I SEMESTER

S. No	Subject Code	Name of the Subject	Contact Hours/ Week		Credits	Scheme of Evaluation		Total Marks
			L+T	P		Internal (CIE)	External (SEE)	
1	S239	English - I	4		3	25	75	100
2	S132	Applied Mathematics - I	4+1		3	25	75	100
3	S232	Engineering Chemistry	4+1		3	25	75	100
4	S170	Computer Programming	4+1		3	25	75	100
5	S143	Basic Electrical Engineering	4		3	25	75	100
6	L140	Engineering Chemistry Lab.		3	2	25	50	75
7	L144	English Communication Lab.		3	2	25	50	75
8	L126	Computer Programming Lab.		3	2	25	50	75
9	L175	Raptor and Office suite Lab.		3	2	25	50	75
		Total			**23**	**225**	**575**	**800**

II-SEMESTER

S. No	Subject Code	Name of the Subject	Contact Hours/Week		Credits	Scheme of Evaluation		Total
			L+T	P		Internal (CIE)	External (SEE)	
1	S240	English - II	4		3	25	75	100
2	S133	Applied Mathematics - II	4+1		3	25	75	100
3	S238	Engineering Physics	4		3	25	75	100
4	S224	Electronics Devices and Circuits	4+1		3	25	75	100
5	S178	Data Structures	4+1		3	25	75	100
6	L142	Engineering Physics Lab.		3	2	25	50	75
7	L123	Computer Aided Engineering Drawing		3	2	25	50	75
8	L128	Data Structures Lab.		3	2	25	50	75
9	L154	IT Workshop		3	2	25	50	75
		Total			**23**	**225**	**575**	**800**

III-SEMESTER

S. No	Subject Code	Name of the Subject	Contact Hours/ Week		Credits	Scheme of Evaluation		Total
			L+T	P		Internal (CIE)	External (SEE)	
1	S134	Applied Mathematics - III	4+1		3	25	75	100
2	S290	Linux Programming	4+1		3	25	75	100
3	S197	Discrete Mathematics	4+1		3	25	75	100
4	S325	Object Oriented Programming using Java	4+1		3	25	75	100
5	S191	Digital Logic Design	4+1		3	25	75	100
6	S327	Operating Systems	4+1		3	25	75	100
7	**S243**	Environmental Studies	4			25	75	100
8	L155	Java Programming Lab.		3	2	25	50	75
9	L177	Shell Scripting Lab.		3	2	25	50	75
		Total			**22**	**225**	**625**	**850**

Note : The Subject with Code S243 is Mandatory Course

IV SEMESTER

S. No	Subject Code	Name of the Subject	Contact Hours/ Week		Credits	Scheme of Evaluation		Total
			L+T	P		Internal (CIE)	External (SEE)	
1	S180	Database Management Systems	4+1		3	25	75	100
2	S312	Micro Processors and Interfacing	4+1		3	25	75	100
3	S295	Managerial Economics and Financial Analysis	4+1		3	25	75	100
4	S169	Computer Organization	4+1		3	25	75	100
5	S381	Software Engineering	4+1		3	25	75	100
6	S351	Probability and Statistics	4+1		3	25	75	100
7	**S355**	Professional Ethics and Human Values	4			25	75	100
8	L130	Database Management Systems Lab		3	2	25	50	75
9	L162	Micro Processors and Interfacing Lab		3	2	25	50	75
		Total			**22**	**225**	**625**	**850**

Note: The Subject with Code S355 is Mandatory Course

V-SEMESTER

S. No	Subject Code	Name of the Subject	Contact Hours/ Week		Credits	Scheme of Evaluation		Total
			L+T	P		Internal (CIE)	External (SEE)	
1	S181	Design and Analysis of Algorithms	4+1		3	25	75	100
2	S168	Computer Networks	4+1		3	25	75	100
3	S401	Theory of Computation	4+1		3	25	75	100
4	S323	Object Oriented Analysis and Design	4+1		3	25	75	100
5	S167	Computer Graphics	4+1		3	25	75	100
6	S137	Artificial Intelligence	4+1		3	25	75	100
7	L166	Object Oriented Analysis and Design Lab.		3	2	25	50	75
8	L119	Communication and Presentation Skills Lab.		3	2	25	50	75
9	L176	Seminar			2	75	-	75
		Total			**24**	**275**	**550**	**825**

VI-SEMESTER

S. No	Subject Code	Name of the Subject	Contact Hours/ Week		Credits	Scheme of Evaluation		Total
			L+T	P		Internal (CIE)	External (SEE)	
1	S268	Image Processing	4+1		3	25	75	100
2	S425	Web Technologies	4+1		3	25	75	100
3	S163	Compiler Design	4+1		3	25	75	100
4	S177	Data Mining and Data Warehousing	4+1		3	25	75	100
5		**Program Elective-I**	4+1		3	25	75	100
	S280	Internet Protocols						
	S383	Software Testing Methodologies						
	S321	Neural Networks						
	S336	Parallel Computing						
6		**Program Elective-II**	4+1		3	25	75	100
	S152	Business Intelligence and Big data						
	S201	Distributed Systems						
	S262	Human Computer Interaction						
	S103	Advanced Computer Architecture						
7	L184	Web Technologies Lab.		3	2	25	50	75
8	L120	Compiler Design and Data Mining Lab.		3	2	25	50	75
9	L164	Mini Project			2	25	50	75
		Total			**24**	**225**	**600**	**825**

VII-SEMESTER

S. No	Subject Code	Name of the Subject	Contact Hours/Week		Credits	Scheme of Evaluation		Total
			L+T	P		Internal (CIE)	External (SEE)	
1	S175	Cryptography and Network Security	4+1		3	25	75	100
2	S157	Cloud Computing	4+1		3	25	75	100
3	S130	Android Application Development	4+1		3	25	75	100
4	S186	Design Patterns	4+1		3	25	75	100
5		**Program Elective - III**	4+1		3	25	75	100
	S102	Ad-Hoc Networks						
	S382	Software Project Management						
	S337	Pattern Recognition						
	S166	Computational Geometry						
6		**Open Elective - I**	4+1		3	25	75	100
	S142	Banking Operations						
	S276	Insurance Operations						
	S395	Supply Chain Management						
	S101	Actuarial Sciences and Risk Management						
7	L118	Cloud Computing and Information Security Lab.		3	2	25	50	75
8	L110	Android Applications lab.		3	2	25	50	75
9	L153	Internship			2	75		75
		Total			**24**	**275**	**550**	**825**

VIII-SEMESTER

S. No	Subject Code	Name of the Subject	Contact Hours/Week		Credits	Scheme of Evaluation		Total
			L+T	P		Internal (CIE)	External (SEE)	
1	S270	Industrial Management	4+1		3	25	75	100
2		**Program Elective-IV**	4+1		3	25	75	100
	S316	Mobile Computing						
	S326	Object Oriented Software Engineering						
	S320	Natural Language Processing						
	S249	Fault Tolerant Systems						
3		**Open Elective-II**	4+1		3	25	75	100
	S328	Operations Management						
	S329	Operations Research						
	S370	Renewable Energy Sources						
	S254	Fuzzy Logic						
4	L121	Comprehensive Viva-voce		3	2	75		75
5	L157	Main Project		3	9	50	150	200
		Total			**20**	**200**	**375**	**575**

Note: A few course as notified in the respective departments are offered to the students on electives under Massive Open Online Courses (MOOCs).

I SEMESTER

S239 - ENGLISH – I

(Common to all branches)

Prerequisite: None

Course Educational Objectives

In this course, the students will learn

1. The standard vocabulary along with the meaning and usage of the words
2. The concepts of functional grammar and syntax for better writing and speaking skills
3. The concepts of skimming, scanning and critical reading for better comprehension abilities.
4. The effective pronunciation, language usage through extensive reading
5. The concepts of writing reports, resume, statement of purpose, memos and e-mails etc.

Course Outcomes

After the completion of this course, students will have the ability to

1. Read, write and understand what ever is written and spoken in English
2. Speak fluently with acceptable pronunciation and write using appropriate words, spellings, grammar and syntax
3. Read the lines, between lines and beyond lines excelling in comprehension skills
4. Speak grammatically error free English
5. Draft reports, memos, mails & letters as part of their work.

UNIT – I

Astronomy (Learning English)
Grammar: Parts of Speech
Vocabulary: Antonyms
Analytical Writing: Unscrambling words in a sentence; Un-jumbling the sentences into a paragraph; Types of sentences; Paragraph writing

UNIT – II

Travel and Transport (Learning English)
The Trailblazers - **Jagadis Chandra Bose**(Masterminds)
Grammar: prepositions; word plurals; sentence completion
Vocabulary: Synonyms
Analytical Writing: Drafting E-Mails; Letter writing (Formal & Informal)

UNIT - III

Humour (Learning English)
The Trailblazers – **Prafulla Chandra Ray** (Masterminds)
Grammar: Active & Passive Voices
Vocabulary: Pre-fixes & Suffixes
Analytical Writing: Note-making

UNIT - IV

Health and Medicine (Learning English)
The Trailblazers – **Srinivasa Ramanujam** (Masterminds)
Grammar: Tenses
Vocabulary: Deriving words
Analytical Writing: Abstract writing/Synopsis writing

UNIT - V

The World of Figures and Physics – **Chandra Sekhara Venkata Raman** (Masterminds)
Grammar: Articles
Vocabulary: One-Word substitutes
Analytical Writing: Essay writing; Dialogue writing (Formal & Informal)

TEXT BOOKS

1 "Learning English", Orient Longman Private Limited,2008 JNTU edition.
2 Enakshi Chatterjee, "Masterminds", Orient Longman Private Limited. 2002 (Reprint)

REFERENCES

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

I SEMESTER

S132 - APPLIED MATHEMATICS – I

(Common to AE, CE, CSE, EEE, EIE, IT, ME)

Prerequisite: None

Course Educational Objectives

In this course, the students will learn about

1. The concepts of Differential Equations and solving the first order and the first degree differential equations.
2. The concepts of Higher Order Differential Equations and solving such equations with constant and variable coefficients.
3. The concepts of theory of Matrices which are used to solve linear simultaneous equations.
4. The concept of Eigen Values and Eigen Vectors and solving an Eigen Value Problem.
5. The concepts of partial differentiation and formation of partial differential equations

Course Outcomes

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

1. Know fundamental mathematical skills required to form a necessary base to analyze first order differential equations.
2. Know the Higher Order Differential Equations, Procedures to solve them and their physical applications.
3. Find the solutions of System of Homogeneous and Non Homogeneous Linear equations using matrices for different physical applications.
4. Find Eigen values and Eigen vectors, higher powers and inverse of a given matrix, and can apply it in the concept of free vibrations of two- mass systems.
5. Find the solutions of linear partial differential equations.

UNIT – I

Differential Equations of First Order and First Degree

Differential equations of first order and first degree – Exact, Linear and Bernoulli. Applications to Orthogonal trajectories, applications to LCR circuits.

UNIT – II

Higher Order Differential Equations

Linear differential equations of second and higher order with constant coefficients and with variable coefficients, method of variation of parameters , Linear differential equations of second and higher order with variable coefficients – Cauchy's Equation and Legendre's Equations.

UNIT – III

Functions of Several variables

Generalized Mean Value Theorem(without proof), Maclaurin's series, Functions of several variables, Jacobians (polar, cylindrical, spherical coordinates), Functional dependenceMaxima and Minima of functions of two variables with constraints and without constraints – Lagrangian Multiplier Method. Formation of Partial Differential Equations by the elimination of arbitrary constants and arbitrary functions. Solution of first order and first degree linear partial differential equation – Lagranze's method

UNIT –IV

System of Linear Equations.

Matrices - Rank- Echelon form, Normal form , PAQ form– Solution of Linear Systems – Homogeneous system of equations and Non Homogeneous System of Equations, Gauss Elimination, Gauss - Seidal and Jacobi Methods.

UNIT – V

Eigen Values and Eigen Vectors

Eigen values – Eigen Vectors – Properties – Cayley Hamilton Theorem – Inverse and Powers of a matrix by using Cayley Hamilton Theorem.

TEXT BOOKS

1. Dr. B.S. Grewal, "Higher Engineering Mathematics", Khanna Publishers New Delhi, 42nd Edition, 2012.
2. Dr. B. V. Ramana, "Higher Engineering Mathematics", Tata Mac Graw Hill Ltd Publications New Delhi, 1st Edition, 2010.

REFERENCES

1. M. D. Greenberg, "Advanced Engineering Mathematics", Tata Mac Graw Hill Ltd Publications, 2nd Edition, 2011.
2. Erwin Krezig, "Advanced Engineering Mathematics", John Wiley & Sons, 8th Edition, 2011.
3. W. E. Boyce and R. C. Diprima, " Elementary Differential equations", John Wiley & sons, 7th Edition, 2001.

I SEMESTER

S232 - ENGINEERING CHEMISTRY

(Common to all branches)

Prerequisite: None

Course Educational Objectives:

Through this course the student will learn

1. The concept of water technology with special focus on hardness & softness of water, methods of softening and desalination of brackish water.
2. The concept of conventional and alternative fuels and working of petrol and diesel engines.
3. The concept of corrosion and control measures.
4. The concept of polymers and polymerization.
5. The concept of green chemistry and applications of liquid crystals.

Course Outcomes:

After completion of the course the students will acquire the ability to:

1. Analyze the quality of water and its maintenance for industrial purposes.
2. Analyze issues related to fuels and their synthesis and able to understand working of IC and Diesel engines.
3. Realize the principles of corrosion and make use of the principles for maintenance of various equipments more effectively.
4. Get hands on experience in various processes like polymerization, preparation, properties and applications of plastics and rubbers.
5. Realize the use of liquid crystals in various technological applications.

UNIT - I

WATER TECHNOLOGY: Sources of water and quality. Hardness of Water - Temporary and Permanent hardness. Units and their interrelation. Problems on Temporary and Permanent hardness. Disadvantages of hard water in various industries.

Boiler troubles – scale & sludge formation, Caustic Embrittlement, boiler corrosion, priming & foaming (carryover).

Internal Treatment – Colloidal Phosphate, Calgon, Carbonate, Sodium aluminate Conditioning of Water.

External Treatment - Lime-Soda Process, Zeolite process , Ion- Exchange Process merits and demerits. (Note-Problems on lime-soda process are not included)

Desalination of brackish water-Electrodialysis, reverse osmosis

UNIT - II

Fuel Technology: Definition and classification of Fuels, merits and demerits of solid liquid and gaseous fuels. Gross and net calorific values – (definition only).

Solid fuels- coal - analysis, Proximate and ultimate analyses of coal – significances.

Liquid Fuels – petroleum-origin and refining of petroleum- cracking- fixed bed and moving bed methods, synthetic petrol – Bergius and Fischer Tropsch's methods.

Working of I.C and C.I engines –Knocking in I.C and C.I engines, antiknocking agents Octane number , Cetane number(Definitions only)

Gaseous fuels- Natural gas, CNG Advantages of CNG, Flue gas analysis – Orsat's apparatus.

UNIT - III

CORROSION: Definition, Examples.

Dry Corrosion(Direct Chemical corrosion), Types of dry corrosion-oxidative corrosion, Pilling Bed worth rule, corrosion by other gases, liquid metal corrosion.

Wet Corrosion (Electro Chemical corrosion) Mechanism- Oxygen absorption Hydrogen evolution type, Types of wet corrosion, Galvanic Corrosion, passivity, Galvanic Series Concentration Cell Corrosion, intergranular corrosion, stress corrosion, Soil corrosion.

Factors Influencing Corrosion- Nature of metal and nature of environment.

Control of Corrosion - Proper Design, Use of pure metals and metal alloys, Cathodic Protection - Sacrificial anode and Impressed Current, Modifying the Environment and use of Inhibitors.

UNIT - IV

Polymer Science and Technology: Definition, classification of polymers, Functionality, Types of polymerization-addition, condensation, copolymerization

Plastics preparation, properties and engineering applications of PVC, Teflon, Bakelite, PMMA.

Conducting polymers: Polyacetylene, Polyaniline, conduction, doping, application.

Rubbers Natural rubber and it's processing, disadvantages of Natural rubber , Vulcanization and significance.

Elastomers- preparation, properties and engineering applications of Buna S, Buna N, Thiokol.

Fibers- preparation, properties and engineering applications of Polyester, fiber reinforced plastics (FRP).

UNIT – V

(a) **Green chemistry-**Goals and significance of green chemistry. Basic components (alternative starting materials, reagents, reaction conditions, final products) of green chemistry research.

(b) **Liquid crystals –**Classification of liquid crystals (Thermo tropic, lyotropic) and applications.

TEXT BOOKS

1. Jain & Jain, "A text book of Engineering Chemistry", DhanpatRai Publishing Company, New Delhi (15th Edition) (2006).
2. Dr. S.S Dara, Dr.S.S Umare "A Text book of Engineering Chemistry", S.Chand Publications, 12th Edition, 2010.
3. Shashi Chawla, "A Text book of Engineering Chemistry", DhanpatRai Publishing Company, Third Edition, 2003.

REFERENCES

1. Dr. Y. Bharathi Kumari and Dr. Jyotsna Cherukuri, "A Text book of Engineering Chemistry", VGS Publications, First Edition, 2009
2. N. Krishnamurthy, P. Vallinayagam and D. Madhavan, "A Text book of Engineering Chemistry", PHI Learning PVTLTD New Delhi, 2nd edition, 2008.
3. Dr. M. R. Senapati, "Advanced Engineering Chemistry", University Science Press (Impart from Laxmi Publications), 3rd Edition, 2009.

I SEMESTER

S170 - COMPUTER PROGRAMMING

(Common to all branches)

Course Educational Objectives:

The Students will learn

1. The basic elements C programming structures like data types, expressions, control statements, various I/O functions and how to solve simple mathematical problems using control structures.
2. Modular programming using functions.
3. The derived data types like arrays, strings, various operations and Memory management using pointers.
4. User defined structures and various operations on it.
5. The basics of files and its i/o operations.

Course Outcomes:

After undergoing the training in this course the students will acquire the ability to:

- Identify basic elements of C programming structures like datatypes, expressions, control statements, various I/O functions and Evaluation of simple mathematical problems using control structures.
- Implementation of derived data types like arrays, strings and various operations.
- Understanding of memory management using pointers and designing of modular programming.
- Construct user defined structures and implements various applications.
- Create text & binary type files and understanding of various file I/O operations.

Pre Requisite: The students should have basic knowledge in Maths & computers**.**

UNIT - I

Algorithm / pseudo code, flowchart, example flow charts, structure of C program, identifiers, basic data types and sizes, Constants, variables, Input-output statements, A sample c program, operators: arithmetic, relational and logical operators, increment and decrement operators, conditional operator, bit-wise operators, assignment operators, expressions, type conversions, conditional expressions, precedence of operators and order of evaluation. Conditional statements: if, ifelse, else if ladder and switch statements, continue, go to and labels. Loops: while, do-while and for statements, break, programming examples.

UNIT - II

Arrays- one dimensional arrays-concept, declaration, definition, accessing elements, storing elements, two dimensional and multi-dimensional arrays. **Character Strings:** declaration, initialization, reading, writing strings, arithmetic operations on characters, string handling functions programming examples

UNIT – III

Pointers- concepts, declaring &initialization of pointer variables, pointer expressions, address arithmetic, pointers and arrays, pointers and character strings, pointers to pointers,Pre-processor Directives and macros. **Functions:** basics, category of functions, parameter passing techniques, recursive functions, Functions with arrays, storage classes- extern, auto, and register, static, scope rules, Standard library functions., dynamic memory management functions, command line arguments, c program examples.

UNIT - IV

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

UNIT - V

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

TEXT BOOKS

1. B.W. Kernighan and Dennis M.Ritchie, "The C Programming Language", PHI/Pearson Education.
2. Prof. N.B.Venkateswarlu and Prof.E.V.Prasad," C and Data Structures Snap Shot Oriented Treatise Using Live Engineering Examples ", S Chand & Co, New Delhi.

REFERENCES

1. Reema Thareja, "Programming in C", Oxford Publications.
2. Stephen G. Kochan," Programming in C", Pearson Education, III Edition
3. Pradip Dey and Manas Ghosh, "Programming in C", Oxford Publications.

I SEMESTER

S143 - BASIC ELECTRICAL ENGINEERING

(Common to AE, CSE, IT)

COURSE EDUCATIONAL OBJECTIVES

- Students understand Kirchhoff's Laws and how to apply them.
- Students understand Ohm's Law.
- Students understand nodal analysis methods and how to apply them.
- Students understand mesh and loop analysis methods and how to apply them.
- Students understand the concept of linearity.
- Students understand superposition and how to use it.
- Students understand how to analyze circuits containing ideal operational amplifiers.

COURSE OUTCOMES:

- After the completion of the course, the student should be able
- To predict the behavior of any electrical and magnetic circuits.
- To identify the type of electrical machine used for that particular application.
- To wire any circuit depending upon the requirement.

UNIT – I

Electrical Circuit Fundamentals

Basic definitions, Types of elements-active and passive, Ohm's Law, Kirchhoff's Laws-Network reduction techniques-series, parallel, star to delta ,delta to star transformations, source transformations(for resistive networks).

UNIT – II

DC Machines

DC Generator: Principle of operation of DC Generator- E.M.F Equation-Types of DC Generator - Magnetization and Load characteristics of DC Generators.

DC Motor: Principle of operation of DC Motor- Types of DC motors- 3 Point Starter-losses and Efficiency

UNIT – III

AC Fundamentals & Transformers

AC Fundamentals : Peak, R.M.S, average, instantaneous values, Form factor and Peak factor– periodic waveforms – Phase and Phase difference –Concepts of Reactance, Impedance, Susceptance and Admittance, Real , Reactive and apparent Powers, Power Factor. **Transformers:** Principle of operation of single phase transformers, ideal transformer, Practical transformer –Emf equation-Losses- efficiency and regulation-O.C and S.C tests.

UNIT – IV

A.C Machines

Alternators: Fundamentals of Alternating Current-Principle of operation of Alternators – Salient pole and Non-Salient pole rotors, Voltage Regulation by synchronous impedance method only. **Induction Motor:** Principle of operation of Induction Motors –Slip ring and Squirrel cage motors –Slip-Torque characteristics.

UNIT – V

Electrical Measuring Instruments.

Basic Principles of indicating instruments – permanent magnet moving coil and moving iron instruments.

TEXT BOOKS

1. WH Hayt, JE Kemmerly and SM Durbin, "Engineering Circuit Analysis", Tata McGraw Hill Publication, 6th Edition.
2. M.S Naidu and S. Kamakshaiah, "Introduction to Electrical Engineering", TMH Publication.

REFERENCES

1. Kothari and Nagarath, "Basic Electrical Engineering" -TMH Publications, 2nd Edition.
2. V.K.Mehta and Rohith Mehta, "Principles of Electrical Engineering", S.Chand Publications.

I SEMESTER

L140 - ENGINEERING CHEMISTRY LAB

(Common to all branches)

Prerequisite: None

Course Educational Objectives:

Through this course the student will learn

1. To analyze water for its quality and to determine the important parameters like alkalinity and hardness.
2. To distinguish types of titrations used in volumetric analysis.
3. To gain hands on experience in practical aspects of preparation of polymers.

Course Outcomes:

After undergoing the training in this course the students will acquire the ability to:

1. Assess quality of water based on the procedures given.
2. Distinguish different types of titrations in volumetric analysis after performing the experiments listed in the syllabus**.**
3. Acquire practical knowledge related to preparation of polymers.
4. Exhibit skills in performing experiments based on theoretical fundamentals.

(Any 8 experiments)

Model experiment

1. Estimation of sodium hydroxide by using hydrochloric acid.

Water analysis

2. Determination of alkalinity of water sample

3. Determination of total Hardness of water by EDTA method
4. Determination of permanent hardness of water by EDTA method.
5. Determination of Dissolved Oxygen (D.O) content by Winkler's method

Preparation of polymers

6. Preparation of Urea formaldehyde resin.
7. Preparation of Phenol formaldehyde resin.

Redox titrations

8. Determination of amount of potassium dichromate in given solution by using sodium thiosulphate.
9. Determination of the amount of Oxalic acid and Sulphuric acid in 1 liter solution by Using given standard Sodium Hydroxide and Potassium Permanganate solution.
10. Estimation of Mohr's salt by using potassium permanganate.
11. Estimation of Mohr's salt by using potassium dichromate.
12. Estimation of Mohr's salt by using Oxalic acid.

Estimation of Vitamin content

13. Estimation of Vitamin-C

REFERENCES

Lab manual

I SEMESTER

L144 - ENGLISH COMMUNICATION LAB

(Common to all branches)

Prerequisite: English-I

Course Educational Objectives

In this course, the students will learn to

1. Better pronunciation through emphasis on word accent.
2. Use language effectively to face interviews, group discussions and public Speaking
3. Possess Positive attitude and inculcate group behavior
4. Negotiate well with inter personal skills and intra personal skills
5. Speak spontaneously on any topic given

Course Outcomes

After the completion of this course, students will have the ability to

1. Withstand the global competition in the job market with proficiency in English communication.
2. Articulate English with good pronunciation.
3. Face competitive exams like GRE, TOEFL, IELTS etc.
4. Face interviews and skillfully manage themselves in group discussions
5. Communicate with the people effectively.

