time control system : K.Ogate ; PHI
3. Digital Control Systems : B.C.Kuo
4. Applied non-linear control : J.E.Slotine & W.P.Li; Prentice Hall, USA,
5. Nonlinear Control Systems: Isidari ; Springer-Verlag.

NOTE : 8 questions are to be set –one from each unit. Students have to attempt five questions.