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

1. Introduction to English Phonemes; Phonetic Transcription, Stress.
2. JAM
3. Role Play
4. Information Transfer
5. Group Discussions

SUGGESTED SOFTWARE

1. Digital Mentor: Globarena,Hyderabad,2005
2. Sky Pronunciation Suite: Young India Films, Chennai, 2009
3. Mastering English in Vocabulary, Grammar, Spelling, Composition, Dorling Kindersley,USA,2001
4. Dorling Kindersley Series of Grammar, Punctuation, Composition, USA, 2001
5. Oxford Talking Dictionary, The Learning Company, USA, 2002
6. Learning to Speak English - 4 CDs. The Learning Company,USA,2002
7. Cambridge Advanced Learners English Dictionary (CD). Cambridge University Press, New Delhi, 2008

I SEMESTER

L126 - COMPUTER PROGRAMMING LAB

(Common to all branches)

COURSE OBJECTIVES:

- To Learn the fundamentals of ANSI C programming and the standard C libraries
- To Get a solid understanding of C functions and data structures
- To Become familiar with the basic concepts of object-oriented programming
- To write programs using the C language.
- To Gain skills in C Programming Language.

COURSE OUTCOMES:

After completion of the course students..

- Can write programs in C language.
- Can use loops effectively in programming.
- Can use files concept in programming.
- Can gain skills in C programming.

LIST OF LAB PROGRAMS:

I) Write a programme in 'C' language to cover the following problems.

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

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

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

II) WRITE EXAMPLE PROGRAMS:

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

b) Roots of Quadratic Equation.

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

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

e) Prepare electricity bill for the consumed units – assume suitable Constraints.

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

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

III) EXAMPLE PROGRAMS:

a) To Display first N natural numbers

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

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

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

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

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

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

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

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

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

V) a) Example program to bring clarity on pointer declaration & initialization and Pointer arithmetic.
b) Write an example program to describe the usage of *call by reference*.
c) Write a program to find sum of the elements of the array using Functions.

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

f) Write an example program to illustrate the usage of command line arguments.
g) Program to illustrate the usage of dynamic memory management functions.

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

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

I SEMESTER

L175 - RAPTOR AND OFFICE SUITE LAB

COURSE EDUCATIONAL OBJECTIVES:

- Make the student understand the logic behind the solution.
- Emphasis will be more on solution than tool.
- Prepares the student to venture into designing solutions to more complex problems.

COURSE OUTCOMES:

By completion of this course student will..

- Has a clear understanding of flow of control.
- Will have the appreciation of flow chart approach of problem solving.
- Reduces the time to be spent in learning a programming language.

Programs:

1. Design a flowchart to print "Hello".
2. Design a flowchart to perform addition of two numbers.
3. Design a flowchart to perform various arithmetic operators.
4. Design a flowchart to find whether a given number is even or not.
5. Design a flowchart to find whether a given number is positive or not.
6. Design a flowchart to find whether given year is leap year or not.
7. Design a flowchart to find the factorial of given number.
8. Design a flowchart to print the reverse of given number.
9. Design a flowchart to illustrate the concept of Increment/decrement operators.
10. Design a flowchart to illustrate the concept of Switch case.
11. Design a flowchart to find the biggest of two numbers using Ternary operator.
12. Design a flowchart to print prime numbers from 1 to N (N must be the value provided by user).
13. Design a flowchart to verify that given number is Armstrong or not.
14. Design a flowchart to verify given number is palindrome or not.
15. Design a flowchart to print Fibonacci series.
16. Design a flowchart to print number pattern
17. Design a flowchart to illustrate the concept of accepting values into arrays.
18. Design a flowchart to perform sum of elements in an array.
19. Design a flowchart to find maximum and minimum element in array.
20. Design a flowchart to illustrate the concept of functions.
21. Design a flowchart to illustrate the concept of recursive functions.

OFFICE SUITE:

Cycle1:

Create a formatted word document using MS-WORD

Features to be covered: Formatting Fonts in Word, Applying Text effects, Using Character Spacing, Borders and colors, Inserting Header and Footer, Using Date and Time Options.

Cycle2: Using MS-WORD

Formatting Styles, Inserting Tables, Bullets and Numbering, Changing Text Direction, Cell Alignment, Hyperlink, Symbols, Spell check, merging of cells, Cell Spacing, Splitting of cells.

Cycle3: Exercise on Mail Merge

Superscript, Subscript, Inserting Picture, WordArt, Writing of Equations, Drawing charts, Page numbers, Indentation, Margins, Print the word document using page setup and print facilities.

Cycle4: Using Excel: Accessing, Overview of tool bars, Saving Excel files

Generating appropriate charts for the statistical data using MS-Excel.

Cycle5: Exercise on using formula facility of MS-Excel.

Exercise on Functions

Cycle6: Exercise on What-If Analysis.

Exercise on inserting Pictures, Clip art etc.,

Cycle 7: LOOKUP/VLOOKUP

Performance Analysis: Split cells, freeze panes, group and outline, Boolean and Logical operators, conditional formatting.

Cycle 8: Create a Soft Copy of a simple database using Excel. Run sort and filter facilities for the database.

Cycle 9: Create a PowerPoint for a simple technical topic using MS Power Point.

Cycle10: Exercise on inserting images, charts in Power point

II SEMESTER

S240 - ENGLISH – II

(Common to all branches)

Prerequisite: ENGLISH-I

Course Educational Objectives

In this course, the students will learn

1. English with emphasis on LSRW skills.
2. To make decisions, while thinking logically analyzing situations carefully.
3. To read speedily and meaningfully.
4. Both active and passive vocabulary.
5. To write letters and reports effectively in formal and professional situations.

Course Outcomes

After the completion of this course, prospective engineers will have the ability to

1. Use English language effectively.
2. Express right ideas in right context
3. Manage the situation and negotiate business with good English communication
4. Think and analyze the situations and make good presentations of their work and decisions
5. prepare themselves to face interviews and also to participate in group discussions

UNIT - I

Environment (Learning English)
The World of Figures and Physics – **Satyendranath Bose** (Master Minds)
Grammar: Correction of sentences
Analytical Writing: Report Writing

UNIT - II

Inspiration (Learning English)
The Institution Builders– **Santi Swarup Bhatnagar** (Masterminds)
Grammar: If-clause; Question tags
Vocabulary: Idioms and Phrases
Analytical Writing: Resume'; Statement of Purpose

UNIT - III

Human Interest (Learning English)
The institution builders – **Meghanadh Saha** (Master Minds)
Grammar: Direct & Indirect Speeches
Vocabulary: Phrasal Verbs
Analytical Writing: Memo Drafting

UNIT – IV

Media (Learning English)
The New Age – **Homi Jehangir Bhabha** (Master Minds)
Grammar: Concord
Vocabulary: Analogy
Analytical Writing: Information Transfer/ Data Interpretation (Tables, Pie charts, Bar graphs, Tree diagrams, Pictograms, etc.)

UNIT – V

The New Age – **Vikram Sarabhai** (Master Minds)
Grammar: Gerunds & Infinitives; Correction of Sentences
Vocabulary: Words often confused
Analytical writing – Comprehension, Expansions (of a given topic/ proverbs)

TEXT BOOKS

1. "Learning English", Orient Longman Private Limited.JNTU edition, 2008
2. Enakshi Chatterjee, "Masterminds", Orient Longman Private Limited, Reprint-2002

REFERENCES

1. Koneru Aruna, "Professional Communication", Tata McGraw-Hill, New Delhi, 2007.
2. Rizvi, "Effective Technical Communication", Tata McGraw-Hills, New Delhi, 2009.
3. Andrea J. Rutherford, "Basic Communication Skills for Technology", Pearson Education., 1st edition, 2009
4. Kaplan and Baron's, "GRE and TOEFL", Latest editions.2008

II SEMESTER

S133 - APPLIED MATHEMATICS – II

(Common to AE, CE, CSE, EEE, EIE, IT, ME)

Prerequisite: None

Course Educational Objectives:

In this course student will learn about

1. The basic concepts of Laplace Transforms and their applications in solving the Differential Equations.
2. The expansion of function in an infinite series of sine and cosines.
3. Fourier Integral Theorem, Fourier Integral Transforms along with their properties and applications.
4. Z-transform and its role in discrete analysis and in solving Difference equations.
5. The concepts of multiple integrals and changing of order of integration

Course outcomes:

At the end of this course student will be able to

1. Understand the importance of mathematics and its techniques to solve real life problems.
2. Apply the concepts of Laplace Transforms on Operational Calculus and solve Differential Equations of any order.
3. Express most of the single valued functions in the form of Fourier series and extend the ideas and techniques to non-periodic functions also.
4. Express a function as a continuous frequency resolution using Fourier Transforms.
5. Understand the analogy between Laplace Transform and Z-Transform and apply it wherever necessary & apply Multiple Integrals in various coordinate systems.

UNIT – I

Laplace Transforms

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

UNIT – II

Fourier Series

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

UNIT – III

Fourier Transforms

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

UNIT – IV

Z-Transforms

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

UNIT – V

Multiple Integrals

Multiple integrals - double and triple integrals (Cartesian, polar, spherical coordinates) – Changing of order of Integration and applications to areas and volumes.

TEXT BOOKS

1. Dr. B.S. Grewal, "Higher Engineering Mathematics", Khanna Publishers, 42ndEdition, 2012.
2. Dr. B. V. Ramana, "Higher Engineering Mathematics", the McGraw Hill Companies, 1st Edition, 2010.

REFERNCES

1. Michael D. Greenberg , "Advanced Engineering Mathematics", The McGraw Hill Companies, 2nd Edition, 2011.
2. Erwin Krezig, "Advanced Engineering Mathematics", John Wiley & sons, 8th Edition, 2011.

II SEMESTER

S238 - ENGINEERING PHYSICS

(Common to all branches)

Pre-requisite course: NONE

Course Educational Objectives:

In this course student will learn about

- The basic concepts of Optics such as Interference, Diffraction and Polarization.
- The principle of quantum mechanics,dual nature of matter waves.
- The principle and working of different Lasers.
- The principle and classification of optical fibers
- classification of magnetic materials and their properties.
- Concept of Superconductivity, types and their applications

Course Outcomes:

At the end of this course student will be able to

CO1: Understand the nature of polarization, Diffraction and interference.

CO2: Understand the dual nature of particle and significance of the wave function .

CO3: Understand the principle of LASER and optical fibers. Types of lasers and optical fibers and their applications.

CO4: Understand the different types of magnetic materials and their uses.

CO5: Understand the phenomenon of superconductivity, critical parameters, types of super conductors and their applications

UNIT – I

INTERFERENCE, DIFFRACTION, POLARIZATION

INTERFERENCE: Introduction, super position principle, coherent sources, thin films, Newton's rings (in reflected system only).

DIFFRACTION:

Introduction, Fresnel and Fraunhofer diffractions – comparsion between Fresnel's and fraunhofer's diffraction-Difference between interference and diffraction-Fraunhofer diffraction at single slit - Fraunhofer diffraction at Double slit –Diffraction Grating- Grating spectrum.

POLARIZATION:

Introduction-plane of vibration and plane of polarization -Polarization by reflection Brewster's law –geometry of calcite crystal- Double refraction -nicol prism construction , Quarter wave plate- Half wave plate.

UNIT - II

PRINCIPLES OF QUANTUM MECHANICS:

De Broglie hypothesis- Matter waves- Davison and Germer experiment- GP Thomson experiment , Heisenberg Uncertainty principle-Schrodinger time independent wave equation-Physical significance of the wave function-particle in a box.

UNIT – III

LASERS AND FIBER OPTICS

LASERS:

Introduction – Characteristics of Lasers- Principle of laser (Absorption, Spontaneous and stimulated emission of Radiation), Population Inversion- Einstein Coefficients ,three and four level pumping schemes, block diagram of laser. Ruby Laser- Helium Neon Laser, Applications of Lasers.

FIBER OPTICS

Introduction- Principle of optical Fiber- Acceptance angle and Acceptance cone- Numerical aperture – Types of optical fibers-refractive index profile- Application of optical fibers.

UNIT – IV

MAGNETIC MATERIALS:

Magnetic properties -Origin of magnetic moments-Classification of magnetic materials- Dia, Para, Ferro magnetic , Antiferromagnetic , Ferrimagnetic materials- Domain theory of ferromagnetism(qualitative), Hysteresis curve- Soft and Hard magnetic materials. Applications of magnetic materials.

UNIT – V

SUPER CONDUCTORS

Phenomenon, critical parameters, Meissner effect, Type-I, Type-II Super conductors, BCS theory of super conductivity,Flux Quantization,London Eqs., Penetration depth, Josephson Effects- Applications of Super conductors.

TEXT BOOKS

1. V .RAJENDRAN,"Engineering Physics", Tata McGraw-Hill, 2009.
2. P K Palani Samy, "Engineering Physics", SciTech Publications, 2006.

REFERENCES

1. M R Srinivasan, "Engineering Physics", new age international, 2014.
2. M.N.Avadhanulu and P.G.Kshirsagar, and S.Chand," Engineering physics", New Delhi.
3. RK GAUR & SL GUPTA, "Engineering Physics", Dhanpat Rai Publication, 2008.
4. Dr. P. Srinivasa Rao & Dr. K. Muralidhar," Basic Engineering Physics", Himalaya Publishing House.

II SEMESTER

S224 - ELECTRONIC DEVICES AND CIRCUITS

(Common to ECE, EIE, IT)

COURSE EDUCATIONAL OBJECTIVES:

1. The course intends to provide an overview of the principles, operation and application of the analog building blocks like diodes, BJT, FET etc for performing various functions.
2. This course relies on elementary treatment and qualitative analysis and makes use of simple models and equation to illustrate the concepts involved.
3. To provide an overview of amplifiers, feedback amplifiers and oscillators.
4. To gain the knowledge on existing on future analog circuits.

COURSE OUTCOMES:

1. Acquire knowledge in the field of solid state materials.
2. Be able to analyze the structure of different types of semiconductor crystal structures. Know the intrinsic property of semiconductor materials.
3. Idea about the equilibrium and non equilibrium states of semiconductors.
4. Know the complete internal structure of PN junction including different types of bias. Acquire sound knowledge about MS junction.
5. Idea about the structure of MOS capacitor. Sound knowledge of MOS transistor including types & structures.
6. Operation of MOS transistor. Concept of charge inversion on MOSFET.
7. Acquire knowledge in the field of Quantum electronics devices.
8. Gain idea about the structure CMOS
9. Gain sound knowledge in the field of VLSI technology.

UNIT-I

Semiconductor Physics: Charged particles, Energy band theory of crystals, Insulators, Conductors, Semiconductors, Mobility and Conductivity, Energy distribution of electronics, Electrons and Holes in an Intrinsic Semiconductors, Conductivity of a semiconductor, Carrier concentration in an intrinsic Semiconductors, Donor and Acceptor Impurities, Mass Action Law, Charge densities in semiconductor, Fermilevel in a semiconductor having impurities, Diffusion, Carrier Lifetime, Continuity Equation, Hall Effect.

UNIT-II

Junction Diode: Qualitative theory of PN Junction, Band Structure of an open circuited PN junction, Current components in a PN Diode, Qualitative theory of the PN diode currents-Diode current equation, Law of the junction, Forward currents, Reverse Saturation Current, PN Junction diode operation in Forward bias and Reverse bias, Volt Ampere Characteristics of Diode, Temperature dependence of Diode, Diode Resistance, Diode Capacitance-Transition Capacitance, Diffusion Capacitance and their derivations.

Special Diodes: Operation, characteristics and applications of Zener Diode, Tunnel Diode, Varactor Diode, Photo Diode, LED, Liquid crystal diode and Photo diode.

UNIT-III

Bipolar Junction Transistors: Introduction to Three terminal Devices, PNP and NPN Transistors, Transistor Current components-Emitter Efficiency, Transport Factor, Large Signal Current Gain; Input and Output characteristics of Transistor in Common Base, Common Emitter and Common Collector configurations, Relation between α and β, Base width modulation, Ebers-Moll Model.

Field Effect Transistors: Comparison between FET and BJT, JFET Construction, Operation, Classification, Drain and Transfer Characteristics of JFET, MOSFET Characteristics-Enhancement and Depletion Mode.

Optical and Power Electronic Devices: Photo Transistor, Silicon Controlled Rectifier, Unijunction Transistor, UJT relaxation oscillator.

UNIT-IV

BJT Biasing: Transistor Biasing and Stability- DC load line, Operating Point, AC load line, Thermal Instability, Stability factors S,S^{I},S^{II}, Bias Stabilization Techniques- Fixed Bias, Collector to Base Bias and Self Bias, Thermal Concepts- Thermal Runaway, Thermal Resistance, Thermal Stability, Condition to avoid Thermal Runaway, Bias Compensation Techniques- Diode Compensation for V_{BE}, Diode Compensation for I_{CO}.

FET Biasing: Different FET biasing methods.

UNIT-V

Rectifiers: Half Wave Rectifier, Full Wave Rectifier with center tap transformer, Full Wave Rectifier with Bridge circuit, derivation for DC, RMS Currents and Voltages, Ripple Factor, Rectifier Efficiency, Peak Inverse Voltage, Transformer Utilization Factor, Percentage of Regulation, Comparison of Rectifiers, Harmonic components in a Rectifier circuit.

Filters: Inductor Filter, Capacitor Filter, L-Section Filter, π-Section Filter, Multiple L-Section and Pi-Section Filters.

Regulators: Voltage Regulation using Zener diode, design of a Zener regulator.

TEXT BOOK

Jacob Millman and Christos C Halkias, "Electronic Devices and Circuits", Tata McGraw Hill, Publishers, New Delhi.

REFERENCES

1. R.L. Boylestad and Louis Nashelsky, "Electronic Devices and Circuits", Pearson/Prentice Hall Publishers.
2. Thomas L.Floyd, "Electronic Devices and circuits", Pearson Education Publishers.
3. Ben Streetman and Sanjay Banerjee , "Solid State Electronic Devices", Prentice Hall Publishers.
4. Allen Mottershed, "Electronic Devices and Circuits", PHI Publishers.
5. B.Visvesvara Rao etal, "Electronic Devices and Circuits", Pearson Education Publishers.
6. John Paul, "Electronic Devices and Circuits", New Age International Publishers.
7. GSN Raju, "Electronic Devices and Circuits", IK International Publishers, New Delhi.

II SEMESTER

S178 - DATA STRUCTURES

(Common to EIE, CSE, EEE, IT)

Course Educational Objectives:

To make a student familiar with :

- Write algorithms to implement operations involved in different data structures
- Implement stack and queue using arrays as well as linked list
- Apply stack and queue to write some complex algorithms
- Implement different types of trees and their application
- Implement various searching and sorting techniques
- Use Hash Tables to handle large amount of data

Course Outcomes:

At the end of the course a student is able to:

CO1: Analyze worst-case running times of algorithms using asymptotic analysis and implement various data structures like linked lists.

CO2: Understand and implement stacks and queues using arrays and linked lists.

CO3: Analyze and implement various searching and sorting algorithms.

CO4: Build various tree structures like Binary Trees, Binary Search Trees and AVL Trees.

CO5: Design and implement appropriate hash function and collision-resolution algorithms.

Pre requisite: Students should have a good knowledge in C Programming Language

UNIT - I

Algorithm Analysis:

Mathematical Background, Model, Analysis and Run Time Calculations, **Lists:** Abstract Data Types, List using arrays and pointers, Singly Linked, Doubly Linked, Circular Linked Lists, Polynomial ADT.

UNIT – II

Stacks: The Stack: Definition, operations, implementation using arrays, linked list and **Stack applications:** Infix to postfix expression conversion, Evaluation of Postfix expressions, balancing the symbols.**Queue:** definition, operations, implementation using arrays, linked list&it'sApplications.**Circular queue**: definition&its operations, implementation, **De queue**: definition & its types, implementation.

UNIT - III

Searching: Linear and Binary Searching. **Sorting:** Insertion Sort, Selection sort, Shell Sort, Heap Sort, Merge Sort, Quick Sort, and Bucket Sort.

UNIT - IV

Trees: Terminology, **BinaryTrees:** definition, types of binary trees, Representation, Implementation (linked list), **Tree traversals**: Recursive techniques, Expression Tress, **Search Tree:** Binary Search Tree-search, insert, Delete, **Balanced Tree** –Introduction to AVL tree and Rotations.

UNIT-V

Graphs: Fundamentals, Representation of graphs,**Graph Traversals:** BFS, DFS, **Minimum cost spanning tree:** Definition, Prim's Algorithm, Kruskal's algorithm.

Hashing: Hash Table, Hash Function, Collison resolution Techniques- separate Chaining, open addressing, rehashing, extendible hashing.

TEXT BOOKS

1. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", Pearson Education, 2nd edition.
2. ReemaThareja, "Data Structures using C", Oxford Publications.
3. Prof. N.B.Venkateswarlu and Prof.E.V.Prasad," C and Data Structures Snap Shot Oriented Treatise Using Live Engineering Examples ", S Chand & Co, New Delhi.

REFERENCES

1. Langson, Augenstein&Tenenbaum, "Data Structures using C and C++", PHI, 2nd edition.
2. RobertL.Kruse, Leung & Tando, "Data Structures and Program Design in C', PHI, 2nd edition.
3. D Samantha ,"Classic Data Structures", 2nd edition.

II SEMESTER

L142 - ENGINEERING PHYSICS LAB

(Common to all branches)

Pre-requisite course: NONE

Course Educational Objectives:

In this course student will learn about

- The scientific method of experiments in the laboratory.
- The procedures and observational skills for appropriate use of simple and complex apparatus.
- Analytical techniques, statistical analysis and graphical analysis.
- The theoretical ideas and concepts covered in lecture by completing a host of experiments.
- The radius of curvature of a Plano-convex lens by forming Newton's rings.

Course Outcomes:

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

CO1: Understand to calculate the radius of curvature of a plano-convex lens by forming Newton's Rings.

CO2: Understand the concept of diffraction and also find wavelengths of different spectral lines of the grating.

CO3: Estimate the wavelength of layer radiation.

CO4 : Study the magnetic field along the axis of a current carrying coil and to verify Biot –savart's law .

CO5 : Estimate the Refractions index of the given prism

CO6 : Find the thickness of a thin material using a wedge shaped film.

CO7 : Estimate the width of the slit by forming diffraction pattern.

CO8 : Understand the phenomenon of optical – activity

CO9 : Study the characteristics of LCR circuit

CO10: Understand the Phenomenon of resonance

CO11: Determine the rigidity modules of given material

CO12 : Understand the longitudinal and transverse vibrations of tuning fork.

List of Experiments:

1. Determine the Radius of Curvature of Plano - Convex lens by forming Newton's Rings.
2. Determine the Wavelengths of various spectral lines using grating with the normal incidence method.
3. Determine the rigidity modulus of a given material using Torsional pendulum.
4. Determine the frequency of a vibrating bar or electrical tuning fork using Meldy's apparatus.
5. Study the characteristics of L.C.R Circuit.
6. Determine the frequency of AC supply by using Sonometer.
7. Determination of wavelength of laser radiation.
8. Evaluation of numerical aperture and acceptance angle of given fiber.
9. Determine the Refractive index of a given prism.
10. Determine the thickness of a thin material using wedge shaped film.

Reference Books: Lab Manual prepared by the LBRCE.

II SEMESTER

L123 - COMPUTER AIDED ENGINEERING DRAWING LAB

(Common to EIE, CSE, ECE, EEE, IT)

Course Educational Objectives:

The main objective of this course is

- To teach students the basic commands necessary for professional 2D drawing, design, and drafting using AutoCAD Essentials.
- To give an introduction to orthographic projections, and isometric drawings using AutoCAD.

Course Outcomes:

After completion of this course the student is able to

- Use the AutoCAD basics in industries where the speed and accuracy can be achieved.
- Visualize the solids clearly without any complexity.

At least 10 Exercises are to be conducted using Auto Cad software:

BASIC AUTO CAD COMMANDS:

1. Basic drawing commands (line, circle, arc, ellipse, polygon, and rectangle).
2. Edit commands (copy, move, erase, zoom).
3. Array commands (polar array, rectangular array, P-edit, divide aline, offset).
4. Hatching &line commands (hatching with different angles& different types of lines).
5. Mirror & trim commands (mirror an object, trim, extend a line, chamfer &fillet, explode).
6. Dimensioning & text commands (linear, angular, radius, diameter& text).

PROJECTION OF POINTS AND LINES:

1. Projection of points (I, II, III, & IV quadrants).
2. Projection of lines parallel to both reference planes.
3. Projection of lines parallel to one reference plane & inclined to other reference plane.

ORTHOGRAPHIC PROJECTIONS:

1. Conversion of plane figures.
2. Conversion of circular figures.
3. Conversion of both combination of plane figures and circular figures.

ISOMETRIC PROJECTIONS:

4. Conversion of plane figures.
5. Conversion of circular figures.
6. Conversion of both combination of plane figures and circular figures.

REFERENCES:

1. M. Kulkarni, A.P Rastogi, and A.K. Sarkar, “Engineering Graphics with AutoCAD”, PHI Learning Private Limited, New Delhi, 2009.

2. Bethune, “Engineering Graphics with AutoCAD”, PHI Learning Private Limited, New Delhi, 2009.

3. N. D. Bhatt, “Engineering Drawing”, 51th Revised and Enlarged Edition, Charotar Publishers, 2012.

CYCLE: 1

SNO	SHEETS	EXERCISE	COMMANDS TO BE COVERED	REFERENCES	PAGE NUMBER
1	SHEET-1	Basic drawing commands	line, circle, arc, ellipse, polygon, and rectangle	PLATE 2.1& 2.2	26
2	SHEET-2	Edit commands	copy, move, erase, zoom, measure, divide, pan, change properties	PLATE 2.3& 2.4	27
3	SHEET-3	Array commands	polar array, rectangular array, P-edit, divide aline, offset	PLATE 2.5& 2.6	28&29
4	SHEET-4	Hatching &line commands	hatching with different angles& different types of lines	PLATE 2.8& 2.9	31&32
5	SHEET-5	Mirror & trim commands	mirror an object, trim, extend a line, chamfer &fillet, explode	PLATE 2.7& 2.13	30&35
6	SHEET-6	Dimensioning & text commands	linear, angular, radius, diameter& text	PLATE 4.1	69
7	SHEET-7	Projection of points	Points & lines	Case-1,2,3,4	171
8	SHEET-8	Projection of lines(parallel to both reference planes)	line	Fig:9.4(a & b)	172&173
9	SHEET-9	Projection of lines (parallel to one reference plane & inclined to other reference plane)	lines	Fig:9.4(c)	173

CYCLE: 2

SNO	SHEETS	EXERCISES	REFERENCE	PAGE NUMBER
Orthographic projections				
10	SHEET-10	Conversion of plane figures	PLATE 5.1& 5.3	82&83
11	SHEET-11	Conversion of circular figures	PLATE 5.9& 5.13	86&88
12	SHEET-12	Conversion of both combination of plane figures and circular figures	PLATE 5.25,5.26 PLATE5.27,5.28	94&95
Isometric projections				
13	SHEET-13	Conversion of plane figures	PLATE 6.3	122
14	SHEET-14	Conversion of circular figures	PLATE 6.4	123
15	SHEET-15	Conversion of both combination of plane figures and circular figures	PLATE 6.8&6.10	125&126

Note: References and Page numbers have been given from below text book

M. Kulkarni, A.P Rastogi, and A.K. Sarkar, "Engineering Graphics with AutoCAD", PHI Learning Private Limited, New Delhi, 2009.

II SEMESTER

L128 - DATA STRUCTURES LAB

(Common to EIE, CSE, EEE, IT)

COURSE EDUCATIONAL OBJECTIVES:

- To develop skills to design and analyze simple linear and non linear data structures
- To Strengthen the ability to identify and apply the suitable data structure for the given real world problem
- To Gain knowledge in practical applications of data structures

COURSE OUTCOMES:

At the end of this lab session, the student will

- Be able to design and analyze the time and space efficiency of the data structure
- Be capable to identity the appropriate data structure for given problem
- Have practical knowledge on the application of data structures

LIST OF LAB PROGRAMS:

1. Write a C program to implement various operations on List using arrays.
2. Write a C program to implement various operations on Single linked List using pointers.
3. Write an interactive C program to create a linear linked list of customer names and their telephone numbers. The program should be menu-driven and include features for adding a new customer, deleting an existing customer and for displaying the list of all customers.
4. Write a C program to create a circular linked list so that the input order of data items is maintained. Add the following functions to carry out the following operations on circular single linked lists. a) Count the number of nodes. b) insert a node c) delete a node
5. Write a C program that will remove a specified node from a given doubly linked list and insert it at the end of the list on an existing list. Also write a function to display the contents of the list.
6. Write a C program to implement a stack using array &linked list in which Push, Pop and display can be performed.
7. Write a program to convert infix expression to post fix expressions using array implementation of stack
8. Write a program for evaluating post fix expressions using array implementation of stack
9. Write a C program to implement a queue using arrays and linked list in which insertions, deletions and display can be performed.
10. Write a C program to implement insertion sort& shell sort
11. Write a C program to implement Selection sort.
12. Write a C Program to implement Merge Sort
13. Sort a sequence of n integers using Quick sort technique and then search for a key in the sorted array using Binary search, linear search techniques.
14. Write a C program to Heap sort
15. Write a C program to construct a binary tree and do inorder, preorder and postorder traversals, printing the sequence of nodes visited in each case.
16. Write a C program to implement BST operations- insert, search and delete
17. Write a C program to implement the following graph Traversals
    a) BFS b)DFS

II SEMESTER

L154 - IT WORKSHOP

(Common to CE, CSE, IT)

COURSE EDUCATIONAL OBJECTIVES:

The IT Workshop for engineers is a training lab course spread over 40 hours. The modules include training on PC Hardware, Internet & World Wide Web and Productivity tools including Word, Excel, Power Point.

Enable students to understand how computers work, different types of computers, functions of applications, input and data storage devices, different operating systems, ethics, data communications, and systems analysis and design.

COURSE OUTCOMES:

1. Present and describe how PCs and larger computer systems are used in the business community and the positive/negative impacts of that technology in business and society.
2. Explain the difference between hardware, software; operating systems, programs and files.
3. Identify the purpose of different software applications.
4. Describe how business information systems are likely to change

PC Hardware introduces the students to a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like MS Windows , Linux and the required device drivers. In addition hardware and software level troubleshooting process, tips and tricks would be covered.

The students should work on working PC to disassemble and assemble to working condition and install Windows and Linux on the same PC. Students are suggested to work similar tasks in the Laptop scenario wherever possible.

Internet & World Wide Web module introduces the different ways of hooking the PC on to the internet from home and workplace and effectively usage of the internet. Usage of web browsers, email.

Productivity tools module would enable the students in crafting professional word documents, excel spread sheets and power point presentations. (**Recommended to use Microsoft office 2007 in place of MS Office 2003)**

Cycle 1:

Desktop Database-MS Access

i) Create a new table in a new desktop database,
ii) Create a new table in a existing database
iii) Create a new table by importing or linking to external data
iv) Set the table properties in a desktop database.

Cycle 2:

Desktop database-MS Access

i) Review data from multiple related tables simultaneously
ii)Create an append, update and delete queries.

Cycle 3:

Desktop Database-Ms Access

i) Create an Access Form
ii) Create Reports

Cycle 4:

Mail Client

i) Create profiles and set up an e-mail account and adding contacts
ii) Create a new mail message and forward or reply to an e-mail message
iii) Add an attachment to an e-mail message and open or save an e-mail message attachment

Cycle 5: MS Binder

i) Storing and organizing related project files in a binder
ii) Retrieving related project files from a binder

III SEMESTER

S134 - APPLIED MATHEMATICS – III

(Common to AE, CE, CSE, EEE, EIE, IT, ME)

Prerequisite: Applied Mathematics-II, Applied Mathematics-II

Course Educational Objectives:

In this course student will learn about

1. The methodology of interpolation and extrapolation to common problems using different formulae
2. The application of Numerical Techniques in Integration; solving the algebraic and transcendental equations.
3. Solving Differential equations by using Numerical Methods..
4. The concepts of Vector Calculus Vector Differentiation and Conservative Fields.
5. The concepts of line integrals, surface and volume integrals, vector integral theorems and their applications

Course outcomes:

At the end of this course student will be able to

1. Apply the knowledge acquired to identify, formulate and solve problems in engineering using Numerical Techniques.
2. Apply the techniques of numerical interpolation and approximation of functions with ease.
3. Perform integration of functions when the actual function is not given and solve algebraic and transcendental equations.
4. Solve Ordinary Differential Equations with given initial conditions.
5. Apply Integration to find length, area and volume of any given surface.

UNIT – I

Solution of Algebraic and Transcendental Equations and Numerical Integration

Solutions of Algebraic and Transcendental Equations – Regula False Position method and Newtons Raphson Method in one variable. Numerical Integration – Trapezoidal rule – Simpson's 1/3 Rule –Simpson's 3/8 Rule.

UNIT – II

Interpolation and Finite Differences

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

UNIT – III

Numerical solution of Ordinary Differential Equations

Numerical solution of Ordinary Differential equations, Solution by Taylor's series - Picard's Method of successive Approximations - Euler's Method - Runge- Kutta Methods.

UNIT – IV

Vector Differentiation

Vector Differentiation: Gradient- Directional Derivatives -Divergence – Solenoidal fields- Curl –Irrotation fields-potential surfaces - Laplacian and second order operators and related properties of sums and products

UNIT – V

Vector Integration

Vector Integration - Line integral – work done –area - surface and volume integrals Vector integral theorems: Greens, Stokes and Gauss Divergence Theorems (Without proof) and related problems.

TEXT BOOKS

1. S. S. Sastry, "Introductory Methods of Numerical Analysis", Prentice Hall of India, 5th Edition, 2005.
2. Dr. B. V. Ramana, "Higher Engineering Mathematics", the McGraw Hill Companies, 1st Edition, 2010.

REFERNCES

1. Dr. B.S. Grewal, "Higher Engineering Mathematics", Khanna Publishers, 42ndEdition, 2012.
2. Steven .C. Chopra and Ra. P. Canale, "Numerical Methods for Engineers with programming and software application", The McGraw Hill Companies, 4th Edition, 2002.
3. M. K. Jain, S. R. K. Iyengar, R.K. Jain, "Numerical Methods for Scientific and Engineering Computation", New Age International Publishers, 5th Edition, 2007.

III SEMESTER

S290 - LINUX PROGRAMMING

Course Educational Objectives:

- To provide good insight into LINUX Operating System.
- Appreciates the difference between Windows & Linux.
- Gets a feel of multi user ,multi tasking environment.

Course Outcomes:

At the end of the course students will have the

- Ability to interact with LINUX Operating System.
- Understand the security features of LINUX.
- An insight into UBUNTU LINUX.

UNIT – I

Introduction to Linux operating system, Architecture of Linux, Features of Linux operating system.**Linux Utilities**-File handling utilities, Security by file permissions, Process utilities, Disk utilities, Networking commands, Filters, Text processing utilities and Backup utilities.

UNIT – II

Working with the Bourne again shell (bash): Introduction, shell responsibilities, pipes and input Redirection, output redirection, here documents, running a shell script, the shell as a programming language, shell meta characters, file name substitution, shell variables, command substitution, shell commands, the environment, quoting, test command, control structures, arithmetic in shell, shell script examples, interrupt processing, functions, debugging shell scripts.

UNIT – III

Files: File Concept, File System Structure, Inodes, File Attributes, File types, Library functions, the standard I/O and formatted I/O in C, stream errors, kernel support for files, System calls, file descriptors, low level file access – File structure related system calls (File APIs), file and record locking, file and directory management – Directory file APIs, Symbolic links & hard links.

UNIT - IV

sed – scripts, operation, addresses, commands, applications, awk – execution, fields and records, scripts, operation, patterns, actions, functions, using system commands in awk.

Sockets: Introduction to Sockets, Socket Addresses, Socket system calls for connection oriented protocol and connectionless protocol, example-client/server programs.

UNIT - V

Process creation and termination in Ubuntu. Scheduling algorithms used in Ubuntu, page replacement algorithms used in Ubuntu, inter process communication in Ubuntu, multithreading in Ubuntu, file system in Ubuntu, Semaphores, message queues and shared memory working mechanisms in Ubuntu.

TEXTBOOKS

1. N.Matthew, R.Stones and Wrox, ”Beginning Linux Programming”, Wiley India Edition, 4th Edition.
2. Robert Love, “Linux System Programming Talking Directly to the Kernel and C Library”, O'Reilly Media publications, 2nd Edition.

REFERENCES

1. T.Chan ,”Unix System Programming using C++”, PHI.
2. Sumitabha Das,”Unix Concepts and Applications”, TMH, 4th Edition.
3. W.R.Stevens, “UNIX Network Programming”, PHI,
4. Graham Glass, King Ables, “UNIX for programmers and users”, Pearson Education, 3rd Edition.

III SEMESTER

S197 - DISCRETE MATHEMATICS

(Common to CSE, IT)

Course Educational Objectives:

- Explain with examples the basic terminology of functions, relations, andsets.
- Perform the operations associated with sets, functions, and relations.
- Relate practical examples to the appropriate set, function, or relation model, and interpret the associated operations and terminology in context.
- Use formal logic proofs and/or informal but rigorous logical reasoning to, for example, predict the behavior of software or to solve problems such aspuzzles.
- Describe the importance and limitations of predicate logic.
- Relate the ideas of mathematical induction to recursion and recursivelydefined structures.

Course outcomes:

At the end of this course the student should be able to

- Outline basic proofs for theorems using the techniques of - direct proofs, example, and proof by contradiction, mathematical induction.
- Illustrate by examples the basic terminology of functions, relations, andsets and demonstrate knowledge of their associated operations.
- Designing Network application, data structures using Graph terminology.
- Construct compilers, error detection code, solve practical applications with the use of basic counting principles of permutations, combinations, inclusion/exclusion principle and the pigeonhole methodology.
- To solve scientific problems, mathematical issues with recurrence relations.

Pre requisite: Basic mathematical knowledge

UNIT - I

Mathematical Logic :

Propositional Calculus: Statements and Notations, Connectives, Truth Tables, Tautologies, Equivalence of Formulas, Duality law, Tautological Implications, Normal Forms, Theory of Inference for Statement Calculus, **Consistency of Premises, Indirect Method of Proof. Predicate calculus:** Predicative Logic, Statement Functions, Variables and Quantifiers, Free & Bound Variables, Inference theory for predicate calculus.

UNIT - II

Set Theory:

Introduction, Operations on Binary Sets.Relations: Properties of Binary Relations, Relation Matrix and Digraph, Operations on Relations, Partition and Covering, Transitive Closure, Equivalence, Compatibility and Partial Ordering Relations, Hasse Diagrams. **Functions**: Bijective Functions, Composition of Functions, Inverse Functions, Permutation Functions, Recursive Functions

UNIT - III

Graph Theory:

Basic Concepts of Graphs, Sub graphs, Matrix Representation of Graphs: Adjacency Matrices, Incidence Matrices, Isomorphic Graphs, Eulerian and Hamiltonian Graphs, Multigraphs, Graph Theory II: Planar Graphs, Euler's Formula, Graph Coloring, Chromatic Number, Trees, Spanning Trees: Properties, Algorithms for Spanning trees and Minimum Spanning Trees.

UNIT - IV

Algebraic Structures: Algebraic Systems with one Binary Operation, Properties of Binary operations, Semi groups and Monoids: Homomorphism of Semi groups and Monoids, Groups: Abelian Group, Cosets, Subgroups (Definitions and Examples of all Structures), **Combinatorics:** Basic of Counting, Permutations, Permutations with Repetition of Objects, Restricted Permutations, Combinations, Restricted Combinations, Pigeonhole Principle and its Application, Binomial Theorem**,** Binomial and Multinomial Coefficients.

UNIT - V

Recurrence Relation: Generating Function of Sequences, Calculating Coefficient of Generating Functions, Recurrence Relations, Formulation as Recurrence Relations, Solving linear homogeneous recurrence Relations by substitution, generating functions and The Method of Characteristic Roots. Solving Inhomogeneous Recurrence Relations

TEXT BOOKS

1. Tremblay and Manohar, "Discrete Mathematical Structures with Applications to Computer Science", TMH
2. Mott, Kandel and Baker, "Discrete Mathematics for Computer Scientists & Mathematicians", PHI, 2nd edition.

REFERENCES

1. S. Santha, "Discrete Mathematics With Combinatorics And Graph Theory", Cengage Learning India Private Limited, 2009.
2. Thomas Koshy,"Discrete Mathematics with Applications", Elsevier.
3. JK Sharma, Macmillan, "Discrete Mathematics", 2nd edition.
4. Uma Parvathi and Chandra sekharan, "Discrete Mathematics", PHI, 2010.
5. P.Grimaldi and Ramana, "Discrete and Combinational Mathematics", Ralph, Pearson, 5th edition.
6. CL Liu,Mahapatra ,"Elements of Discrete Mathematics", TMH

III SEMESTER

S325 - OBJECT ORIENTED PROGRAMMING USING JAVA

(Common to AE, EIE, IT)

Course Educational Objectives:

- Understanding Object Oriented Paradigm and implementation.
- Understanding the advantage of bottom up design over top down approach.
- An understanding of comprehensiveness of a Object Oriented Programming approach to a real world problem and the limitations of procedural approach.

Course Outcomes:

After completion of the course students will:

- Have sound knowledge in object oriented concepts and how they are implemented in JAVA.
- Appreciates the difference between procedure oriented ,object based and object oriented programming languages.
- The student will be able to understand the platform independency of JAVA.

UNIT - I

Basics of Object Oriented Programming (OOP):

Need for OO paradigm, A way of viewing world – Agents, responsibility, messages, methods, classes and instances, class hierarchies (Inheritance), method binding, overriding and exceptions, summary of oop concepts, coping with complexity, abstraction mechanisms.

Java Basics:

Data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and casting, simple java program, classes and objects – concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion, string handling.

UNIT - II

Inheritance: Hierarchical abstractions, Base class object, subclass, subtype, substitutability, forms of inheritance- specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance. Member access rules, super uses, using final with inheritance, polymorphism, abstract classes. **Packages and Interfaces:** Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages, differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces.

UNIT - III

Exception handling and Multithreading: Concepts of exception handling, benefits of exception handling, Termination or presumptive models, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes. Differences between multi threading and multitasking, thread life cycle, creating threads, synchronizing threads, daemon threads, thread groups.

UNIT – IV

Applets: Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets. Applet to applet communication, secure applet**,Event Handling:**Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes, inner classes. The AWT class hierarchy, user interface components- labels, button, canvas, scrollbars, text components, check box, check box groups, choices, lists panels – scrollpane, dialogs, menubar, graphics, layout manager – layout manager types – borders, grid, flow, card and grid bag.

UNIT - V

Swings: Introduction, limitations of AWT, MVC architecture, components, containers, exploring swing- JApplet, JFrame and JComponent, Icons and Labels, text fields, buttons – The JButton class, Check boxes, Radio buttons, Combo boxes, Tabbed Panes, Scroll Panes, Trees, and Tables.

TEXT BOOKS

1. Herbert schilidt, "Java: The complete reference", TMH, 7th edition.
2. Prof N.B Venkateswarlu and Prof E V Prasad," Learn Object Oriented Programming using Java, S. Chand.
3. Harvey M. Dietal and Paul J. Dietal, "Java: How to Program", PHI, 8th edition.

REFERENCES

1. Dr K SomaSundaram ,"Programming in Java2",JAICO Publishing house
2. P. Radha Krishna, "Object Oriented Programming through Java", University Press.

III SEMESTER

S191 - DIGITAL LOGIC DESIGN

(Common to CSE, IT)

COURSE EDUCATIONAL OBJECTIVES:

- The objectives of this course are to:
- Introduce the concept of digital and binary systems
- Be able to design and analyze combinational logic circuits.
- Be able to design and analyze sequential logic circuits.
- Understand the basic software tools for the design and implementation of digital circuits and systems.
- Reinforce theory and techniques taught in the classroom through experiments and projects in the laboratory.

COURSE OUTCOMES:

- Students should be able to
  - Be able to design a finite state machine and sequential logic design.
- Be able to synthesize a logic design from a natural language description of a problem.
- Be able to realize a complete arithmetic and logic unit.
- Be able to generate an HDL realization of combinational logic in a programmable gate array.
- Simulate a complete design to evaluate functional correctness and timing.
- Appreciation for advances in logic technology and their impact on computer systems.

UNIT - I

Binary Systems: Digital Computers and Digital Systems, Binary Numbers, Number base Conversion, Octal and Hexadecimal Numbers, Complements, Binary Codes, Binary Storage and Registers, Binary Logic, Integrated Circuits. **Boolean Algebra And Logic Gates:** Basic Definitions, Axiomatic definition of Boolean Algebra, Basic theorems and Properties of Boolean Algebra, Boolean functions, Canonical and Standard Forms, Other operations, Digital Logic Gates.

UNIT - II

Simplification Of Boolean Expressions: Formulation of simplification problem, Prime Implicants and irredundant disjunctive and conjunctive expression, Karnaugh Maps, Minimal Expressions for complete and incomplete Boolean functions. Five and Six Variable K-Maps, Quine-McCluskey Method, Prime Implicants and Implicate tables and irredundant expressions, and Table reductions.

UNIT - III

Combinational Logic: Design Procedure, Adders, Subractors, Code Conversion, Analysis Procedure, multilevel NAND and NOR circuits. Combinational Logic with MSI And LSI: Binary Parallel Adder, Decimal Adder, Magnitude Comparator, Decoders, Multiplexers.

UNIT- IV

Sequential Logic: Flip Flops, Triggering of Flip-Flops, Analysis of Clocked Sequential Circuits, State Reduction and Assignment, Flip-Flop Excitation tables, Design Procedure, Design of Counters, Design with state equations Registers, Counters and Memory : Registers. Shift registers, Ripple Counters, Synchronous Counters, Timing sequences, the memory unit.

UNIT - V

Programmable Logic & Clock Circuits: Read – Only Memory (ROM), PROM, Programmable Logic Device (PLD), Programmable Logic Array (PLA), Programmable Array Logic (PAL),555 timer, Astable and Monostable operations.

TEXT BOOKS

1. M.Morris Mano, Michael D Ciletti, "Digital Design", PEA, 4th edition.
2. Charles Roth and Jr.Lizy John, "Fundamentals of Logic Design", 5th edition.

REFERENCES

1. Kohavi, Jha ,"Switching and Finite Automata Theory, Cambridge, 3rd edition.
2. Leach, Malvino, Saha, " Digital Logic Design",TMH.
3. R.P. Jain , "Modern Digital Electronics", TMH.
4. M.Morris Mano, 'Computer Engineering Hardware Design', PHI.

III SEMESTER

S327 - OPERATING SYSTEMS

(Common to CSE, ECE, IT)

Course Educational Objectives:

- The main objective of the course is to provide basic knowledge of computer operating system structure and functioning.
- Students able to understand how Operating Systems evolved with advent of computer architecture.
- Comprehend the different CPU scheduling algorithms, page replacement algorithms and identify best one.
- Able to understand and find the best mechanism for handling deadlocks. Also understand File and directory management.

Course Outcomes

After successful completion of this course student shall able to,

- Understand the Operating System (OS) in different viewpoints. Learn the basic reasons for necessity of an OS in our computer and what necessary services it provides to the computer users. Also know the primary concepts of different operating systems structure.
- Understand the concept of process management, CPU scheduling algorithms and able to identify which CPU scheduling algorithm is efficient.
- Understand the importance of synchronization and how to handle deadlocks.
- Know how memory management strategies such as paging and segmentation. Appreciate concepts of virtual memory, demand paging and page replacement algorithms.
- Comprehend and analyze the importance of different file structures that are used in file storage system.
- Learn the basic concepts of directory implementation, free-space management and file recovery.

Pre requisite: Knowledge of system and its resources fur running a process.

UNIT – I

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

UNIT – II

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

UNIT – III

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

UNIT – IV

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

UNIT – V

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

TEXT BOOK

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

REFERENCES

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

III SEMESTER

S243 - ENVIRONMENTAL STUDIES

(Common to all branches)

Prerequisite: None

Course Educational Objectives:

In this course the student will learn about

1. Environmental issues related to local, regional and global levels.
2. Concepts of ecosystems and threats to global biodiversity.
3. Environmental pollution problems.
4. Environmental issues in the society.
5. Problems associated with over population and burden on environment.

Course Outcomes:

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

1. Evaluate local, regional and global environmental issues related to resources and management.
2. Understand the implications of the ecosystems and identify the threats to global biodiversity
3. Realige the problems related to pollution of air, water and soil.
4. Investigate and solve social issues of the environment.
5. Create awareness on the concept of sustainable population growth**.**

UNIT – I

Natural Resources: Definition, Scope and importance of Environmental Studies – Need for Public Awareness. Renewable and non-renewable resources –

Natural resources and associated problems – Forest resources, Water resources, Mineral resources, Food resources and Energy resources.

UNIT - II

Ecosystems: Concept of an ecosystem - Structure and functions of an ecosystem - Producers, consumers and decomposers. Energy flow in the ecosystem, Ecological succession, Food chains, Food webs and ecological pyramids. Bio-Geo Chemical Cycles.

Biodiversity and its conservation: **Introduction** – Definition & Levels of Measuring Biodiversity: Genetic, Species, Community and Ecosystem diversity.

Bio-geographical classification of India, India as a mega diversity nation, Values of Biodiversity: Direct and Indirect Values, Hot-spots of biodiversity, Threats to biodiversity, Man-wildlife conflicts, Endangered and endemic species of India. Conservation of biodiversity.

UNIT - III

Environmental Pollution: Definition, Sources, Effects and Control measures of

a) Air pollution
b) Water pollution
c) Soil pollution
d) Noise pollution
e) Radioactive Pollution

Solid waste Management: Sources of waste, Effects of improper handling of waste and measures to reduce the waste production and management methods of Municipal solid waste.

Disaster management: Floods, Earthquakes, Cyclones, Landslides and Tsunami.

UNIT - IV

Social Issues and the Environment: From Unsustainable to Sustainable development & Equitable use of resources for sustainable life style - Environment and human health - Resettlement and Rehabilitation of people, its problems and concern & Case Studies - Climate change : Global warming, Acid rains, Ozone layer depletion, Nuclear accidents and Holocaust & Case studies - Consumerism and waste products.

UNIT -V

Human Population and the Environment: Population growth & Variations among Nations, Population explosion – Family Welfare Program - Human Rights - Value Education - HIV/AIDS - Women and Child Welfare - Role of Information Technology in Environment and human health & Case Studies. Environmental legislation in India.

TEXT BOOKS

1 P.N.Palanisamy , "Environmental Science", Dorling Kindersley (India) Pvt.Ltd. Licenses of Pearson Education in South Asia, 2013, 2nd edition.

2 R. Rajagopalan, "Environmental Studies (From Crisis to Cure)", Oxford University Press, 2011, Second Edition.

REFERENCE

1. M. Anji Reddy, "Textbook of Environmental Sciences and Technology", BS Publications, 2011 Second Edition.

2. Erach Bharucha, "Textbook of Environmental Studies for Undergraduate Courses", University Grants Commission, University Press (India) Private Limited, 2005. (2010 Reprinted).

III SEMESTER

L155 - JAVA PROGRAMMING LAB

(Common to CSE, IT)

Course Educational Objectives:

- Understanding the concepts of of reliability and extensibility.
- Understands the features present in java that give the user the facility of safe computing.
- Student understands and learns various advanced features available in JAVA Language.

Course Outcomes

By completion of this course student will have

- Hands on experience in working of java environment & appreciates java features like applets.
- Hands on experience in working on web components.
- Experience in working on synchronized computation using concepts like multithreading

PROGRAMS:

1. Use JDK 1.5 or above on any platform e.g. Windows or Unix.
2. Student is expected to complete any 16 programs.
3. The Fibonacci sequence is defined by the following rule. The first 2 values in the sequence are 1, 1. Every subsequent value is the sum of the 2 values preceding it. Write A Java Program (WAJP) that uses both recursive and non-recursive functions to print the n^{th} value of the Fibonacci sequence.
4. WAJP to demonstrate wrapper classes, and to fix the precision.
5. WAJP that prompts the user for an integer and then prints out all the prime numbers up to that Integer.
6. WAJP that checks whether a given string is a palindrome or not. Ex: MALAYALAM is a palindrome.
7. WAJP for sorting a given list of names in ascending order.
8. WAJP to check the compatibility for multiplication, if compatible multiply two matrices and find its transpose.
9. WAJP that illustrates how runtime polymorphism is achieved.
10. WAJP to create and demonstrate packages.
11. WAJP, using *StringTokenizer* class, which reads a line of integers and then displays each integer and the sum of all integers.
12. WAJP that reads on file name from the user then displays information about whether the file exists, whether the file is readable/writable, the type of file and the length of the file in bytes and display the content of the using *FileInputStream* class.
13. WAJP that displays the number of characters, lines and words in a text/text file.
14. Write an Applet that displays the content of a file.
15. WAJP that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the + - x / % operations. Add a text field to display the result.
16. WAJP for handling mouse events.
17. WAJP demonstrating the life cycle of a thread.
18. WAJP that correctly implements Producer-Consumer problem using the concept of Inter Thread Communication.
19. WAJP that lets users create Pie charts. Design your own user interface (with Swings & AWT).
20. WAJP that allows user to draw lines, rectangles and ovals.
21. WAJP that implements a simple client/server application. The client sends data to a server. The server receives the data, uses it to produce a result and then sends the result back to the client. The client displays the result on the console. For ex: The data sent from the client is the radius of a circle and the result produced by the server is the area of the circle.
22. WAJP to generate a set of random numbers between two numbers x1 and x2, and x1>0.

23. WAJP to create an abstract class named Shape, that contains an empty method named numberOfSides(). Provide three classes named Trapezoid, Triangle andHexagon, such that each one of the classes contains only the method numberOfSides(), that contains the number of sides in the given geometrical figure.
24. WAJP to implement a Queue, using user defined Exception Handling (also make use of throw, throws).
25. WAJP that creates 3 threads by extending Thread class. First thread displays “Good Morning” every 1 sec, the second thread displays “Hello” every 2 seconds and the third displays “Welcome” every 3 seconds. (Repeat the same by implementing Runnable)

III SEMESTER

L177 - SHELL SCRIPTING LAB

Course Educational Objectives:

- Student should be able to have critical understanding to do programming in LINUX Operating System.
- Be able to use LINUX as a platform and use other higher level language compilers to carryout programming.
- To understand how inter process communication is achieved in a multiuser multitasking environment.

Course Outcomes:

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

- A good knowledge of shell scripting.
- Understanding the process of interaction with the underlying hardware.
- Implementing security features available in LINUX.

PROGRAMS:

1.Write a shell script that accepts a file name, starting and ending line numbers as arguments and displays all the lines between the given line numbers.

2. Write a shell script that deletes all lines containing a specified word in one or more files supplied as arguments to it.

3. Write a shell script that displays a list of all the files in the current directory to which the user has read, write and execute permissions.

4. Write a shell script that receives any number of file names as arguments checks if every argument supplied is a file or a directory and reports accordingly. Whenever the argument is a file, the number of lines on it is also reported.

5. Write a shell script that accepts a list of file names as its arguments, counts and reports the occurrence of each word that is present in the first argument file on other argument files.

6. Write a shell script to list all of the directory files in a directory.

7. Write a shell script to find factorial of a given integer.

8. Write an awk script to count the number of lines in a file that do not contain vowels.

9. Write an awk script to find the number of characters, words and lines in a file.

10. Write a c program that makes a copy of a file using standard I/O and system calls.

11. Implement in C the following Unix commands using System calls

A .cat B. ls C. mv

12. Write a program that takes one or more file/directory names as command line input and reports the following information on the file.

A. File type. B. Number of links. C. Time of last access. D. Read, Write and Execute permissions.

13. Write a C program to emulate the Unixls –l command.

14. Write a C program to list for every file in a directory, its inode number and file name.

15. Write a C program that demonstrates redirection of standard output to a file.Ex: ls> f1

16. Write a C program to create a child process and allow the parent to display “parent” and the child to display “child” on the screen.

17. Write a C program to create a Zombie process.

18. Write a C program that illustrates how an orphan is created.

19. Write a C program that illustrates how to execute two commands concurrently with a command pipe. Ex:-ls –l | sort

20. Write C programs that illustrate communication between two unrelated processes using named pipe.

21. Write a C program (sender.c) to create a message queue with read and write permissions to write 3 messages to it with different priority numbers.

22. Write a C program (receiver.c) that receives the messages (from the above message queue as specified in (21)) and displays them.

S180 - DATABASE MANAGEMENT SYSTEMS

(Common to AE, CSE, EEE, EIE, IT)

Prerequisite: Elementary set theory, concepts of relations and functions, propositional logic data structures (trees, Graphs, dictionaries)& File Concepts.

Course Educational Objectives:

This course enables the students to know about

- DBMS basic concepts, Database Languages.
- Data base Design.
- Normalization process and Transaction processing.
- Indexing.

Course Outcomes:

After the completion of the course, students should be able to

CO1: Understand DBMS concepts, architecture, Database languages, data models and design of database.

CO2: Applying the concepts of relational algebra, calculus, and also SQL.

CO3: Applying the normalization process for data base design.

CO4: Understand the issues in transaction processing, Analyzing different Concurrency and recovery strategies of DBMS

CO5:Analyzing different file organization techniques & Indexing Techniques.

UNIT - I

Introduction: An overview of database management system, database system Vs file system, Database system concepts and architecture, data models schema and instances, data independence and data base language and interfaces, Data definitions language, DML, Overall Database Structure.

Data modeling using the Entity Relationship Model: ER model concepts, notation for ER diagram, mapping constraints, keys, Concepts of Super Key, candidate key, primary key, Generalization, aggregation, reduction of an ER diagrams to tables, extended ER model, relationships of higher degree.

UNIT - II

Relational data Model and Language: Relational data model concepts, integrity constraints: entity integrity, referential integrity, Keys constraints, Domain constraints, relational algebra.

Introduction to SQL: Characteristics of SQL, Advantage of SQL. SQL data types and literals. Types of SQL commands. SQL operators and their procedure. Tables, views and indexes. Queries and sub queries. Aggregate functions. Insert, update and delete operations. Joins, Unions, Intersection, Minus, Cursors in SQL.

UNIT - III

Normalization: Functional dependencies, normal forms, first, second, third normal forms, BCNF, inclusion dependences, loss less join decompositions, normalization using FD, MVD, and JDs, alternative approaches to database design.

UNIT – IV

Transaction Processing Concepts*:* Transaction system, Testing of serializability, Serializability of schedules, conflict & view serializable schedule, recoverability, log based recovery, checkpoints, ARIESalgorithm,deadlock handling.**Concurrency Control Techniques:** Concurrency control, locking Techniques for concurrency control, Time stamping protocols for concurrency control, validation based protocol, multiple granularity, Recovery with concurrent transactions.

UNIT-V

Storage and Indexing: RAID levels, page formats, record formats, file types and organization, ISAM, B-tree,B+-tree.

TEXT BOOK

1. Korth, Silbertz, Sudarshan, "Database Concepts", Tata McGraw Hill.
2. Elmasri, Navathe, "Fundamentals of Database Systems", Addision Wesley.

REFERENCES

1. Raghu Ramakrishnan, "Database Management System", McGraw Hill.
2. Maheshwari Jain, "DBMS: Complete Practical Approach", Firewall Media, New Delhi.
3. Date C J, "An Introduction to Database System", Addision Wesley.

IV SEMESTER

S312 - MICRO PROCESSORS AND INTERFACING

(Common to CSE, IT)

Pre requisite: Digital Circuits, Computer organization

Course Objectives:

- To understand the architecture, programming and addressing modes of Intel 8086 .
- To understand various interfacing circuits necessary for various applications

Course Outcomes:

- Identify the basic element and functions of microprocessor.
- Describe the architecture of microprocessor and its peripheral devices.
- Demonstrate fundamental understanding on the operation between the microprocessor and its interfacing devices.
- Apply the programming techniques in developing the assembly language program for microprocessor application

UNIT-I

Microprocessor Architecture: Introduction to Microprocessors-Purpose of a Microprocessor, different types of Microprocessors, their features and their comparison; 8086 Microprocessor-Architecture, Special functions of General purpose registers, 8086 flag register and function of 8086 Flags, Addressing modes of 8086, Instruction set of 8086.

UNIT-II

8086 Assembly Language Programs: Pin diagram of 8086, Minimum mode and maximum mode of operation, Assembly language programs involving logical, Branch and Call instructions, Sorting, Evaluation of Arithmetic Expressions, String manipulation, Assembler directives, simple programs, procedures, and macros.

UNIT-III

8086 Memory & I/O Interfacing

Machine cycles, T- States, Timing diagrams, Memory interfacing, I/O Interfacing, Need for DMA. DMA data transfer Method, Interfacing with 8237/8257

UNIT-IV

Peripherals and Interfacing: 8255 PPI – various modes of operation and interfacing to 8086, Keyboard and Seven segment Displays, Stepper Motor, D/A and A/D converter interfacing.

UNIT-V

Data transfer: Serial data transfer schemes, RS 232C, 8251 USART architecture and interfacing

Interrupts: Interrupt structure of 8086, Interrupt Vector table, Interrupt service routines, Introduction to DOS and BIOS interrupts, 8259 PIC Architecture and interfacing cascading of interrupt controller and its importance.

Introduction to microcontrollers

TEXT BOOK

1. A.K.Ray and K.M. Bhurchandi, “Advanced Microprocessor and Peripherals”, TMH Publishers, 2nd edition.
2. Douglas V. Hall, “Micro Processors & Interfacing”, TMH, 2007

REFERENCES

1. J.K.Uffenbeck, “The 8088 and 8086 Micro Processors”, PHI, 4th Edition, 2003.
2. Ajay Deshmukh, “Micro Controllers-Theory and Applications”, Tata McGraw Hill Publishers.
3. Kenneth J.Ayala, “The 8051 Micro Controller”, Cenage Learning Publishers.

IV SEMESTER

S295 - MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

(Common to CE, CSE, EEE, EIE, IT)

Course Educational Objectives:

In this course student will learn about

1. The concepts of economics and accounting to make them effective business decision makers;
2. To help to the students of engineering to understand the concepts of demand, production, cost, and market structures for various business decisions.
3. Fundamentals of Economics, which is an important social science subject helps to engineers to take certain business decisions in the processes of optimum utilization of resources:
4. An overview on capital investment appraisal methods and sources of raising capital to promote the students to start new enterprises
5. Fundamental skills about accounting and to explain the process of preparing accounting statements & analysis for effective business decisions.
6. Fundamentals of Balance sheet and financial accounting.

Course Outcomes:

After completion of the course, students will be able to

1. Capable of analyzing fundamentals of economics such as demand, production, price, supply and investment concepts which helps in effective business administration.
2. Choose the right type of business activity, establish the business unit and invest adequate amount of capital in order to get maximum return from select business activity.
3. Prepare and analyse accounting statements like income & expenditure statement, balance sheet apart from the fundamental knowledge, to understand financial performance of the business and to initiate the appropriate decisions to run the business profitably.
4. Take the effective business decision& analyze the accounting statements.
5. Prepare the Balance sheet and calculate the financial accounts.

UNIT - I

Introduction to Managerial Economics: Economics – Definitions, Micro, Macro & Welfare economics – Managerial Economics - Definition, Nature and Scope of Managerial Economics, Limitations –Demand Analysis: Demand Determinants, Law of Demand and its exceptions, Types of demand. Definition, Types Measurement and Significance & types of Elasticity of Demand. Demand Forecasting, Factors governing demand forecasting, methods of demand Forecasting

UNIT - II

Theory of Production and Cost Analysis: Production Function – Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs. Laws of Returns, Internal and External Economies of Scale. **Cost Analysis:** Cost concepts, Cost & output relationship in short run & long run, Break-even Analysis (BEA)-Determination of Break-Even Point (simple problems)-Managerial Significance and limitations of BEA.

UNIT - III

Introduction to Markets & Pricing Policies:

Market structures: Types of competition, Features of Perfect competition, Monopoly and Monopolistic Competition, oligopoly - Price-Output Determination in case of Perfect Competition and Monopoly, Monopolistic competition. Objectives and Policies of Pricing-Methods of Pricing

UNIT - IV

Capital and Capital Budgeting: Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Components of working capital & Factors determining the need of working capital. Methods and sources of raising finance. Nature and scope of capital budgeting, features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method, Profitability Index, Internal rate of return (simple problems)

UNIT - V

Introduction to Financial Accounting: Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts with simple adjustments. **Financial Analysis through ratios:** Importance, types: Liquidity Ratios, Activity Ratios, Capital structure Ratios and Profitability ratios

TEXT BOOK

Aryasri," Managerial Economics and Financial Analysis", TMH, 2005, 2nd edition.

REFERENCES

1. Varshney & Maheswari," Managerial Economics", Sultan Chand, 2003.
2. Ambrish Gupta,"Financial Accounting for Management", Pearson Education, New Delhi.
3. Domnick Salvatore, "Managerial Economics in a Global Economy", Thomson, 4th Edition.

IV SEMESTER

S169 - COMPUTER ORGANIZATION

(Common to EIE, CSE, ECE, EEE, IT)

Course Educational Objectives:

- Students will be able to make use of the binary number system to translate values between the binary and decimal number systems, to perform basic arithmetic operations (i.e. addition, subtraction, multiplication, and division) and to construct machine code instructions.
- Students will be able to design logical expressions and corresponding integrated logic circuits for a variety of problems including the basic components of a CPU such as adders, multiplexers, the ALU, a register file, and memory cells.
- Students will be able to explain the fetch-execute cycle performed by the CPU and how the various components of the data path are used in this process.

Course outcomes:

The specific course outcomes supporting the program outcomes are:

- Able to understand register transfer, micro operations such as arithmetic logic ad shift.
- Able to analyze the basic concepts and elements of a computer system.
- Able to learn how to design a CPU.
- Able to perform arithmetic operations.
- Able to study memory and I/O management.

Pre requisite: Digital Logic Design

UNIT - I

Register Transfer and Micro Operations: Register Transfer language, Register Transfer Bus and Memory Transfers, Arithmetic Micro Operations, Logic Micro Operations, Shift Micro Operations, Arithmetic Logic Shift Unit.

Basic Computer Organization and Design: Instruction Codes, Computer Registers, Computer Instructions– Instruction cycle, Memory – Reference Instructions, Input – Output and Interrupt.

UNIT - II

Micro Programmed Control: Control Memory, Address Sequencing, Micro program example, Design of Control unit, hard wired control, Micro programmed control.

Central Processing Unit: STACK organization, Instruction formats, Addressing modes, DATA Transfer and Manipulation, Program control, Reduced Instruction Set computer.

UNIT - III

Pipelining and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC pipeline, Vector Processing.

Computer Arithmetic: Data Representation, Fixed Point Representation, Floating Point Representation, Addition and Subtraction, Multiplication Algorithms, Division Algorithms, Floating Point Arithmetic operations, Decimal Arithmetic unit, Decimal Arithmetic operations.

UNIT- IV

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

UNIT - V

Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, Direct Memory Access, Input –Output Processor, Serial communication.

TEXT BOOK

M.Morris Mano, "Computer Systems Architecture", Pearson Education publishers.

REFERENCES

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

IV SEMESTER

S381 - SOFTWARE ENGINEERING

(Common to CSE, EEE, IT)

Course Educational Objectives:

After learning the software engineering the student:

- An understanding of different software processes and how to choose between them
- How to understand requirements from a client and specify them
- Design in the large, including principled choice of software architecture, the use of modules and interfaces to enable separate development, and design patterns
- Understanding good code practices, including documentation, contracts, regression tests and daily builds.
- Various quality assurance techniques, including unit testing, functional testing and automated analysis tools.

Course Outcomes:

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

- Students will understand importance of software engineering and software process concepts.
- Students will learn about different software development process models and how to choose an appropriate one for project.
- Students will demonstrate the ability to manage a project including planning, scheduling and risk assessment/management
- Students will gain confidence at having conceptualized, designed and implemented a working, medium sized project with their team.
- Students will learn about and go through the software development cycle with emphasis on different processes- requirements, design and implementation phases.
- Students will author a software testing plan

Pre requisite: C programming, Database Management Systems

UNIT - I

Introduction to software engineering: The evolving role of Software, software, changing nature of software, legacy software, software myths.

Software process: layered technology, process frame work, CMMI, process patterns, assessment, personal and team process models, process technology, product and process.

UNIT - II

Process models: Prescriptive models, water fall model, incremental, evolutionary and specialized process models, unified process.

Software engineering practice: communication practices, planning practices, modelling practices, construction practice and deployment.

UNIT - III

Requirements Engineering: A bridge to design and construction, RE tasks, initiating the RE process, Eliciting Requirements, developing use cases, building the analysis models, negotiating and validating requirements.

Building the analysis model: requirements analysis, analysis modelling approaches, data modelling concepts, OOA, scenario based modelling, flow rated modelling, class based modelling, creating a behaviour model.

UNIT - IV

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

UNIT - V

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

TEXT BOOK

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

REFERENCES

1. Ian Sommerville, "Software engineering", Pearson education, 2008, 8th edition.
2. Ali Behforooz and Frederick J Hudson, "Software Engineering Fundamentals", Oxford University Press, New Delhi, 1996.
3. Stephan Schach, "Software Engineering", Tata McGraw Hill, 2007.
4. Pfleeger and Lawrence , "Software Engineering: Theory and Practice, Pearson education, 2001,1995, PHI, second edition.

IV SEMESTER

S351 - PROBABILITY AND STATISTICS

(Common to CSE, IT, ME)

Course Educational Objectives:

The main objectives of this course are

- To revise elementary concepts and techniques encountered in probability.
- To extend and formalize knowledge of the theory of probability and random variables.
- To introduce new techniques for carrying out probability calculations and identifying probability distributions.
- To motivate the use of statistical inference in practical data analysis.
- To study elementary concepts and techniques in statistical methodology.

Course Outcomes:

This course is intended to contribute to the following program outcomes:

- An ability to apply the knowledge of mathematics, science and engineering.
- An ability to design and conduct experiments, as well as to analyze and interpret data
- An ability to identify, formulate and solve engineering problems.
- An ability to use the techniques, skills and modern probabilistic and statistical tools necessary for engineering practice

UNIT - I

PROBABILITY AND RANDOM VARIABLES

Conditional probability – Multiplication theorem-Baye's theorem.

Random variables – Discrete and continuous Random Variables and their distribution functions, Mathematical Expectation of Univariate Random Variable.

UNIT – II

PROBABILITY DISTRIBUTIONS

Probability Distributions-. Binomial, Poisson, Normal and Gamma distributions- related properties, simple applications. Moment Generating Function and properties. Moment Generating Function for standard distributions.

UNIT – III

SAMPLING DISRIBUTION AND ESTIMATION

Population and samples. Sampling distribution of mean (with known and unknown variance), proportion, variances. - Sampling distribution of sums and differences. Point and interval estimators for mean, variance and proportions.

UNIT – IV

TESTING OF HYPOTHESIS

Null and Alternative Hypothesis, One tail and two tailed tests,Type I and Type II errors. Testing of hypothesis concerning means, proportions and their differences using Z-test. Tests of hypothesis using Student's t-test, F-test and χ^2 test. Applications of decision making using the above tests.

UNIT – V

CORRELATION AND CURVE FITTING

Simple Bivariate Correlation and Regression lines.

Curve fitting: Fitting a straight line –Second degree curve-exponential curve by method of least squares and goodness of fit.

TEXT BOOK

1. Miller & Freund's, "Probability and Statistics for Engineers", Prentice Hall of India, New Delhi, 2011, 8th edition..
2. William W. Hines "Probability and Statistics in Engineering" John Wiley & Sons, 2002, 4th edition.

REFERENCES.

1. Jay L.Devore , "Probability and Statistics for engineering and the sciences", Cengage Learning India, 2012, 8th edition.
2. S.C.Gupta & V.K.Kapoor, "Fundamentals of Mathematical Statistics", Sultan Chand and sons, New Delhi 2002, 11thedition.
3. T.K.V.Iyangar, "Probability and Statistics", S.Chand & Company, New Delhi, 2012, 3rd edition.
4. B.V.Ramana, "Higher Engineering Mathematics" TMH, New Delhi, 2010, 1st Edition.

IV SEMESTER

S355 - PROFESSIONAL ETHICS AND HUMAN VALUES

(Common to all branches)

COURSE EDUCATIONAL OBJECTIVES:

- To create an awareness on engineering ethics and human values.
- To adumbrate the inevitability of different intellectual property rights like patents, copyrights, trademarks, industrial design and trade secret.
- To give an impetus on achieving higher positions in profession, with ethic and human values as a base and support for the growth.
- To explicate the professional and societal responsibilities of the engineers.
- To make the student realize the sensitiveness associated with experimentation process

COURSE OUTCOMES:

At the end of the course, the student

- Acquires the basic concepts of Professional ethics and human values & Students also gain the connotations of ethical theories.
- Knows the duties and rights towards the society in an engineering profession
- Would realize the importance and necessity of intellectual property rights.
- Can take all the necessary precautions while conducting the experiments, which may reduce the risk.
- Understands the importance of risk evacuation system in reality and takes the utmost responsibility while handling the risky situations.

UNIT - I

ETHICS

Senses of 'Engineering Ethics' -Variety of moral issues - Types of inquiry -Moral dilemmas Moral autonomy -Kohlberg's theory Gilligan's theory -Consensus and controversy – Models of Professional Roles -Theories about right action- Self interest - Customs and religion -Uses of Ethical theories.

UNIT - II

HUMAN VALUES

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

UNIT – III

ENGINEERING AS SOCIAL EXPERIMENTATION

Engineering as experimentation - Engineering Projects VS. Standard Experiments - Engineers as responsible experimenters – Codes of ethics - Industrial Standards - A balanced outlook on law- The challenger case study.

UNIT - IV

SAFETY, RESPONSIBILITIES AND RIGHTS

Safety and risk- Assessment of safety and risk- Risk benefit analysis and reducing risk- Three Mile Island and Chernobyl case study - Collegiality and loyalty -Respect for authority - Collective bargaining – Confidentiality- Conflicts of interest - Occupational crime - Professional Rights- Employee rights- Intellectual Property Rights (IPR) discrimination.

UNIT - V

GLOBAL ISSUES

Multinational Corporation's -Environmental ethics-computer ethics -weapons development Engineers as managers - consulting engineers-engineers as expert witnesses and advisors Moral leadership - sample code of Ethics (Specific to a particular Engineering Discipline).

TEXT BOOKS

1. R.S.Nagarajan,"Professional Ethics and Human Values", New Age Publishers – 2006.
2. Mike Martin and Roland Schinzinger, "Ethics in engineering", McGraw Hill, New York 1996.

REFERENCES

1. Govindarajan M, Natarajan S, Senthil Kumar V. S, " Engineering Ethics", Prentice Hall of India, New Delhi, 2004.
2. Charles D. Fleddermann, "Engineering Ethics", Pearson Education/ Prentice Hall, New Jersey,2004.
3. Charles E Harris, Michael S. Protchard and Michael J Rabins, "Engineering Ethics – Concepts and Cases", Wadsworth Thompson Leatning, United States, 2000.
4. John R Boatright, "Ethics and the conduct of business", Pearson Education, New Delhi,2003.
5. Edmund G Seebauer and Robert L Barry, "Fundamentals of ethics for scientists and engineers", Oxford University Press, Oxford, 2001.

IV SEMESTER

L130 - DATABASE MANAGEMENT SYSTEM LAB

(Common to CSE, IT)

Pre requisite: Knowledge of basic SQL commands.

Course Educational Objectives:

The major objective of this lab is to provide a strong formal foundation in database concepts, technology and practice to the participants to groom them into well-informed database application developers.

The sub-objectives are:

1. To give a good formal foundation on the relational model of data
2. To present SQL and procedural interfaces to SQL comprehensively
3. To give an introduction to systematic database design approaches covering conceptual design, logical design and an overview of physical design

Course Outcomes

After undergoing this laboratory module, the participant should be able to:

CO1: Understand and effectively explain the underlying concepts of database design.
CO2: Design and implement a database schema for a given problem-domain
CO3: Populate and query a database using SQL DML/DDL commands and applying enforce integrity constraints on a database.
CO4: Executing PL/SQL including stored procedures, stored functions, cursors, packages.

Roll number, student name, date of birth, branch and year of study.

1. Insert 5 to 10 rows in a table?
2. List all the students of all branches
3. List student names whose name starts with ‘s’
4. List student names whose name contains ‘s’ as third literal
5. List student names whose contains two ‘s’ anywhere in the name
6. List students whose branch is NULL
7. List students of CSE & ECE who born after 1980
8. List all students in reverse order of their names
9. Delete students of any branch whose name starts with ‘s’
10. Update the branch of CSE students to ECE
11. Display student name padded with ‘*’ after the name of all the students

2) Create the following tables based on the above Schema Diagram with appropriate data types and constraints and perform the following queries.

SAILORS (Saild, Salname, Rating, Age)

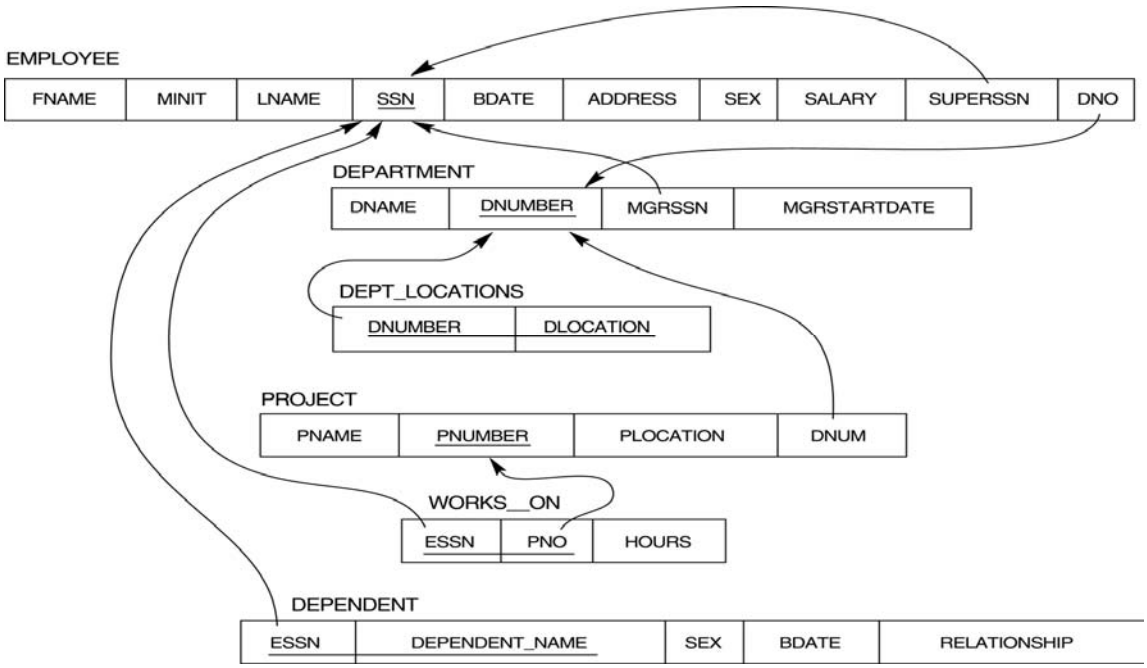
RESERVES (Sailid, boatid, Day)

BOATS (Boatid, Boat-name, Color)

1. Insert 5 to 10 rows in all tables?

2. Find the name of sailors who reserved boat number 3.
3. Find the name of sailors who reserved green boat.
4. Find the colors of boats reserved by "Ramesh".
5. Find the names of sailors who have reserved atleast one boat.
6. Find the all sailid of sailors who have a rating of 10 or have reserved boated 104.
7. Find the Sailid's of sailors with age over 20 who have not registered a red boat.
8. Find the names of sailors who have reserved a red or green boat.
9. Find sailors whose rating is better than some sailor called 'Salvador'.
10. Find the names of sailors who are older than the oldest sailor with a rating of 10.

3) Schema Diagram for the rest of the SQL and PLSQL Programs.



Create the following tables based on the above Schema Diagram with appropriate data types and constraints.

EMPLOYEE (Fname, Mname, Lname, SSN, Bdate, Address, Gender, Salary, SuperSSN, Dno)

DEPARTMENT(Dnumber, Dname, MgrSSN, Mgrstartdate)

DEPENDENT (ESSN, Dependent_Name, Gender, Bdate, Relationship)

1) Insert 5 to 10 rows into all the tables.

2) Display all employee's names along with their department names.
3) Display all employee's names along with their dependent details.
4) Display name and address of all employees who work for 'ECE' department.
5) List the names of all employees with two or more dependents.
6) List the names of employee who have no dependents.
7) List the names of employees who have at least one dependent.
8) List the names of the employees along with names of their supervisors using aliases.
9) Display name of the department and name of manager for all the departments.
10) Display the name of each employee who has a dependent with the same first name and gender as the employee.
11) List the names of managers who have at least one dependent.
12) Display the sum of all employees' salaries as well as maximum, minimum and average salary in the entire departments department wise if the department has more than two employees.
13) List the departments of each female employee along with her name.
14) List all employee names and also the name of the department they manage if they happen to manage a dept.
15) Display the name of the employee and his / her supervisor's name.

4) Create the following tables based on the above Schema Diagram with appropriate data types and constraints in addition to the tables in Experiment 2.

DEPT_LOCATIONS (Dnumber, Dloaction)

PROJECT (Pname, Pnumber, Plocation, Dnum)

WORKS_ON(ESSN, Pno, Hours)

1) Insert 5 to 10 rows into all the tables.
2) Find the names of the employees who work on all the projects controlled by the department 'ECM'.
3) List the project number, name and no. Of employees who work on that project for all the projects.
4) List the names of all the projects controlled by the departments department wise.
5) Retrieve the names of employees who work on all projects that 'John' works on.
6) List the project numbers for projects that involve an employee either as worker or as a manager of the department that controls the project.

7) List the names of all employees in one department who work more than 10 hours on one specific project.

8) For each project, list the project name and total hours (by all employees) spent on that project.

9) Retrieve the names of all employees who work on every project.

10) Retrieve the names of all employees who do not work on any project.

11) Display the name and total no. of hours worked by an employee who is working on maximum no. of projects among all the employees.

12) Display the names of all employees and also no. of hours, project names that they work on if they happen to work on any project(use outer join).

13) List the employee name, project name on which they work and the department they belong to for all the employees using alias names for the resulting columns.

14) Retrieve the names of all employees who work on more than one project department wise.

15) List all the departments that contain at least one occurrence of 'C' in their names.

5) Create a view that has project name, controlling department name, number of employees and total hours worked on the project for each project with more than one employee working on it.

1) List the projects that are controlled by one department from this view.
2) List the managers of the controlling departments for all the projects.
3) Demonstrate one update operation on this view.
4) List the Location of the controlling departments for all the projects.
5) Retrieve the data from the view.

PL/SQL LAB CYCLE

CYCLE-II

6. Write a PL/SQL Block to find whether the number is Armstrong or not.
7. Write a PL/SQL program for generating Fibonacci series
8. Write an anonymous PL/SQL block that fetches and displays the data from employee table to the console.
9. Write a program that updates salaries of all employees with 10 % hike (use cursors).
10. Write a program to fetch salary and employee name from employee table for a given user input. When no data found raise an exception that prints the message "no data found".

11. Write a program to find the number of records of any given table using % ROWCOUNT.
12. Write a cursor to display the list of employees and total salary department wise.
13. Write a database trigger on employee table so that the trigger fires when all the DML statements are executed (print appropriate message).
14. Write a trigger in such a way that it should not allow insert or update or delete on Wednesday and Thursday and display the proper message.
15. Write a procedure to display the name and salary of employee when user inputs SSN using IN/OUT parameters.
16. Write a function to check the validity of the given employee number from the employee table (print the appropriate message using PL/SQL block).
17. Visit TPC and submit report.

IV SEMESTER

L162 - MICROPROCESSOR AND INTERFACING LAB

Course Objectives:

1. Understand the different data transfer instructions.
2. Understand the different Arithmetic,logic instructions.
3. Understand the different interfacing devices.
4. Understand the 8051 microcontroller.

Course Outcomes:
At the end of this course,student will be able to

1. Clearly understand the different types of instructions.
2. Differentiate the Signed and unsigned instructions.
3. To write the assembly language programs.
4. Differentiate the different interfacing devices.
5. ports and timers in 8051 microcontroller.

LIST OF EXPERIMENTS
(Minimum 12 experiments has to be conducted)

Part I: 8086 Programs

1. Data Transfer Operations (MOV & XCHG)
2. Arithmetical Operations (ADD,ADC,SUB,SBB,DAA,AAA)
3. Logical Operations (AND,OR,XOR,Shift, Rotate)
4. String Operations
5. Sorting (Ascending & Descending Order)
6. Code Conversion Programs
7. String Comparison (PASSWORD CHECKING)
8. Read a Character and Display using MASM
9. Display String on the monitor using MASM

Part II: 8086 Interfacing

10. Key board Interfacing
11. Display Interfacing
12. Stepper motor Interfacing
13. DAC Interfacing (Sine, Square, Saw tooth, Triangular)
14. ADC Interfacing
15. 8259 Interrupt Controller

V SEMESTER

S181 - DESIGN AND ANALYSIS OF ALGORITHMS

(Common to CSE, IT)

Course Educational Objectives:

1. To explain the fundamental concepts of various algorithm design techniques.
2. To make the students familiar to conduct performance evaluation of algorithms.
3. To expertise the students with the various existing algorithm design techniques.
4. To motivate the students to design a new algorithms for various problems.
5. To introduce the concepts of NP-Hard problems.

Course Outcomes:

After completion of the course students are able to:

1. Analyze and make quantitative judgment about the efficiency of algorithms.
2. Apply algorithm design techniques to solve new problems.
3. Propose new algorithm design techniques for solving real world problems.
4. Have a sense of the complexities of various problems in different domains.

UNIT - I

Introduction:

Algorithm definition, Specifications, Performance Analysis- Time Complexity, Asymptotic Notations-Big-Oh, Omega, Theta.**Divide and Conquer**: General Method, Binary Search, Finding Maximum and Minimum, Merge Sort, Quick sort.

UNIT - II

The Greedy Method

General Method, Knapsack Problem, Job sequencing with deadlines, Minimum-cost spanning trees, Optimal storage on tapes, Optimal merge pattern, Single source shortest paths.

UNIT - III

Dynamic Programming

General method, Multistage graph, All pairs shortest path, Single-source shortest path, Optimal Binary search trees, 0/1 Knapsack, Reliability design, the traveling salesman problem.

UNIT – IV

Back tracking

The General Method, The 8-Queens Problem, Sum of subsets, Graph coloring, Hamiltonian cycles. **Branch and Bound** - The method, 0/1 Knapsack problem, Traveling salesperson

UNIT - V

NP-hard and NP-Complete Problems

Basic concepts, Cook's Theorem, NP- Hard Graph problems. **Amortized Analysis:** An Unrelated Puzzle, Binomial Queues, Skew Heaps, Fibonacci Heaps, Splay Trees.

TEXT BOOK

1. Ellis Horowitz, Sartaj Sahni, "Fundamentals of Computer Algorithms", Galgotia Pubications
2. Mark Allen Weiss ,"Data Structures and Algorithm Analysis in C++", PEA 2007, 3rd edition.

REFERENCES

1. Aho, Hopcroft & Ullman, "The Design and Analysis of Computer Algorithms", Addison Wesley publications
2. Thomas H. Corman et al, "Introduction to Algorithms", PHI.

V SEMESTER

S168 - COMPUTER NETWORKS

(Common to EIE, CSE, ECE, EEE, IT)

Course Educational Objectives:

1. To educate concepts, vocabulary and techniques currently used in the area of computer networks.
2. To study protocols, network standards, the OSI model, IP addressing, cabling, networking components, and basic LAN design.
3. To accumulate existing state-of-the-art in network protocols, architectures, and applications.
4. To be familiar with contemporary issues in networking technologies

Course Outcomes:

After completion of this course, the students would be able to

1. To understand the organization of computer networks, factors influencing computer network development and the reasons for having variety of different types of networks.
2. To design a network routing for IP networks.
3. To identify main internal PC components and connections.
4. To explain how a collision occurs and how to solve it.
5. To demonstrate proper placement of different layers of ISO model and illuminate its function.
6. To learn Internet structure and can see how standard problems are solved in that context.
7. To determine proper usage of the IP address, subnet masks and default gateway in a routed network.
8. To understand internals of main protocols such as HTTP, FTP, SMTP, TCP, UDP, IP

UNIT - I

Introduction: Use of Computer Networks- Network Hardware- Network software-Reference models Example Networks- Network Standardization. Physical Layer: The theoretical basis for Data communication- Guided Transmission Media.

UNIT - II

Data link layer: design issues- framing, error detection and correction, CRC, Elementary data link protocols- Simplex, Stop&Wait protocols, Sliding window protocols-one-bit,go-back-n,selective repeat. Medium Access Control Sub layer: Channel allocation problem- multiple access protocols-ALOHA,CSMA protocols, token bus,token ring, Ethernet, Collision free protocols, Data link layer switching, Bridges, Bridge learning algorithms,bridges from 802.x to 802.y, Local internetworking,spaning Tree bridges, Remote bridges.

UNIT – III

Network layer: Network layer design issues- Routing algorithms- Shortest path, Flooding, Distance vector routing, Link State routing , Hierarchical Routing, Broadcast routing & Multicast Routing,ICMP,ARP,RARP,BOOTP,DHCP, Congestion control algorithms- Leaky Bucket, Toke Bucket,Quality of service, Internetworking- network layer in the Internet.

UNIT - IV

Transport layer: Transport service- Elements of transport protocols- Internet transport protocols: TCP & UDP, Flow control-Segments, TCP Timers.

UNIT - V

Application Layer: Domain Name System- Electronic Mail -the World Wide Web, Network Security.

TEXT BOOK

Andrews S. Tanenbaum, "Computer Networks", PHI, Fourth Edition.

REFERENCES

1. William Stallings, "Data and Computer Communications", Pearson Education, seventh Edition.
2. Behrouz A .Fourouzan, "TCP/IP Protocol Suite", Tata-McGraw Hill, Fourth Edition.
3. James F.Kurose, Keith W.ROSS, "Computer Networking a Top-Down Approach featuring the Internet", Pearson Education.

V SEMESTER

S401 - THEORY OF COMPUTATION

(Common to CSE, IT)

Course Educational Objectives

- Basic understanding of the notion of a regular set and its representation by DFA's, NFA's, and regular expressions.
- To study abstract models of information processing machines and limits of digital computation
- Basic understanding of the notion of a context-free language and its representation by context-free grammars and push-down automata.

Course Outcomes

As a result of the content and structure of this course, students should be able to:

- Able toUnderstand the functioning of Finite-State Machines, Deterministic Finite-State Automata and Nondeterministic Finite-State Automata.
- Able to Create Automata to accept strings from various simple languages.
- Able to Discuss the different languages like Regular, Context-Free and Context-Sensitive languages;
- Able to Convert from Push Down Automata to Context –Free Grammars and Vice-Versa.
- Able to Design the Turing Machines and understanding of the notion of an undecidable problems.

Pre requisite: Knowledge in mathematics, including a course in Discrete mathematics, and in programming.

UNIT - I

Introduction to Finite Automata: Strings, alphabets and languages ,finite state systems, basic definitions, non deterministic finite automaton, NFA with □-transitions - Significance, acceptance of languages, Equivalence between NFA with and without □-transitions, NFA to DFA conversion, minimization of FSM, equivalence between two FSM's, Finite Automata with output- Moore and Melay machines.

UNIT - II

Regular Expressions: Regular sets, regular expressions, Constructing finite Automata for a given regular expressions, Conversion of Finite Automata to Regular expressions. Pumping lemma of regular sets, closure properties of regular sets.

UNIT - III

Context Free Grammar: Regular grammars-right linear and left linear grammars, Context free grammar, derivation trees, Right most and leftmost derivation of strings, Ambiguity in context free grammars. Simplification of Context Free Grammars. Chomsky normal form, Greiback normal form, Pumping Lemma for Context Free Languages, closure properties of CFL's

UNIT - IV

Push Down Automata: Introduction, definition, model, acceptance of CFL, Acceptance by final state and acceptance by empty stack and its equivalence. Equivalence of CFL and PDA and Interco version.

UNIT - V

Turing Machine: Introduction, The Turing machine model, Computable languages and functions, Techniques of Turing Machine Construction .**Undesirability:** Properties of Recursive and Recursively Enumerable Languages; Universal Turing Machines, undesidability of posts- Correspondence problem. **The Chomsky Hierarchy:** Regular grammars, unrestricted grammars, Context sensitive languages.

TEXT BOOKS

1. John E. Hopcraft and J.D.Ullman, "Introduction to Automata Theory Languages and Computation", Narosa Publications, 1999.
2. Daniel I.A. Cohen, "Introduction to Computer Theory", John Wiley. 1997, 2nd Edition

REFERENCES

1. John C Martin, "Introduction to languages and the Theory of Computation", TMH
2. Lewis H.P. & Papadimition C.H, "Elements of Theory of Computation", Pearson /PHI.
3. Mishra and Chandrashekaran,"Theory of Computer Science – Automata languages And computation", PHI, 2nd edition.
4. Sipser, "Introduction to Theory of Computation", Thomson, 2nd Edition.

V SEMESTER

S323 - OBJECT ORIENTED ANALYSIS AND DESIGN

Course Educational Objectives:

1. The course Object-Oriented Analysis and Design (OOAD) will expose students to the basics of object-oriented analysis and design using UML (Unified Modeling Language).
2. Learn how to use the UML modeling language and use the notation of UML diagrams such as Activity Diagrams, Use Case, Class, Sequence, etc.
3. Understand how the various models relate to each other and know when to use each model in the system development life cycle.
4. To provide the importance of the software design process.

Course Outcomes:

After completion of the course students are able to:

1. To create use case documents that capture requirements for a software system.
2. To create class diagrams that model both the domain model and design model of a software system.
3. To design the interface between the classes and objects.
4. To create interaction diagrams that models the dynamic aspects of a software system.
5. To understand the facets of the Unified Process approach to designing and building a software system.
6. To build a model for the user interface (UI) of a software application.
7. To measure the Level of User satisfaction and software quality assurance.

UNIT - I

Introduction to UML: Importance of modeling, principles of modeling, object oriented modeling, conceptual model of the UML, Architecture, and Software Development Life Cycle.

UNIT - II

Basic Structural Modeling: Classes, Relationships, common Mechanisms, and diagrams.
Advanced Structural Modeling: Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages,case studies

UNIT - III

Class & Object Diagrams: Terms, concepts, modeling techniques for Class & Object Diagrams,case studies

UNIT - IV

Basic Behavioral Modeling-I: Interactions, Interaction diagrams Use cases, Use case Diagrams, Activity Diagrams ,case studies

UNIT - V

Advanced Behavioral Modeling: Events and signals, state machines, processes and Threads, time and space, state chart diagrams.
Architectural Modeling: Component, Deployment, Component diagrams and Deployment diagrams, case studies

TEXT BOOK

Grady Booch, James Rumbaugh and Ivar Jacobson, "The Unified Modeling Language User Guide, Pearson Education, 2nd edition.

REFERENCES

1. Meilir Page-Jones, "Fundamentals of Object Oriented Design in UML", Pearson Education.
2. Pascal Roques, "Modeling Software Systems Using UML2", WILEY Dreamtech India Pvt Ltd.
3. Atul Kahate," Object Oriented Analysis & Design", Tata McGraw-Hil Companies.
4. Craig Larman, "Appling UML and Patterns: An introduction to Object – Oriented Analysis and Design and Unified Process", Pearson Education.

V SEMESTER

S167 - COMPUTER GRAPHICS

(Common to CSE, IT)

Course Educational Objectives:

- Student will understand the mechanism behind the image display on the screen.
- An understanding about mathematical foundations on various multi dimensional image transformations.
- An understanding into the procedure which are used to display the real world objects on a limited screen environment without losing generality.

Course Outcomes:

After completion of the course students are able to:

- Understands various projection mechanisms.
- Understands various image drawing & clipping algorithms.
- How a 3D image is displayed on a 2D screen.

UNIT - I

Introduction: Usage of Graphics and their applications, Presentation Graphics-Computer Aided Design-ComputerArt- Entertainment- Education and Training-Visualization- Image Processing- Graphical User Interfaces. Over view of Graphics systems: Video Display Devices- Raster Scan systems-random scan systems-Graphics monitors and workstations-Input devices.

UNIT - II

Output primitives: Points and Lines-Line Drawing Algorithms- Loading the Frame buffer-Line function- Circle- Generating Algorithms- Ellipse Generating Algorithms-Other Curves-Parallel Curve Algorithms-Curve Functions-Pixel Addressing- Filled Area Primitives-Filled Area Functions.

UNIT - III

Two Dimensional Geometric Transformations: Basic Transformations- Matrix Representations - Homogeneous Coordinates - Composite Transformations - Other Transformations-Transformations between Coordinate Systems - Affine Transformations-Transformation Functions- Raster methods for Transformation.

UNIT - IV

Two Dimensional Viewing: The viewing Pipeline-Viewing Coordinate Reference Frame-Window-to-Viewport Coordinate Transformation-Two Dimensional Viewing Functions-Clipping Operations-Point Clipping-Line Clipping-Polygon Clipping.

UNIT - V

Three Dimensional Concepts and Object representations: 3D display methods-3DGraphics-Polygon Surfaces- Curved Lines and Surfaces- Quadratic Surfaces, Three Dimensional Geometric and Modeling Transformations: Translation-Rotation-scaling-Other Transformations-Composite Transformations-3D Transformation Functions-Modeling and Coordinate Transformations.

TEXT BOOK

Donald Hearn & M. Pauline Baker, “Computer Graphics C Version”, Pearson Education, New Delhi, 2004.

REFERENCES

1. David F. Rogers; “Procedural Elements for Computer Graphics”; TMH
2. J. D. Foley, S. K Feiner, A Van Dam F. H John; “Computer Graphics: Principles & Practice in C”; Pearson
3. Franscis S Hill Jr; “Computer Graphics using Open GL”; Pearson Education, 2004.

V SEMESTER

S137 - ARTIFICIAL INTELLIGENCE

(Common to CSE, IT)

Course Educational Objectives

- This course is used to provide the description of agents and various types of agents and how they used to solve various AI problems.
- This gives a clear view of analysingAI problems, types of problems techniques of solving problems.
- It gives a clear view of knowledge, representation of knowledge, types of logic and its algorithms.
- It provides a better understanding of uncertainty and certainty, its factors various theories of uncertainty and appropriate examples.
- It provides a clear view of state space in search, game playing procedures, expert systems and advanced concepts like swarm intelligent systems.

Course Outcomes:

- After the completion of the course, students should be able to,
- **CO1**: Understand about AI techniques and different ways to implement them and deals about the techniques and set of rules to find solutions in problem solving.
- **CO2**:Implement and understand about various searching strategies,presenting various searching algorithms in searching techniques and also deals about problem solving techniques in search trees.
- **CO3**:Understand about knowledge, represent different issues in knowledge, and present various ways to represent it, implement predicate and propositional knowledge and present logic resolution and unification techniques.
- **CO4**: Present different types of knowledge and reasoning techniques, understand about logic programming and PROLOG, and implement indexing and matching techniques.
- **CO5**: Present uncertainty in knowledge and various techniques to solve it.Present efficient techniques to remove uncertainty in knowledge domain.

Pre requisite: Knowledge of neural networks.

UNIT - I

Introduction: History of AI - Intelligent agents – Structure of agents and its functions – Problem spaces and search - Heuristic Search techniques – Best-first search - Problem reduction - Constraint satisfaction - Means Ends Analysis.

UNIT - II

Knowledge Representation: Approaches and issues in knowledge representation-Knowledge - Based Agent- Propositional Logic – Predicate logic – Unification – Resolution - Weak slot – filler structure – Strong slot - filler structure.

UNIT - III

Reasoning under uncertainty: Logics of non-monotonic reasoning - Implementation- Basic probability notation - Bayes rule – Certainty factors and rule based systems-Bayesian networks – Dempster - Shafer Theory - Fuzzy Logic.

UNIT - IV

Planning and Learning: Planning with state space search - conditional planning-continuous planning - Multi-Agent planning. Forms of learning - inductive learning - Reinforcement Learning - learning decision trees - Neural Net learning and Genetic learning

UNIT - V

Advanced Topics: Game Playing: Minimax search procedure - Adding alpha-beta cutoffs. **Expert System:** Representation - Expert System shells - Knowledge Acquisition. **Robotics:** Hardware - Robotic Perception – Planning - Application domains. **Swarm Intelligent Systems** – Ant Colony System, Development, Application and Working of Ant Colony System.

TEXT BOOKS

1. Elaine Rich, Kevin Knight and Shiva Shankar B.Nair, “Artificial Intelligence”, Tata McGraw-Hill, 2009, Third edition.
2. Stuart J. Russell and Peter Norvig, "Artificial Intelligence: A Modern Approach", Pearson Education Asia, 2003, Second edition.
3. N. P. Padhy, “Artificial Intelligence and Intelligent System”, Oxford University Press, 2005, Second edition.

REFERENCES

1. Rajendra Akerkar, “Introduction to Artificial Intelligence”, Prentice-Hall of India, 2005.
2. Patrick Henry Winston, “Artificial Intelligence”, Pearson Education Inc., 2001,Third edition.
3. Eugene Charniak and Drew Mc Dermott, “Introduction to Artificial Intelligence", Addison-Wesley, ISE Reprint, 1998.
4. Nils J.Nilsson, “Artificial Intelligence - A New Synthesis", Harcourt Asia Pvt. Ltd.,Morgan Kaufmann, 1988.

V SEMESTER

L166 - OBJECT ORIENTED ANALYSIS AND DESIGN LAB

COURSE EDUCATION OBJECTIVES:

1) T study the Use Case View
2) To study the Logical View
3) To study the Component View
4) To study the Deployment View
5) To study the Database Design

COURSE OUTCOMES:

After Completion of the Course Students are able to

1) The Students Learn Forward and Reverse Engineering Techniques
2) The Students Learn Unified Liibrary Application
3) The Students Learn Online booking
4) The Students Learn Hospital Management System
5) The Students Learn Cellular Network

LST OF OOAD LAB PROGRAMMS

The student should take up the following case studies which are mentioned below, and Model it in different views i.e. Use case view, logical view, component view, Deployment view, Database design, forward and Reverse Engineering, and Generation of documentation of the project.

1. Unified Library application
2. Automatic Teller Machine(ATM)
3. Student Admission Procedure
4. Online Book Shopping
5. Hospital Management System
6. Cellular Network

TEXT BOOKS:

Grady Booch, James Rum Baugh, Ivar Jacobson," The Unified Modelling Language User Guide", Pearson Education.

REFERENCES:

1. Meilir Page-Jones," Fundamentals of Object Oriented Design in UML", Pearson Education.
2. Pascal Roques," Modeling Software Systems Using UML2", WILEY- Dreamtech India Pvt. Ltd.
3. Atul Kahate, "Object Oriented Analysis & Design", the McGraw-Hil Companies.
4. Appling UML and Patterns," An introduction to Object – Oriented Analysis and Design and Unified Process", Craig Larman, Pearson Education.

V SEMESTER

L119 - COMMUNICATION AND PRESENTATION SKILLS LAB

(Common to all branches)

Prerequisite: English -I, English - II

Course Educational Objectives

In this course, the students will learn to

1. Gather information and to organize ideas relevantly and coherently
2. Participate in group discussions and debates, Face interviews
3. Write project/research reports/technical reports/ formal letters
4. Make oral presentations
5. Transfer information from non-verbal to verbal texts and vice versa

Course Outcomes

After the completion of this course, prospective engineers will have the ability to

1. Make power point presentations and oral presentations
2. Articulate English with good pronunciation
3. Face competitive exams like GRE, TOEFL, IELTS etc.
4. Face interviews and skillfully manage through group discussions
5. Negotiate skillfully for better placement

The following course content is prescribed for the Communication and presentations Lab:

- Vocabulary building – synonyms and antonyms, one-word substitutes, analogy, idioms and phrases, verbal & alphabet series.
- Oral Presentations – JAM
- Functional English - starting a conversation – responding appropriately and relevantly – using the right body language – role play in different situations.
- Group Discussion – dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and coherence.
- Making power point presentations.
- Interview Skills – concept and process, pre-interview planning, opening strategies, answering strategies, practicing mock-interviews.
- Resume' writing – structure and presentation, planning, defining the career objective, projecting ones strengths and skill-sets, summary, formats and styles, letter-writing.
- Reading comprehension – reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, and critical reading.

Minimum Requirement:

The English Language Lab shall have two parts:

i. **The Computer aided Language Lab** for 60 students with 60 systems, one master console, LAN facility and English language software for self- study by learners.

ii. **The Communication Skills Lab** with movable chairs and audio-visual aids with a P.A System, a T. V., a digital stereo –audio & video system and camcorder etc.

System Requirement (Hardware component):

Computer network with LAN with minimum 60 multimedia systems with the following specifications:

i. P – IV Processor
   1. Speed – 2.8 GHZ
   2. RAM – 512 MB Minimum
   3. Hard Disk – 80 GB

ii. Headphones of High quality

Suggested Software:

- Glob arena's software,2002
- Young India's Clarity software,2005

Books Recommended:

1. Stephen Bailey, "Academic Writing- A Practical guide for students", Rontledge Falmer, London & New York, 2004.
2. Dr A Ramakrishna Rao, Dr G Natanam & Prof SA Sankaranarayanan, "English Language Communication: A Reader cum Lab Manual, Anuradha Publications, Chennai, 1st edition, 2006
3. DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice, New Age International (P) Ltd., Publishers, New Delhi, 2007
4. Books on TOEFL/GRE/GMAT/CAT by Barron's/cup, 15th edition, 2010
5. IELTS series with CDs by Cambridge University Press, 3rd Edition, 2007

VI SEMESTER

S268 - IMAGE PROCESSING

(Common to CSE, IT)

Course Educational objectives:

- To explain the different magma geochemistry derived from partial melting of the mantle in different tectonic regime.
- To familiarize students with a number of substantive eighteenth century texts. Students will be trained in the close reading of language and its relation to literary form.
- To demonstrate the application of molecular graphics to drug design.
- Use topographic maps and employ these maps to interpret the physiography and history of an area.

Course Outcomes:

This course will enable you to:

- convert color images from one coordinate system to another
- exploit human visual perception to enhance images
- enhance poor contrast images
- apply 2D DCT and wavelet transform to images and analyze the coefficients
- apply spatial and frequency-domain filtering to images.

Pre requisite: Knowledge of computer graphics.

UNIT - I

Introduction: What is Digital Image Processing, Examples of fields that use digital image processing, fundamental steps in digital image processing, components of image processing system.. Digital Image Fundamentals: A simple image formation model, image sampling and quantization, basic relationships between pixels.

UNIT - II

Image Enhancement In The Spatial Domain: Basic gray-level transformation, histogram processing, enhancement using arithmetic and logic operators, basic spatial filtering, smoothing and sharpening spatial filters.

UNIT - III

Image Restoration: A model of the image degradation/restoration process, noise models, restoration in the presence of noise–only spatial filtering, Weiner filtering, constrained least squares filtering, geometric transforms; Introduction to the Fourier transform and the frequency domain, estimating the degradation function.

Color Image Processing: Color fundamentals, color models.

UNIT - IV

Image Compression: Fundamentals, image compression models, Lossless Compression: Huffman coding, Run length coding contour coding, A brief discussion on Lossy Compression Image compression standards.

Morphological Image Processing: Preliminaries, dilation, erosion, open and closing, hit or miss transformation, basic morphologic algorithms.

UNIT - V

Image Segmentation: Detection of discontinuous, edge linking and boundary detection, threshold, region–based segmentation. Computer Science & Engineering 49

TEXT BOOK

Rafael C. Gonzalez, Richard E. Woods,"Digital Image Processing", Pearson Education/PHI, Second Edition.

REFERENCES

1. Milan Sonka, Vaclav Hlavac and Roger Boyle, "Image Processing, Analysis and Machine Vision", Thomson Learning, Second Edition.
2. Alasdair McAndrew, "Introduction to Digital Image Processing with Mat lab", Thomson Course Technology
3. Adrian Low, "Computer Vision and Image Processing", B.S.Publications, Second Edition
4. Rafael C.Gonzalez, Richard E.Woods, Steven L. Eddins,"Digital Image Processing using Mat lab", Pearson Education.

VI SEMESTER

S425 - WEB TECHNOLOGIES

(Common to CSE, ECE, IT)

Course Educational Objectives:

1. To describe the basic infrastructure and architecture of the Internet, including the main protocols.
2. To use tools to query parts of the Internet infrastructure including name servers, individual machines, and web sites.
3. To list and describe contemporary Internet applications, their purpose, internal architectures, and related security, commercial and social issues.
4. To design and to develop simple database driven web applications using a server-side scripting language.
5. Given a screen shot or access to a web application, students will be able to apply for appropriate techniques and principals to evaluate its usability and accessibility.

Course Outcomes:

After the completion of the course the student will

1. Understand the need for and be able to write validated XHTML 1.0.
2. Understand the principles of W3C WCAG 1.0 (as a minimum) and be able to write compliant XHTML documents.
3. Understand and be able to apply sound, non-browser specific web design principles.
4. Understand and be able to use Java script to access the DOM to reference web document object CSS properties.
5. Understand the application of XHTML for document structure and content.
6. Understand and apply CSS definitions for document presentation.
7. Understand and apply Java script, CSS & XHTML to create dynamic XHTML.
8. Be aware of emerging technologies and developing W3C recommendations

UNIT – I

HTML Common tags

List, Tables, images, links, forms, Frames; Cascading Style sheets; Introduction to Java Scripts, Objects in Java Script, Dynamic HTML with Java Script

UNIT – II

Extensible Markup Language

XML: Document type definition, XML Schemas, Document Object model, Presenting XML, Using XML Processors: DOM and SAX. **Java Beans**: Introduction to Java Beans, Advantages of Java Beans, Persistence, Java Beans API, Introduction to EJB's.

UNIT – III

Servlets

Introduction to Servelets: Lifecycle of a Serverlet, The Servelet API, The javax.servelet Package, Servelet parameters, Initialization parameters. The javax.servlet HTTP package, Http Request & Responses, Cookies- Session Tracking, accessing database from servlet

UNIT – IV

Introduction to JSP:

Introduction to JSP, Components of JSP, Implicit objects. Conditional Processing – Displaying Values Using an Expression to Set an Attribute, Declaring Variables and Methods Error Handling and Debugging Sharing Data between JSP, accessing database from jsp page

UNIT – V

Introducing Swing:– Introduction,keyfeatures of swings, limitations of AWT, components &containers,swing packages,creating swing applet- JApplet class, JFrame and JComponent, Labels, text fields, buttons – The JButton class, Tabbed Panes, Scroll Panes, Trees, and Tables. **Struts Framework:** Introduction to Struts, Overview of MVC Design Pattern, Struts main Components, Controller components (Action Servlet, Request Processor, Action, Action Mapping, Action Form Beans, Struts Configuration files).

TEXT BOOKS

1. Chris Bates, "Web Programming building internet applications", WILEY Dreamtech. 2nd edition.
2. Bill Siggelkow, S P D O'Reilly,"Jakarta Struts Cookbook ".

REFERENCES

1. Sebesta ,"Programming world wide web", Pearson
2. Dietel and Nieto," Internet and World Wide Web – How to program", PHI/Pearson Education Asia.
4. Sebesta, "Programming World Wide Web and Java Server Pages", Peko sky, Pearson.

VI SEMESTER

S163 - COMPILER DESIGN

(Common to CSE, IT)

Course Educational Objectives

- To introduce the major concept areas of language translation and compiler phases.
- To develop an awareness of the function and complexity of modern compilers.
- To provide theoretical and hands on experience in compilers.

Course Outcomes

- Able to describe the theory and practice of compilation, in particular, the lexical analysis, syntax, and semantic analysis, code generation and optimization phases of compilation.
- Able to create lexical rules and grammars for a programming language.
- Ability to implement a parser such as a Top-Down and bottom-up SLR parsers.
- Ability to implement semantic rules into a parser that performs attribution while parsing.
- To learn the new code optimization techniques to improve the performance of a program in terms of speed & space
- Abilty to design a compiler for a concise programming language.

Pre requisite: Knowledge on theory of computation.

UNIT - I

Introduction to Compiler: Compiler, The Phases of Compiler, Approaches to compiler Development-Boot Strapping, Lexical Analysis: The role of lexical analyzer, Input buffering, Specification of tokens, Recognization of Tokens, A language for specifying lexical analyzers (LEX).

UNIT - II

Syntax Analyzer: The role of parser, Writing a Grammar-Elimination of Left recursion and Left factoring. **Top down parsing** –Recursive descent parsing, Predictive parsing, Preprocessing steps required for predictive parsing, LL (1) grammar.

UNIT - III

Bottom up parsing: Shift/Reduce parsing, Operator Precedence Parsing, LR parsers-SLR, CLR and LALR, Error recovery in LR parsing, YACC – automatic parser generator.

UNIT - IV

Syntax Directed Translation: Syntax directed Definitions, Construction of syntax trees Attribute Grammars- S-attributed and L-attributed grammars, Type checking. **Run time storage:** Storage organization, storage allocation strategies. **Intermediate code generation:** Intermediate code forms-Syntax tree, polish notation and three address code, implementation of three-address code, Declarations, Boolean Expressions and Control-flow statements.

UNIT - V

Code optimization: Introduction, The principle sources of optimization, Loop optimization, and Peephole optimization, optimization of basic blocks.

Code generation: Design issues, object code forms, A simple code generator, Register allocation and assignment, DAG representation of Basic Blocks, Code generation using DAG.

TEXT BOOK

Alfred V.Aho, Jeffrey Ullman, Ravi sethi, “Compilers Principles, Techniques and Tools”, Pearson Education, 2008, 2nd Edition.

REFERENCES

1. Parag H.Dave, Himanshu B.Dave, “Compilers Principles and Practice”, Pearson Education, 2012, First Edition.
2. Andrew W.appel, “Modern compiler implementation in C”, Cambridge, 2010, Revised Edition.

VI SEMESTER

S177 - DATA MINING AND DATA WAREHOUSING

(Common to CSE, IT)

Course Educational Objectives

- Define the basic concepts of data mining and Interpret the contribution of data warehousing and data mining to the decision support level of the organizations.
- Categorize and carefully differentiate between situations for applying different data mining techniques: mining frequent pattern, association, correlation, classification, prediction, and cluster analysis;
- Propose data mining solutions for different applications

Course Outcomes:

- By the completion of the course, the students should be able to:
- Understand the concept of Data Mining, Data Warehouse and Data Marts.
- Assess raw input data and apply data pre-processing techniques, generalization techniques and data characterization techniques to provide suitable input for a range of data mining algorithms.
- Identify Associations in large databases using different techniques.
- Differentiate various classification and clustering techniques .
- Analyze how data mining techniques can be applied to complex data objects like spatial data, multimedia data and web mining.

Pre requisite: Student should possess the knowledge of DATABASE MANAGEMENT SYSTEMS, basic mathematics.

UNIT - I

Introduction, Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Implementation, Further Development, Data Warehousing to Data Mining

UNIT - II

Why Preprocessing, Cleaning, Integration, Transformation, Reduction, Discretization, Concept Hierarchy Generation, Data Mining Primitives, Query Language, Graphical User Interfaces, Architectures, Concept Description, Data Generalization, Characterizations, Class Comparisons, Descriptive Statistical Measures

UNIT - III

Association Rule Mining, Single-Dimensional Boolean Association Rules from Transactional Databases, Multi-Level Association Rules from Transaction Databases

UNIT - IV

Classification and Prediction, Issues, Decision Tree Induction, Bayesian Classification, Association Rule Based, Other Classification Methods, Prediction, Classifier Accuracy, Cluster Analysis, Types of data, Categorisation of methods, Partitioning methods, Outlier Analysis.

UNIT - V

Multidimensional Analysis and Descriptive Mining of Complex Data Objects, Spatial Databases, Multimedia Databases, Time Series and Sequence Data, Text Databases, World Wide Web, Applications and Trends in Data Mining

TEXTBOOK

J. Han, M. Kamber, "Data Mining: Concepts and Techniques", Harcourt India / Morgan Kauffman, 2001.

REFERENCES

1. SamAnahory,DennisMurry, "Data Warehousing in the real world", Pearson Education 2003.
2. David Hand, HeikkiManila, PadhraicSymth, "Principles of Data Mining", PHI 2004.
3. W.H.Inmon, "Building the Data Warehouse", Wiley 2003, 3rd Edition
4. PaulrajPonniah, "Data Warehousing Fundamentals", Wiley-Interscience Publication, 2003

VI SEMESTER

S280 - INTERNET PROTOCOLS

Course Educational Objectives:

- Understands the advantage of modularization in network protocol design.
- Understands the process of delivering the message from source to destination error free.
- Understands how each machine uniquely identified on the internet.

Course Outcomes:

- Understands the various protocol stack models and appreciates the difference between them.
- Understands the functionality of peer to peer layer.
- Develops an insight into the functioning of today network.

UNIT - I

INTRODUCTION: Internet standards, internet administration, the OSI model, Layers I the OSI model, TCP/IP protocol suite, addressing, IP versions. IP addresses: Introduction, classful addressing, other issues, subnetting, and supernetting. Classless addressing: variable-length blocks, subnetting, address allocation.

UNIT - II

ADDRESS RESOLUTION PROTOCOL (ARP): Packet format, encapsulation, operation. Reverse Address resolution protocol (RARP): Packet format, encapsulation, operation, RARP server. Internet Protocol (IP): Datagram fragmentation, options, checksum and IP Package.

UNIT - III

INTERNET CONTROL MESSAGE PROTOCOL (ICMP): Types of messages, Message format, error reporting, query and checksum. Internet Group Management protocol (IGMP): IGMP messages, IGMP operation, Encapsulation and IGMP Package. User Datagram Protocol (UDP): Process to process communication, user datagram, checksum, UDP operation and use of UDP package.

UNIT – IV

TRANSMISSION CONTROL PROTOCOL (TCP): TCP services, TCP features, segment, TCP connection, flow control, error control and congestion control. Stream Control Transmission Protocol (SCTP): services, features, package format, an SCTP Association, flow control, error control, and congestion control. Multicasting and Multicast routing Protocols: Uni-cast, Multicast and Broadcast, Multicast application, Multicast routing, Multicast Link State routing (MOSPF), Multicast Distance Vector (DEMRP) and Core-Based Tree (CBT).Host configuration: BOOTP and DHCP.

UNIT – V

DOMAIN NAME SYSTEMS (DNS): Name space, Domain Name space, Distribution of Name space, DNS in the internet. File Transfer: FTP and TFTP. Electronic Mail: SMTP, POP and IMAP: Architecture, user agent, Message transfer agent: SMTP, Message access agent: POP and IMAP and Web-based Mail. World Wide Web: Architecture, web documents, HTTP. Mobile IP: Addressing, agents, three phases and Inefficiency in Mobile IP
Next generation: IPv6 ,and ICMPv6 .

TEXT BOOK

Behrouz A. Forouzan, “TCP/IP protocol Suite”, Tata McGra-Hill, Third Edition.

REFERENCES

1. Douglas E. Comer and DAVID L. Stevens, “TCP/IP”, Volume –II, PHI.
2. Behrouz A. Forouzan, ”Data Communications and Networking” ,TMH, Third Edition.

VI SEMESTER

S383 - SOFTWARE TESTING METHODOLOGIES

(Common to CSE, IT)

Course Educational Objectives

- Purpose of testing
- Path testing
- Data flow testing, domain testing
- Regular expressions and flow anomaly
- Logic based testing
- Testability tips

Course Outcomes

The students understands the process tobe followed in the software development life cycle

- find practical solutions to the problems
- solve specific problems alone or in teams
- manage a project from beginning to end
- work independently as well as in teams
- define, formulate and analyse a problem.

Pre requisite: Knowledge of different testing methods.

UNIT - I

Introduction: Purpose of Testing Dichotomies, model for testing, consequences of bugs, Taxonomy of bugs.

UNIT - II

Flow Graphs and Path testing: Basic concepts , Predicates, Path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing. **Transaction flow testing**: Transaction flows, transaction flow testing techniques. **Data flow testing:** Basics of Data flow testing, strategies in dataflow testing, application of dataflow testing

UNIT - III

Domain Testing: Domains and paths, Nice and ugly domains, domain testing, domains and interfaces testing, domains and testability

UNIT - IV

Paths, path products and Regular expressions: Path products & Path expression, reduction procedure, applications, regular expressions and flow anomaly detection. **Logic Based Testing**: Overview, decision tables, path expressions, kv charts, specifications

UNIT - V

State, state graphs and Transition Testing: State Graphs, good and bad state graphs, state testing, testability tips. **Graph matrices and Application:** Motivational overview, matrix of graph relations, power of a matrix, node, node reduction algorithm, building tools.

TEXT BOOK

Baris Beizer, “Software Testing Techniques”, International Thomson computer Press, Second edition.

REFERENCES

1. Brain Marick; “The Craft of Software Testing”; Prentice Hall Series in innovative technology.
2. Renu Rajani Pradeep Oak, “Software Testing, Effective methods, Tools and Techniques”, TMHI
3. Dr.K.V.K.K.Prasad, “Software Testing Tools”, Dreamtech.
4. “Software Testing in the Real World “, Edward Kit, Pearson.
5. Perry, John Wiley, ”Effective methods of Software Testing”.

S321 - NEURAL NETWORKS

VI SEMESTER

Course Educational Objectives:

- To understand how neurons of human brain function and how these neurons can be modeled mathematically.
- Understands self learning methods.
- Understands the modularization in neural networks.

Course Outcomes:

After completion of this course the students will be able to

- Correlate a neuron of a human brain and its artificial model.
- Know how the artificial techniques are applicable in neural networks.
- How decision making is done using neural networks.

UNIT - I

INTRODUCTION - what is a neural network? Human Brain, Models of a Neuron, Neural networks viewed as Directed Graphs, Network Architectures, Knowledge Representation, Artificial Intelligence and Neural Networks (p. no's 1 –49)

LEARNING PROCESS 1 – Error Correction learning, Memory based learning, Hebbian learing, and (50-55)

UNIT - II

LEARNING PROCESS 2: Competitive, Boltzmann learning, Credit Assignment Problem, Memory, Adaption, Statistical nature of the learning process, (p. no's 50 –116)

SINGLE LAYER PERCEPTRONS – Adaptive filtering problem, Unconstrained Organization Techniques, Linear least square filters, least mean square algorithm, learning curves, Learning rate annealing techniques, perception –convergence theorem, Relation between perception and Bayes classifier for a Gaussian Environment (p. no's 117 –155)

UNIT - III

MULTILAYER PERCEPTRON – Back propagation algorithm XOR problem, Heuristics, Output representation and decision rule, Computer experiment, feature detection, (p. no's 156 –201) **BACK PROPAGATION -** back propagation and differentiation, Hessian matrix, Generalization, Cross validation, Network pruning Techniques, Virtues and limitations of back propagation learning, Accelerated convergence, supervised learning. (p. no's 202 –234)

UNIT - IV

SELF ORGANIZATION MAPS – Two basic feature mapping models, Self organization map, SOM algorithm, properties of feature map, computer simulations, learning vector quantization, Adaptive patter classification, Hierarchal Vector quantilizer, contexmel Maps (p. no's 443 –469, 9.1 –9.8)

UNIT - V

NEURO DYNAMICS – Dynamical systems, stavility of equilibrium states, attractors, neurodynamical models, manipulation of attractors' as a recurrent network paradigm (p. no's 664 –680, 14.1 –14.6)

HOPFIELD MODELS – Hopfield models, computer experiment I (p. no's 680-751, 14.7 – 14.8)

TEXT BOOKS

Simon Hhaykin , "Neural networks A comprehensive foundations", Pearson Education 2004, 2nd Edition

REFERENCES

1. B.Vegnanarayana, "Artificial neural networks", Prentice Hall of India P Ltd 2005
2. Li Min Fu , "Neural networks in Computer intelligence", TMH 2003
3. James A Freeman David M S kapura, "Neural networks", Pearson Education 2004.

VI SEMESTER

S336 - PARALLEL COMPUTING

COURSE EDUCATIONAL OBJECTIVES

- To understand the scope for parallelism in computing by exploiting the redundancy in the underlying hardware.
- To understand the scope for parallelism in computing through algorithms.

COURSE OUTCOMES:

After completion of this course student will be

- Able to appreciate the increase in efficiency of computing by using parallel algorithms.
- Able to develop multiprogramming skills
- Able to design his/her own algorithms which exploit parallelism.

UNIT - I

PARALLEL PROGRAMMING

Introduction to parallel programming – data parallelism – functional parallelism – pipelining – Flynn's taxonomy – parallel algorithm design – task/channel model – Foster's design methodology – case studies: boundary value problem – finding the maximum – n-body problem – Speedup and efficiency – Amdahl's law – Gustafson-Barsis's Law – Karp-Flatt Metric – Isoefficiency metric

UNIT - II

MESSAGE-PASSING PROGRAMMING

The message-passing model – the message-passing interface – MPI standard – basic concepts of MPI: MPI_Init, MPI_Comm_size, MPI_Comm_rank, MPI_Send, MPI_Recv, MPI_Finalize – timing the MPI programs: MPI_Wtime, MPI_Wtick – collective communication: MPI_Reduce, MPI_Barrier, MPI_Bcast, MPI_Gather, MPI_Scatter – case studies: the sieve of Eratosthenes, Floyd's algorithm, Matrix-vector multiplication

UNIT - III

SHARED-MEMORY PROGRAMMING

Shared-memory model – OpenMP standard – parallel for loops – parallel for pragma – private variables – critical sections – reductions – parallel loop optimizations – general data parallelism – functional parallelism – case studies: the sieve of Eratosthenes, Floyd's algorithm, matrix-vector multiplication – distributed shared-memory programming – DSM primitives

UNIT - IV

PARALLELALGORITHMS

Monte Carlo methods – parallel random number generators – random number distributions – case studies – Matrix multiplication – rowwise block-stripped algorithm – Cannon's algorithm – solving linear systems – back substitution – Gaussian elimination – iterative methods – conjugate gradient method

UNIT V

PARALLEL ALGORITHMS – II

Sorting algorithms – quicksort – parallel quicksort – hyperquicksort – sorting by regular sampling – Fast fourier transform – combinatorial search – divide and conquer – parallel backtrack search – parallel branch and bound – parallel alpha-beta search.

TEXT BOOK

Michael J. Quinn, "Parallel Programming in C with MPI and Open MP", Tata McGraw-Hill Publishing Company Ltd., 2003.

REFERENCES

1. B. Wilkinson and M. Allen, "Parallel Programming – Techniques and applications using networked workstations and parallel computers", Pearson Education,2005.
2. M. J. Quinn, "Parallel Computing – Theory and Practice", Tata McGraw-Hill Publishing Company Ltd., 2002, Second Edition

VI SEMESTER

S152 - BUSINESS INTELLIGENCE AND BIG DATA

COURSE EDUCATIONAL OBJECTIVES:

- Understands the scope of business intelligence in decision making and forecasting.
- Understands distributed storage of large quantity of data and their efficient retrieval.
- Understands latest applications and research areas of business intelligence and big data.

COURSE OUTCOMES:

At the end of this course, you should be able to:

- Understands functioning of various components of hadoop
- Will be able to understand the usage of Business Intelligence Tools.

UNIT - I

Data Science – Introduction, working with data at scale, data scientist, the SMAQ stack for big data, scraping, cleaning & selling big data

Data Hand Tools- free data tools for journalists.

Data Issues- Introduction, anonymization, risk of de-anonymization, Big data & semantic web,meta data.

UNIT - II

Applications of Data: - Product & Process – Twitter archive, data journalism & data tools, newsroom stack, bridging the data divide, data analysis path, Big data in education & academicdisciplines, Discussion of Facebook

UNIT - III

BI foundations - Understanding BI, Describing BI, Defining BI cycle, Enabling BI, Bridging the Analysis Gap-Multidimensional analysis, Operation Systems, BI Systems.

UNIT - IV

Defining BI Technologies- The High-level view, Reporting & Analysis, the data warehouse and Data warehousing Framework, Identifying BI opportunities.

UNIT - V

Implementing a BI solution- implementation strategy, Fundamental decisions,
Case studies- Audi AG, The Frank Russell Company.

TEXTBOOKS

1. Elizabeth Vitt, Michael Luckevich, StaciaMisner, “Business Intelligence”, Microsoft Press, 2010.
2. “Big Data Now”, O’Reily Radar Team.

REFERENCES

1. Rajiv Sabherwal, Irma Becerra- Fernandez, “Business Intelligence-Practices, Technologies and Management”, John Wiley 2011.
2. Larissa T. Moss, ShakuAtre, “Business Intelligence Roadmap”, Addison –Wesley IT Series.
3. Yuli Vasiliev, “Oracle Business Intelligence”.

S201 - DISTRIBUTED SYSTEMS

VI SEMESTER

Course Education Objectives:

- Student will understand the intricacies in a cluster of machines running on a single os.
- Student will understand how data is stored in a distributed environment.
- Student will understand how failure of individual machines will be compensated in a cluster.

Course Outcomes:

After Completion of the Course Students are able to

- Understand transaction processing in a distributed environment.
- Understand communication and failure recovery in a distributed environment.
- Understand how security issues are allowed in a distributed environment.

UNIT - I

Characterization of Distributed Systems-Introduction, Examples of Distributed systems, Resource sharing and web, challenges, System models-Introduction, Architectural and Fundamental models, Networking and Internetworking, Inter process Communication. Distributed objects and Remote Invocation-Introduction, Communication between distributed objects, RPC, Events and notifications, Case study-Java RMI.

UNIT - II

Operating System Support-Introduction, OS layer, Protection, Processes and Threads, Communication and Invocation, Operating system architecture, Distributed File Systems-Introduction, File Service architecture, case study-SUN network file systems.Name Services-Introduction, Name Services and the Domain Name System, Case study of the Global Name Service, Case study of the X.500 Directory Service.

UNIT - III

Peer to Peer Systems-Introduction, Napster and its legacy, Peer to Peer middleware, Routing overlays, Overlay case studies-Pastry, Tapestry, Application case studies-Squirrel, OceanStore. Time and Global States-Introduction, Clocks, events and Process states, Synchronizing physical clocks, logical time and logical clocks, global states, distributed debugging.Coordination and Agreement-Introduction, Distributed mutual exclusion, Elections, Multicast communication, consensus and related problems.

UNIT - IV

Transactions and Concurrency control-Introduction, Transactions, Nested Transactions, Locks, Optimistic concurrency control, Timestamp ordering, Comparison of methods for concurrency controls. Distributed Transactions-Introduction, Flat and Nested Distributed Transactions, Atomic commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery, Replication-Introduction, System model and group communication, Fault tolerant services, Transactions with replicated data.

UNIT - V

Security-Introduction, Overview of Security techniques, Cryptographic algorithms, Digital signatures, Case studies-Kerberos, TLS, 802.11 WiFi.Distributed shared memory, Design and Implementation issues, Sequential consistency and Ivy case study, Release consistency and Munin case study, other consistency models, CORBA case study-Introduction, CORBA RMI, CORBA Services.

TEXT BOOKS

1. G Coulouris, J Dollimore and T Kindberg,"Distributed Systems Concepts and Design", Pearson Education, Fourth Edition.
2. Ghosh, Chapman & Hall/CRC, Taylor & Francis Group," Distributed Systems", 2010.

REFERENCES

1. S.Mahajan and S.Shah ,"Distributed Computing" , Oxford University Press.
2. Pradeep K.Sinha ,"Distributed Operating Systems Concepts and Design", PHI.
3. M Singhal, N G Shivarathri, "Advanced Concepts in Operating Systems", Tata McGraw-Hill Edition.
4. K.P.Birman ,"Reliable Distributed Systems", Springer Publications.
5. A.S. Tanenbaum and M.V. Steen ,"Distributed Systems–Principles and Paradigms" , Pearson Education.
6. R.Chow, T.Johnson , "Distributed Operating Systems and Algorithm Analysis", Pearson Education.
7. A.S.Tanenbaum , "Distributed Operating Systems", Pearson education.
8. Ajay D. Kshemakalyani & Mukesh Singhal, "Distributed Computing, Principles, Algorithms and Systems", Cambrigde, 2010

VI SEMESTER

S262 - HUMAN COMPUTER INTERACTION

(Common to CSE, IT)

COURSE EDUCATIONAL OBJECTIVES:

- To provide basic methodologies and process for designing interface.
- To improve the interaction between users and computers by making computers more usable and receptive to the user's needs.
- To provide relevant principles of behavior, mostly derived from cognitive science and psychology.
- To make the students familiar with developing new interfaces and interaction techniques.
- To provide relevant principles of human ethologic in technological environments.

COURSE OUTCOMES:

After completion of the course students are able to:

- Ability to develop an aptitude for identifying and manifesting important principles of quality interface design established in recent research.
- Ability to isolate features of an existing interface design with flaws and improve them.
- Ability to assess tools for appropriate use in implementing those design elements.
- Ability to demonstrate an accommodation of constraints imposed by mobile devices of interfaces.
- Ability to establish target users, functional requirements, and interface requirements for a given computer application.

UNIT - I

Introduction: Importance of user Interface – definition, importance of good design, benefits of good design. A brief history of Screen design.

The graphical user interface – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics- Principles of user interface.

UNIT – II

Design process – Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, understanding business junctions.

UNIT - III

Screen Designing : Design goals – Screen planning and purpose, organizing screen elements, ordering of screen data and content – screen navigation and flow – Visually pleasing composition – amount of information – focus and emphasis – presentation information simply and meaningfully – information retrieval on web – statistical graphics – Technological consideration in interface design.

UNIT - IV

Windows – New and Navigation schemes selection of window, selection of devices based and screen based controls.

UNIT - V

Components – text and messages, Icons and images – Multimedia, colors – uses, problems with choosing colors.

Interaction Devices – Keyboard and function keys – pointing devices – speech recognition digitization and generation – image and video displays – drivers.

TEXT BOOK

Wilbert O Galitz ,"The essential guide to user interface design", Wiley DreamaTech.

REFERENCES

1. Ben Shneidermann, "Designing the user interface", Pearson Education Asia, 3rd Edition.
2. ALAN DIX, JANET FINCAY, GRE GORYD, ABOWD, RUSSELL BEALG, "Human – Computer Interaction", PEARSON.

VI SEMESTER

S103 - ADVANCED COMPUTER ARCHITECTURE

(Common to CSE, IT)

COURSE EDUCATIONAL OBJECTIVES:

1. Be able to design hardware implementations of processors capable of executing machine instructions for a given computer architecture.
2. Be able to analyze and apply techniques for static, dynamic, and hybrid branch prediction to problems in practical high-speed computer design.
2. Be able to use the Tomasulo Algorithm to identify and satisfy true data dependencies in the design of superscalar processors.
3. Be able to analyze and use various advanced Control flow techniques, both with and without speculative execution, in the design of high-speed processors.
4. Be able to analyze and use techniques that guarantee cache coherence and correct sequential memory access across multiprocessor systems.

COURSE OUTCOMES:

After completion of this course, the students would be able to

1. Basic Understanding of high performance computing classification and their architectures.
2. Performance measurement of computer architecture using different types of methods.
3. Basic understanding of pipelining concepts and its hazard. How to solve the hazards of pipelining using different dynamic Scheduling.
4. Knowledge of multiprocessors, how memory can be shared between them, how we can keep the memory consistent and how we can synchronize the operations between processors.
5. Memory hierarchy which is another technique used to speed up processors and understand the various issues arising in the hierarchy.
6. Performance of Shared memory multiprocessors in Symmetric and Distributed memory architectures.

UNIT - I

Fundamentals of computer design.-technology trends-cost-measuring and reporting Performance. Quantitative principles of computer design.

UNIT – II

Instruction set principles and examples- classifying instruction set- memory addressing- type and size of Operands- addressing modes for signal processing-operations in the instruction set- instructions for control Flow- encoding an instruction set.-the role of compiler

UNIT - III

Instruction level parallelism (ILP)- over coming data hazards- reducing branch costs –high performance instruction delivery- hardware based speculation- ILP software approach- compiler techniques- static branch protection - VLIW approach

UNIT - IV

Memory hierarchy design- cache performance- reducing cache misses penalty and miss rate – virtual memory- protection and examples of VM.

UNIT - V

Multiprocessors and thread level parallelism- symmetric shared memory architectures- distributed shared memory- Synchronization- multi threading.

TEXT BOOK

John L. Hennessy, David A. Patterson and Morgan Kaufmann, "Computer Architecture A quantitative approach", Elsevier Publications, 3rd edition.

REFERENCES

1. Dezso Sima , Terence Fountain, Peter Kacsuk , "Advanced Computer Architectures" , Pearson education.
2. David E. Culler , "Parallel Computer Architecture and a Hardware / Software Approach" .
3. H. Stone , "Advanced Computer Architecture", Addison Wesley, 1989.
4. H. J. Siegel, "Interconnection Network for Large Scale Parallel Processing", McGraw Hill, 1990.
5. K. Hwang and F. A. Briggs," Computer Architecture and Parallel Processing", McGraw Hill, 1985

VI SEMESTER

L184 - WEB TECHNOLOGIES LAB

(Common to CSE, IT)

COURSE EDUCATIONAL OBJECTIVE:

1. Choose best technologies for solving web client/server problems
2. Create conforming web pages
3. Use Javascript for dynamic effects and to validate form input entry
4. Use appropriate client-side or Server-side applications
5. Create adaptive web pages and Implement cookies
6. Install a web server application And Deploy Java Applets and Servlets
7. Create an XML application

COURSE OUTCOMES:

After completion of this course, the students would be able to

1. Understand, analyze and apply the role of languages like HTML, DHTML, CSS, XML, Java script, VBScript, ASP, PHP and protocols in the workings of the web and web applications
2. Create web pages using HTML, DHTML and Cascading Styles sheets.
3. Create dynamic web pages using JavaScript and VBScript (client side programming).
4. Create interactive web applications using ASP.NET.
5. Build web applications using PHP.
6. Create XML documents and XML Scheme

SNO **Programs**

1. Design the following static web pages required for an online book store website.
   Homepage
   Login Page
   Catalogue Page

2. Design the following static web pages required for an online book store website.
   Cart Page
   Registration Page

3. Design a webpage using CSS which includes the following styles.
   Using different font, styles Set a back ground image for both page and single elements on the page Control the background repetition of image with background repeat property Define styles for link as visited, active, hover & link Work with layers Add a customized cursor
4. Write a JavaScript to validate the fields of a registration page.
5. Create an XML document for maintaining a CD catalog
   Display XML document data using HTML
   Display XML data using XSL
6. Write a program to create a Java Bean for user login management component
7. Write program to Install Apache Tomcat Web Server and deploy a static website & Access it.
   Install Apache Tomcat Server on port number 8080
   Deploy html pages in a web server
   Access static website from a web server
8. Write a program to create a Servlet to AUTHENTICATE user details
9. Write a program to implement session management concept in Servlets
10. Write a program to access a database using JDBC & Servlets
11. Write a Program to print multiplication table for any number up to required level using JSP
12. Write a program to display user credentials using use Bean tag of JSP

i. Write a swing application to create tabbed panes

ii. Write a swing application to create a table

VI SEMESTER

L120 - COMPILER DESIGN AND DATA MINING LAB

Course Objectives:

1. Utilize various techniques developed for data mining to discover interesting patterns in large databases;
2. Use existing commercial or public-domain tools to perform data mining tasks to solve real problems in business and commerce;
3. Expose students to new techniques and ideas that can be used to improve the effectiveness of current data mining tools.
4. In this Lab session students implement Lexical Analyzer

Course Educational Outcomes:

After completion of this course, the students would be able to

1. understand why there is a need for data mining and in what ways it is different from traditional statistical techniques;
2. understand the details of different algorithms made available by popular commercial data mining software;
3. solve real data mining problems by using the right tools to find interesting Patterns;
4. Obtain hands-on experience with some popular data mining software.
5. Students implements code for each phase to understand compiler software working and it's coding in detail

Students implements code for each phase to understand compiler software working and it's coding in detail

SNO	Programs
	Defining Weather relation for different attributes
1.	Defining employee relation for different attribute
2.	Defining labor relation for different attributes
3.	Defining student relation for different attributes
4.	Exploring weather relation using experimenter and obtaining results in various schemes
5.	Exploring employee relation using experimenter
6.	Exploring labor relation using experimenter
7.	Exploring student relation using experimenter Setting up a flow to load an arff file (batch mode) and perform a cross validation using J48
8.	Design a knowledge flow layout, to load attribute selection normalize the attributes and to store the result in a csv saver.
9.	Practice Lex/Yacc of compiler writing
10.	Write a program to check whether a string belongs to the grammar or not.
11.	Write a program to generate a parse tree.
12.	Write a program to find leading terminals and trailing terminals.
13.	Write a program to compute FIRST of non-terminals and FOLLOW of non-terminals

VII SEMESTER

S175 - CRYPTOGRAPHY AND NETWORK SECURITY

Course Educational Objectives:

The main goal of this course is to provide you with a background, foundation, and insight into the many dimensions of information security. This knowledge will serve as basis for further deeper study into selected areas of the field, or as an important component in your further studies and involvement in computing as a whole. The primary objectives of the course are to help you:

1. Understand information security's importance in our increasingly computer-driven world.
2. Master the key concepts of information security and how they "work."
3. Develop a "security mindset:" learn how to critically analyze situations of computer and network usage from a security perspective, identifying the salient issues, viewpoints, and trade-offs.
4. Clearly and coherently communicate (both verbally and in writing) about complex technical topics.

Course Outcomes:

After completion of the course students are able to:

1. Define the concepts and definition of the information security
2. Differentiate between several types of Security attacks, Services and Mechanisms
3. Identify the threats to information security
4. Show how to protect information recourses
5. Show how to maintaining and protecting information system

UNIT - I

INTRODUCTION: Security Attacks (Interruption, Interception, Modification and Fabrication), Security Services (Confidentiality, Authentication, Integrity, Non-repudiation, access Control and Availability) and Mechanisms, A model for Internetwork security, Internet Standards and RFCs **Symmetric Encryption and Message Authentication:** Conventional Encryption Principles, Conventional encryption algorithms(DES, Triple DES), cipher block modes of operation(CBC,CFB), location of encryption devices, key distribution. **Message Authentication:** Approaches to Message Authentication, Secure Hash Functions and HMAC.

UNIT - II

Public Key Cryptography: Public key cryptography principles, public key cryptography algorithms, digital signatures, digital Certificates, Certificate Authority and key management **Authentication Applications:** Kerberos, X.509 Directory Authentication Service.

UNIT - III

Email privacy: Pretty Good Privacy (PGP) and S/MIME. **IP Security:** IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations.

UNIT - IV

Web Security: Web Security Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET).

Unit V :

Intruders: Intruders **Malicious Software:** Viruses and related threats. **Firewalls:** Firewall Design principles, Trusted Systems

TEXT BOOKS

1. William Stallings, “Network Security Essentials (Applications and Standards)”, Pearson Education.
2. William Stallings, ” Cryptography and network Security”, PHI/Pearson, Third edition

REFERENCES

1. Whitman, “Principles of Information Security”, Thomson.
2. Robert Bragg, Mark Rhodes, “Network Security: The complete reference”, TMH
3. Bachmann, “Introduction to Cryptography”, Springer publications.

VII SEMESTER

S157 - CLOUD COMPUTING

(Common to EIE, CSE, IT)

Course Educational Objectives:

After completing this course, students will be able to:

- Discuss, with confidence, what is cloud computing and what are key security and control considerations within cloud computing environments.
- Assess cloud characteristics and service attributes, for compliance with enterprise objectives
- Recognize steps and processes used to perform an audit assessment of a cloud computing environmentSummarize specific environments that would benefit from implementing cloud computing, contrasted against those environments that might not benefit.
- Weight the impact of improperly controlled cloud computing environments on organizational sustainability.

Course Outcomes:

- **CO 1:** Presents fundamental concepts of cloud computing, charting their evolution, Delivery models, and Deployment models, can present models for migrating applications to cloud environments.
- **CO 2:** Cover IaaS, from enabling technologies such as virtual machines and virtualized storage, to sophisticated mechanisms for securely storing data in the cloud and managing virtual clusters.
- **CO 3:** Describe PaaS/IaaS, detailing the delivery of cloud hosted software and applications. The design and operation of sophisticated, auto-scaling applications and environments
- **CO 4:** Presents monitoring and management mechanisms for CloudComputing. Architectures for federating cloud computingresources are explored, as well as service level agreement (SLA) management and performance prediction.
- **CO 5:** develop some novel applications that have been made possible by the rapid emergence of cloud computing resources. Best practices for architecting cloud applications, describing how to harness the power of loosely coupled cloud resources.

Pre requisite: Knowledge of issues related to computing.

UNIT - I

Foundations: Introduction to Cloud Computing, Migrating into a Cloud Enriching the 'Integration as a Service' Paradigm for the Cloud Era, Cloud Computing for Enterprise Applications

UNIT – II

Infrastructure as a Service (IaaS): Virtual Machines Provisioning and Migration Services, On the Management of Virtual Machines for Cloud Infrastructures, Enhancing Cloud Computing Environments using a Cluster as a Service.

UNIT - III

Platform and Software as a Service (PaaS): Aneka – Integration of Private and Public Clouds, CometCloud: An Autonomic Cloud Engine, T-Systems' Cloud-Based Solutions for Business Applications,

UNIT – IV

Software as a Service(SaaS):

Workflow Engine for Clouds, Understanding Scientific Applications for Cloud Environments, The MapReduce Programming Model and Implementations

UNIT - V

Monitoring and Management, Applications: An Architecture for Federated Cloud Computing, SLA Management in Cloud Computing: A Service Provider's Perspective, Performance Prediction for HPC on Clouds, Architecting Applications for the Amazon Cloud.

TEXT BOOKS

1. Rajkumar Buyya, James Broberg, Andrzej Goscinski, "Cloud Computing: Principles and Paradigms", Wiley, New York, USA
2. Michael Miller, "Cloud Computing – Web Based Applications That Change the way you Work and Collaborate Online", Pearson Education.

REFERENCES

1. George Reese, "Cloud Application Architectures", O'Reilly Media, 1st Edition.
2. David S. Linthicum, "Cloud Computing and SOA Convergence in Your Enterprise: A Step-by-Step Guide", Addison-Wesley Professional.

VII SEMESTER

S130 - ANDROID APPLICATION DEVELOPMENT

COURSE EDUCATIONAL OBJECTIVES

This course introduces mobile application development on the Android platform. Students will be imparted with the skills for creating and deploying Android applications, with particular emphasis on components and concepts that define the Android platform.

* To develop skills required to produce and maintain a high-quality mobile software product
* To gain a breadth of knowledge for developing applications with the Android SDK
* To gain a depth of knowledge in select areas of the Android SDK
* To know and execute principles and concepts of software requirements engineering, particularly as it relates to mobile software product development

COURSE OUTCOMES:

At the end of this course students will be familiar with

- The Android environment
- Tools for creating Android applications
- The Android approach to structuring applications
- Basic user interfaces
- Application life cycles

UNIT - I

Introduction: Motivation, Goals, Structure, Historical development of cell phones and operating systems, Various versions of Android. **Features of Android**: Definition, features integrated in Android, Android vs. Symbian OS vs. Windows Mobile. **Classification based on main criteria**: Portability, Reliability, Connectivity, Product Diversity, Open platform, Kernel Size, Standards, Security, Special Features.

UNIT - II

Android OS: Android Software Stack, Activities and Applications, Activity Life Cycles, Activity Stacks, Activity States, Resources, SDK, **User Interfaces**: Views, Layouts, Android Widgets, UI XML Specifications. **Intents, Broadcast Receivers, and Adapters:** Explicit Intents, Implicit Intents, Event Broadcasting with Intents, Event Reception with Broadcast Receivers, Adapters and Data Binding.

UNIT - III

Configuring the Android Manifest File, **Using XML-Based Layouts,** Applying Menus, Showing Pop-up Menus, Dealing with Threads, Working with Resources, Location Based Services.

UNIT - IV

Managing and Accessing Local Databases:

A Quick SQLite Primer, Start at the Beginning, Setting the Table, Making Data, What Goes Around, Comes Around , Raw Queries, Regular Queries, Building with Builders, Using Cursors, Change for the Sake of Change, Making Your Own Cursors, Data, Everywhere, Leveraging Java Libraries, The Outer Limits, Ants and Jars, Communicating via Internet

UNIT - V

Notifications: Broadcast Receivers, Services and notifications, Toast, Alarms, Examples. **Custom Components**: Custom Toast, Custom dialogs, Custom Tabs, Custom animated popup panels, Other components, Examples.

Threads: Adding Basic Network Support, Adding additional Network features, Adding Social Features, Creating a Home Screen App Widget.

TEXT BOOK

Reto Meier, "Android Application Development", Wiley Publishing Inc., 2009.

REFERENCES

1. Jerome (J F) DiMarzio, "Android-A Programmers Guide", Mc.Graw Hill, 2008.
2. Rick Rogers, John Lombardo, Zigurd Mednieks, and Blake Meike , "Android Application Development" , Published by O'Reilly Media, Inc., 1005, First Edition.

VII SEMESTER

S186 - DESIGN PATTERNS

(Common to CSE, IT)

Course Educational Objectives:

- The course is designed to introduce students to theoretical concepts and practical issues associated with pattern recognition. The primary objectives of the course are to help you:
- To learn Mathematical models of the three dimensional recognition from depth images, three-dimensional recognition from intensity images and two-dimensional recognition from intensity images. Model based recognition proble1ms. Computational strategies.
- To learn Structural pattern recognition: Features selection and extraction. Constraints. Model and scene representation. The exact matching. Search space. Exhaustive matching methods: Graph isomorphism methods. Relaxation methods. Transforms classifications. Search space reduction methods: Tree search. Hypothesis generation and checking
- To analyze Intermediate representation.
- To analyze Inexact matching.
- To learn Knowledge based recognition.

Course Outcomes:

After completion of the course students are able to:

- Understand the basic structure of pattern recognition systems and the statistical bases of the classification theory (the Bayes classifier).
- Distinguish supervised learning methods from the unsupervised ones.
- Apply supervised learning methods (model-based maximum likelihood, k-nearest neighbors) to the classifier design.
- Apply k-means clustering algorithm.

Apply k-means clustering algorithm.

UNIT – I

Introduction: What is Design pattern?, Design patterns in Smalltalk MVC, Describing Design patterns, the catalog of Design patterns, Organizing the catalog, How design patterns solve design problems, How to select a design pattern, How to use a design pattern.

UNIT – II

A Case study: Designing a document editor: Design problems, Document structure, Formatting, Embellishing the user interface, Supporting multiple look-and-feel standards, Supporting multiple window systems, User operations spelling checking and Hyphenation summary.

UNIT – III

Creational Patterns: Abstract factory, Builder, Factory method, Prototype singleton, Discussion on creational patterns. **Structural pattern part –I**: Adapter, Bridge, Composite. **Structural pattern part –II**: Decorator, Acade, Flyweight, Proxy.

UNIT – IV

Behavioral pattern part –I: Chain of responsibility, Command, Interpreter, Iterator. **Behavioral pattern part –II**: Mediator, Observer, State, Strategy, Template Method, Visitor, Discussion of Behavioral patterns.

UNIT – V

What to expect from Design patters, A brief history, The pattern community, An invitation, A pattern thought.

TEXTBOOKS

1. Erich Gamma, “Design Patterns”, Pearson Education.
2. Eric Freeman, “Head First Design patterns”, Oreilly-SPD.

REFERENCES

1. Mark Grand , “Pattern’s in JAVA Vol-I”, Wiley DreamTech.
2. Alan Ahalloway , “Design patterns Explained” , Pearson Education.

VII SEMESTER

S102 - AD-HOC NETWORKS

Course Educational Objectives:

This course covers fundamental principles of ADHOC Networks

- Understanding the concepts of adhoc networks and its protocols.
- Emphasis on advanced communication techniques in adhoc networks.
- Understanding the emerging trends in wireless networks.

Course Outcomes:

After completion of the course students are able to:

- Understand the design notation of different adhoc networks.
- Evaluate the existing networks & understand QOS factors.
- Understand the routing algorithms in adhoc networks.

UNIT - I

ADHOC WIRELESS NETWORKS: Introduction -Heterogeneity in mobile devices-wireless sensor networks-traffic profiles-types of Ad-hoc mobile communications-types of mobile host movements-challenges facing Ad-hoc mobile networks-Synchronous MAC protocols- Asynchronous MAC protocols-problems in Ad-hoc channel access.

UNIT - II

EFFECTS OF BEACONING & BANDWIDTH EFICIENT LINK STATE ROUTING: Motivation- Ad Hoc Wireless Networks-Power Issues- Smart Batteries and Battery Characteristics-Effects of Beaconing on Battery Life- Associativity based Routing-ABR protocol Description-ABR route discovery phase-ABR route deletion phase-Updating routes in wireless networks

UNIT - III

COMMUNICATION PERFORMANCE OF ADHOC NETWORKS: Performance parameters of interest-route discovery time-end to end delay performance-communication throughput performance-packet loss performance-route reconfiguration repair time-TCP Reno-TCP Tahoe-TCP Vegas-TCP SACK-Problems facing TCP in wireless last hop-Problems facing TCP in Wireless Ad Hoc

UNIT - IV

MULTICASTING IN ADHOC WIRELESS NETWORKS: Multicasting in wired networks-DVMRP-Multicast mesh-CAMP-Group Based-ODMRP-location based-LBM-ABAM-Comparisons of multicast routing protocols.

UNIT - V

MULTIHOP ADHOC NETWORKS: Real world evaluation of mobile Ad-hoc networks-Mobile MAN design- integration and experimentation of mobile multi hop ad hoc networks

TEXT BOOKS

1. Charles .E. Perkins, “AdHoc Networking”, Pearson Education 2008.
2. C.K.Toh, “Ad Hoc Mobile Wireless Networks-Protocols and Systems”, Pearson Education, 2007.

REFERENCES

1. Marco Conti, Jon Crow croft, Andrea Passarella,” Multi hop AdHoc Networks from Theory to Reality”, Nova Science Publishers Inc. New York 2007.
2. Siva Ram Murthy. C and Manoj. B.S, “AdHoc Wireless Networks: Architectures and protocols”, Prentice Hall PTR, 2004.

VII SEMESTER

S382 - SOFTWARE PROJECT MANAGEMENT

COURSE EDUCATIONAL OBJECTIVES

Project Management is generally seen as a key component of successful software projects. Together with software techniques it can produce software of high quality. This course aims to cover the basics

- Deliver successful software projects that support organization's strategic goals
- Match organizational needs to the most effective software development model
- Plan and manage projects at each stage of the software development life cycle (SDLC)
- Create project plans that address real-world management challenges
- Develop the skills for tracking and controlling software deliverables

UNIT - I

Conventional Software Management: The waterfall model, conventional software Management performance. **Evolution of Software Economics:** Software Economics, pragmatic software cost estimation. **Improving Software Economics:** Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections. **The old way and the new:** The principles of conventional software Engineering, principles of modern software management, transitioning to an iterative process.

UNIT - II

Life cycle phases: Engineering and production stages, inception, Elaboration, construction, transition phases. **Artifacts of the process:** The artifact sets, Management artifacts, Engineering artifacts, programmatic artifacts. **Model based software architectures:** A Management perspective and technical perspective.

UNIT - III

Work Flows of the process: Software process workflows, Iteration workflows.

Checkpoints of the process: Major mile stones, Minor Milestones, Periodic status assessments.

Iterative Process Planning: Work breakdown structures, planning guidelines, cost and schedule estimating, Iteration planning process, Pragmatic planning. Use of Software (Microsoft Project) to Assist in Project Planning Activities

UNIT - IV

Project Organizations and Responsibilities: Line-of-Business Organizations, Project Organizations, evolution of Organizations. **Process Automation:** Automation Building blocks, The Project Environment. **Project Control and Process instrumentation:** The seven core Metrics, Management indicators, quality indicators, life cycle expectations, pragmatic Software Metrics, Metrics automation.

UNIT - V

Tailoring the Process: Process discriminants. **Future Software Project Management:** Modern Project Profiles, Next generation Software economics, modern process transitions. **Case Study:** The command Center Processing and Display system- Replacement (CCPDS)

TEXT BOOK

1. Walker Royce, “Software Project Management”, Pearson Education, 2009.

REFERENCES

1. Bob Hughes and Mike Cottrell, ”Software Project Management”, Tata McGraw-Hill Edition.
2. Joel Henry, ”Software Project Management” , Pearson Education.
3. Pankaj Jalote,” Software Project Management in practice”, Pearson Education.2008.
4. Elaine Marmel, ”Microsoft Office Project 2003 Bible”, Wiley Publishing Inc.

VII SEMESTER

S337 - PATTERN RECOGNITION

Course Educational Objectives:

The course is designed to introduce students to theoretical concepts and practical issues associated with pattern recognition. The primary objectives of the course are to help you:

- To learn Mathematical models of the three dimensional recognition from depth images, three-dimensional recognition from intensity images and two-dimensional recognition from intensity images. Model based recognition problems. Computational strategies.
- To learn Structural pattern recognition: Features selection and extraction. Constraints. Model and scene representation. The exact matching. Search space. Exhaustive matching methods: Graph isomorphism methods. Relaxation methods. Transforms classifications. Search space reduction methods: Tree search. Hypothesis generation and checking
- To analyze Intermediate representation.
- To analyze Inexact matching.
- To learn Knowledge based recognition.

Course Outcomes:

After completion of the course students are able to:

- Understand the basic structure of pattern recognition systems and the statistical bases of the classification theory (the Bayes classifier).
- Distinguish supervised learning methods from the unsupervised ones.
- Apply supervised learning methods (model-based maximum likelihood, k-nearest neighbors) to the classifier design.
- Apply k-means clustering algorithm.

UNIT - I

Introduction: Machine perception, pattern recognition example, pattern recognition systems, the design cycle, learning and adaptation

Bayesian Decision Theory: Introduction, continuous features – two categories classifications, minimum error-rate classification- zero–one loss function, classifiers, discriminant functions, and decision surfaces

UNIT - II

Normal density: Univariate and multivariate density, discriminant functions for the normal density different cases, Bayes decision theory – discrete features, compound Bayesian decision theory and context

UNIT - III

Maximum likelihood and Bayesian parameter estimation: Introduction, maximum likelihood estimation, Bayesian estimation, Bayesian parameter estimation–Gaussian case Bayesian Parameter Estimation: General Theory, Sufficient Statistics, and Problems of Dimensionality

UNIT - IV

Un-supervised learning and clustering: Introduction, mixture densities and identifiability, maximum likelihood estimates, application to normal mixtures: Case 1: Unknown Mean Vectors, Case 2: All Parameters Unknown K-means clustering, *Fuzzy k-means clustering. Date description and clustering – similarity measures, criteria function for clustering, Iterative Optimization, Hierarchical Clustering

UNIT - V

Component analyses: Principal component analysis, non-linear component analysis; Independent component analysis (ICA), Low dimensional representations and multi dimensional scaling, Hidden Markov Models, First-order Markov models, First-order hidden Markov models, Hidden Markov Model Computation, Evaluation, Decoding Learning

TEXT BOOKS

1. Richard O. Duda, Peter E. Hart, David G. Stroke, "Pattern classifications", Wiley student edition, Second Edition
2. Earl Gose, Richard John baugh, Steve Jost ,"Pattern Recognition and Image analysis", PHI 2004

REFERENCES

Lawerence Rabiner, Biing – Hwang Juang, George," Fundamentals of speech Recognition", Pearson education.

VII SEMESTER

S166 - COMPUTATIONAL GEOMETRY

OBJECTIVES:

- To understand the principles of geometric transformation
- Understands the principles of triangulations in geometry
- Understands various techniques for detecting visible surfaces.

OUTCOMES:

Upon completion of the course the students will be able to

- Understand the use of computational geometry.
- Understands the searching techniques in geometrical drawings.

UNIT - I

Basic Geometric Concepts:Points, lines, polygons, subdivisions, arrangements, polytopes, cell complexes.

Projective Geometry :Projective Geometry-geometric transformations

UNIT - II

Geometric Searching:Fractional cascading, segment tree, interval tree, range tree, priority search tree. Non-orthogonal range searching ,k-d trees - applications

Point Location:Slab method, trapezoid method, chain method, bridged chain method.

UNIT - III

Plane-Sweep Algorithms:Intersection of segments, intersection of rectangles, trapezoidation. Proximity:Closest pair, furthest pair, Voronoi diagrams, triangulations, Voronoi diagrams and Delaunay Triangulations,Constructing voronoi diagram, Applications.

UNIT - IV

Graph Drawing: Planar drawings, straight-line drawings, orthogonal drawings, polyline drawings, upward drawings, hierarchical drawings, visibility representations.

UNIT - V

Convex hulls :Preliminaries, algorithms for convex hulls-grahams scan-Jarvis march, quick hull techniques, divide and conquermethods, dynamic convex hull algorithms, convex hulls in multi-dimensions, applications.Applications of computational geometry in web applications

TEXT BOOKS

1. Franco P. Preparata, Michael Ian Shamos ,"Computational Geometry an Introduction", Springer-Verlag 1988,2nd edition.
2. de Berg, van Kreveld, Overmars, and Schwarzkopf, "Computational Geometry Algorithms and Applications", Springer publications,2nd edition.

REFERENCES

1. Giuseppe Di Battista, Peter Eades, Roberto Tamassia, Ioannis G. Tollis ,"Graph Drawing, Algorithms for the Visualization of Graphs", Prentice-Hall 1999
2. Joseph O'Rourke ,"Computational Geometry in C" , Cambridge University Press,2nd edition

VII SEMESTER

S142 - BANKING OPERATIONS

COURSE EDUCATION OBJECTIVE:

- Student understands the principles of economics.
- Students get an understanding of the principles on which banking system works.
- Students also understand the banking in the overall academic scenario of the national economy.

COURSE OBJECTIVES

At the end of this programme, the student should be able to perform the following tasks in a Bank:

- Student have sound knowledge on terminology, process followed by the bank.
- Student will be able to talk to the client as well as functional consultant in the same language(of banking operations),so that of process will be easier.
- Student understands the working scenario of the bank.

UNIT – I

Introduction to banking Historical perspective; emergence and importance of commercial banking; an Overview of development in banking since independence.Relationship between banker and customer legal framework – corporate banking loan documentation.

UNIT – II

Introduction to Banking Business; Banking Sectors- Retail, Corporate, Rural and International; Non-banking financial intermediaries; Types of advances and deposits in a ank New Dimensions and Products. –Credit, Debit and Smart Cards, and e-Banking Structure of the Indian Banking System's.Commercial Banks – Public and Private Sector and Foreign Banks. Cooperative Banks.

UNIT – III

Process and documentation of Bank Lending, Forms and Types of Advances and Collaterals. Priority Sector Advances, Export Credits, Assessment of Credit needs for Project and working Capital Finance, Bank Customer Relationship-Four Leading Cases.

UNIT – IV

Banking Reforms and Regulation, Banking Regulation Act, 1949, Reserve Bank of India Act 1934, and Reserve Bank's Instruments of Credit control. Deficiencies in Indian Banking including Problems Accounts and Non-Performing Assets, Banking Sector Reforms.

UNIT – V

Co-operative banks- district co-operative banks in India – land development banks – regional rural banks –NABARD need and importance. Quantitative and selective credit control methods

UNIT – VI

Negotiable instruments – characteristics – types of negotiable instruments promissory notes – bills of Exchange – cheques – crossing – types of crossing - -holder in due course privileges of a holder.

Endorsement – types of endorsements – presentment dishonor –noting charges.

TEXT BOOKS

1. Varshney, “Banking Law and Practice”, Sultan Chand & Sons, New Delhi.
2. Sundhram,” K.P.M, Banking Theory Law and Practice”, Sultan Chand & Co.Ltd., New Delhi.

REFERENCES

1. "Commercial Bank Management”, Harper and Row Publishers, New York
2. Gilbert J.N ,”Lectures on Banking Law “.
3. Tandon ,”Banking Law and practice”.
4. PJM Filder ,”Practice and Law of Banking”.
5. Dr.Subramanyam ,“Law of Banking”.
6. Lord Chroley,” Law of Banking”

VII SEMESTER

S276 - INSURANCE OPERATIONS

COURSE EDUCATION OBJECTIVE:

- Student understands the principles of economics.
- Students get an understanding of the principles on which insurance system works.
- Students also understand the insurance operations in the overall academic scenario of the national economy.

COURSE OBJECTIVES

At the end of this programme, the student should be able to perform the following tasks in a Bank:

- Student have sound knowledge on terminology, process followed by the insurance.
- Student will be able to talk to the client as well as functional consultant in the same language(of insurance operations),so that of process will be easier.
- Student understands the working scenario of the insurance policies.

UNIT – I

Definition of risk and uncertainty: Classification of risk; sources of risk – external and internal. Insurance Meaning, nature and significance; essential requirements and principles of risk insurance; re-insurance; nationalization of insurance business in India; Insurance Regulatory Development Authority Act.

UNIT – II

Legal Principles of Insurance: Contract act 1872, insurable interest utmost good faith, nomination, and assignment indemnity subrogation, contribution, proximate cause, case studies.

UNIT – III

Life Insurance: Aw relating to Life Insurance; general principles of life insurance contract; proposals and policy; assignment and nomination; title and claims; concept of trusts in life policy; Life Insurance Corporation – role and functions.

UNIT – IV

General Insurance law relating to general insurance: Different types of general insurance; general insurance and life insurance; nature of fire insurance; various types of fire policy; subrogation; double; contribution; proximate cause; claims and recovery.

UNIT – V

Marine Insurance: Law relating to marine insurance; scope and nature; types of policy; insurable interest; disclosure and representation; insured perils; proximity cause; voyage; warranties; measurement of subrogation; contribution; under insurance.

UNIT VI

Accident and motor insurance: Nature, disclosure, terms and conditions; claims and recovery; third party insurance; compulsory motor vehicle insurance; accident insurance. Rural insurance, property and liability insurance, project and engineering insurance, social insurance.

TEXT BOOKS

1. Harding and Evanly ,"General principles of Insurance".
2. M.N. Shrinivasan,"Law of Insurance".

REFERENCES

1. Dr. P.K. Gupta, "Principles and practice of non-life insurance", Himalaya publishing house.
2. Dr. P. Periasamy ,"Principles and practice of insurance", Himalaya Publishing house
3. Bhattacharya ,"Law of Insurance".
4. Dr. M.N. Mishra ,"Law of Insurance"
5. Ivanly,"Marine Insurance"

VII SEMESTER

S395 - SUPPLY CHAIN MANAGMENT

COURSE EDUCATIONAL OBJECTIVES:

The course aims to make the students to:

- Apply and gain in-depth knowledge on the integrated purchasing, logistics, materials and supply chain management
- Identify the integration between the various elements in the supply chain process
- Learn how to establish benchmark of the organization by taking best practices of the world class organizations.
- Design transportation networks and use of deferent modes of transportation.
- Develop strategies for successful global supply chain management
- Apply the latest IT tools and techniques to evaluate supply chain systems

COURSE OUTCOMES:

After completing of this course, the students should be able to:

- Examine the design and performance of supply networks and processes in different business contexts.
- Develop capabilities in logistics, coordination for supply chain integration, inventory management; risk pooling, procurement, product and process design, and international supply chain management.
- Configure logistics networks and assess their performance impacts on efficiency and service levels
- Design supply chain contracts for effective governance of supply chain relationships.
- Diagnose information integration problems across the supply chain and their consequent impacts in deploying physical and financial resources optimally.
- Evaluate distribution strategies to balance responsiveness and efficiency.

UNIT - I

Introduction to Supply Chain Management: Concept, Objectives, Scope and Functions of Supply Chain; Process view of a Supply Chain; Impact of Supply Chain Flows.

Supply Chain Drivers: Facilities, Inventory, Transportation, Information, Sourcing, Pricing; Obstacles to Achieve Strategic fit; Role of Aggregate Planning in Supply Chain, Methods and Managing Supply and Demand.

Supply Chain Performance: Competitive Advantage and Supply Chain Strategies, Achieving Strategic fit.

UNIT - II

Logistics Management: Introduction, Difference between Logistics and Supply Chain; Inbound, Inter and Outbound Logistics; Integrated Logistics Management; 3PL, 4PL, Intermodal and Reverse Logistics.

Supply Chain Customer Service: The Marketing and Logistics interface, Customer Service and Customer Retention, Service-Driven Logistics System, Setting customer Service Priorities and Service Standards.

UNIT - III

Supply Chain Relationship: Bench marking - Objectives, Bench marking Cycle, Process and types, Setting Bench marking Priorities.

Sourcing in Supply Chain: Role of Sourcing in Supply Chain Management, Supplier Scoring and Assessment; Supplier Selection and Controlling; The Procurement process, Sourcing Planning and Analysis; Global Sourcing.

Pricing and Revenue in Supply Chain: The role of Revenue Management in Supply Chain.

UNIT - IV

Network design in Supply Chain: The role of distribution in the Supply Chain Management, factors influencing distribution network design; Transportation Fundamentals: The role of Transportation in Supply Chain, Factors influencing Transportation Decisions, Modes of transportation, Transportation documentation.

Coordination in Supply Chain: Introduction, Lack of Supply Chain Coordination and the Bullwhip effect, Impact of Lack of Coordination, Obstacles to Coordination in Supply Chain, Managerial levers to achieve Coordination.

UNIT - V

IT in Supply Chain: The role of IT in the Supply Chain, The Supply Chain IT framework; CRM, Internal SCM, SRM; The future of IT in Supply Chain, Supply Chain IT in Practice.

Global Logistics and Global Supply Chain: Logistics in Global Economy, Change in Global Logistics, Global Supply Chain business process; Global Strategy; Global Purchasing, Global SCM.

Relevant case study discussions in all units

TEXT BOOK

K.Sridhara butt, "Logistics and Supply Chain management", Himalaya Publishers, New Delhi, 2009

REFERENCES

1 Sunil Chopra and Peter Meindl, "Supply Chain Management: Strategy, Planning & Operations", Pearson Education, New Delhi, 2004.

2 Donald J Bowerfox and David J Closs, " Logistics Management: The integrated Supply Chain Process", TMH, 2003.

3 D.K.Agarwal, "Logistics and Supply Chain management", Mc millan Publishers, 201

4. B.Rajasekhar, Acharyulu, "Logistics and Supply Chain management", Excel Books, New Delhi, 2009.

VII SEMESTER

S101 - ACTUARIAL SCIENCES AND RISK MANAGEMENT

COURSE EDUCATION OBJECTIVE:

- Student understands the principles of economics.
- Students get an understanding of the principles of risk management.
- Students also understand the risk management operations in the overall academic scenario of the national economy.

COURSE OBJECTIVES

At the end of this programme,

- Student have sound knowledge on terminology, process followed by the stock brokers.
- Student will be able to talk to the client as well as functional consultant in the same language, so that of process will be easier.
- Student understands the working scenario of the stock brokers.

UNIT – I

Stand alone Risk analysis: Sources, measures and perspectives, On risk, sensitivity analysis, Scenario analysis, Break even analysis, simulation Managing Risk, project selection analysis in practice.

UNIT – II

Risk Analysis: Firm risk and Market risk: Portfolio related Risk measure, Mean variance and portfolio construction. Port folio theory and capital Budgeting CAPM.

UNIT – III

Risk Management: Option valuation; Derivatives: managing financial Risk Options and option contracts; credit risk management; introduction, risks and credit risk management.

UNIT – IV

Risk and Return: Return and Risk, measuring internal risk, measuring Historical return and measuring historical risk measuring expected return and risk. Derivatives and Risk Management: Risk management Forwards and Futures, options; interest rates and currency swaps.

UNIT – V

Foreign exchange exposure and Risk Management: Types of exposure foreign exchange risk measurement – external techniques. Fenn – internal techniques. Hedging Market Risk: Foreign and Forex Management.

Risk and Structured Finance: Structured finance Techniques, and asset backed securities mortgage based securities Securitization.

TEXT BOOKS

1. M Y Khan and P K Jain ,"Financial Management", Tata MacGraw Hill, New Delhi,6th edition.
2. Prasanna Chjandra ,"Investment analysis and Portfolio Management", Tata MacGraw Hill, New Delhi, 2nd edition.

REFERENCES

1. M Pandey ,"Financial Management", Vikas Publishing House.
2. Rajiv Shrivastava and Anil Mishra ,"Financial Management", Oxford Univ. Press, NewDelhi.
3. Prasanna Chandra, "Project Planning Analysis Selection and Implementation and Review", Tata McGraw Hill, New Delhi.

VII SEMESTER

L118 - CLOUD COMPUTING AND INFORMATION SECURITY LAB

Course Educational Objectives:

The main goal of this lab is to provide you with a background, foundation, and insight into the many dimensions of information security and cloud computing. This practical knowledge will serve as basis for further deeper study into selected areas of the field, or as an important component in your further studies and involvement in computing as a whole.

Course Outcomes:

After completion of the course students are able to:

1. Investigate how a global storage solution can be optimized so that it can be delivered successfully from the cloud.
2. Analyze how best to provide reliable access to information both locally and remotely using storage technologies.

PROGRAMS:

1. Installation of Cloud sim.
2. A simple example showing how to create a datacenter with one host and run one cloudlet on it.
3. A simple example showing how to create two datacenters with one host and a network topology each and run two cloudlets on them.
4. A simple example showing how to create two datacenters with one host each and run cloudlets of two users with network topology on them.
5. A simple example showing how to create two datacenters with one host each and run two cloudlets on them.
6. An example showing how to create scalable simulations.
7. Simple D.E.S Implementation
8. RC-4 Stream cipher algorithm
9. SHA-1 implementation
10. R.S.A Implementation

VII SEMESTER

L110 - ANDROID APPLICATIONS LAB

Course Educational Objectives:

This course introduces mobile application development on the Android platform. Students will be imparted with the skills for creating and deploying Android applications, with particular emphasis on components and concepts that define the Android platform.

Course Outcomes:

After completion of the course students are able to:

- Understand the Android environment
- Use Tools for creating Android applications
- Apply the Android approach to structuring applications
- Understands Basic user interfaces
- Apply the Application life cycles

After completion of the course students are able to:

1. The Android environment
2. Tools for creating Android applications
3. The Android approach to structuring applications
4. Basic user interfaces
5. Application life cycles
6. Eclipse and SDK installation
7. Create a “Hello World” Android Application.
8. Develop a program to Declare Layouts dynamically at runtime.
9. Develop a program to demonstrate the use of Events and Event Listeners.
10. Creating a Joke list application which allows a user to view and edit a list of jokes.
11. Creating a joke list application by declaring layouts statically as an xml resource and create custom views, options & context menus.
12. Design simple Games.
13. Create a SQLite Database, manage DB Connections and perform operations on SQLite DB.
14. Design an application, to work with and manage Cursors, and use of Cursor Adapters.
15. Create a new gps recording application called Walkabout.
16. Create voice chat Application
17. Create an Application for SMS.
18. Create an application for SMS Alarm
19. Create a new application App Rater that suggests other applications for users to download & try.
20. Design an application, to create and delete private application files.

VIII SEMESTER

S270 - INDUSTRIAL MANAGEMENT

(Common to CSE, ECE, EEE, EIE, IT, ME

Prerequisite: None

Course Educational Objectives (CEOs):

In this course student will learn about

1. The fundamental concepts and contributions of Management.
2. Human Resource Practices, Quality controls and Project Management which plays a vital role in the organization.
3. Study techniques for increased productivity.
4. Human Resource Management practices.
5. Various network analysis techniques.

Course Outcomes:

After completion of the course, students will be able to

1. Apply the conceptual knowledge of management and organization in work environment.
2. Take decisions relating to location of plant and layout of plant.
3. Conduct work study techniques for increased productivity and also able to control quality of products.
4. Manage human resources efficiently and effectively with best HR practices.
   Plan and control projects through network analysis techniques.

UNIT - I

Introduction: Management - Definition, Nature, Importance of management Functions of Management - Taylor's scientific management theory, Fayal's principles of management, Contribution of Elton mayo, Maslow, Herzberg, Douglas MC Gregor, basic concepts of Organisation- Authority, Responsibility Delegation of Authority, Span of control, Departmentation and Decentralization - Organisation structures (Line organization, Line and staff organization, Functional organization, Committee organization, Matrix organization)

UNIT - II

Operations Management: Plant location, Factors influencing location, Principles and types of plant layouts - Methods of production (job, batch and mass production), Work study - Basic procedure involved in method study and Work measurement

UNIT - III

Quality and materials management: Statistical quality control – Meaning- Variables and attributes - X chart, R Chart, C Chart, P Chart, (simple Problems) Acceptance sampling, Sampling plans, Deming's contribution to quality. Materials management – objectives, Need for inventory control, Purchase procedure, Store records, EOQ, ABC analysis, Stock levels

UNIT - IV

Human Resource management (HRM): Concepts of HRM, Basic functions of HR manager: Man power planning, Recruitment, Selection, Training and development, Placement, Wage and salary administration, Promotion, Transfers Separation, performance appraisal, Job evaluation and merit rating.

UNIT - V

Project management: Early techniques in project management - Network analysis: Programme evaluation and review technique (PERT), Critical path method (CPM), Identifying critical path, Probability of completing project within given time, Project cost analysis, project crashing (simple problems)

TEXT BOOKS

Dr. A.R.Aryasri, "Management Science", TMH, 2009, 4th edition.

REFERENCES

1. Koontz & weihrich," Essentials of management, TMH 2010, 8th edition.
2. Stoner, Freeman, Gilbert, "Management", Pearson education, New Delhi 2004, 6th edition.
3. O.P. Khana, "Industrial engineering and Management".

VIII SEMESTER

S316 - MOBILE COMPUTING

(Common to CSE, ECE, IT)

COURSE EDUCATION OBJECTIVES

1 To study the Novel Applications
2 To study the Mobile Services
3 To study the Mobile Network Layer
4 To study the Wireless LAN Technology
5 To study the Wireless Application Protocol

COURSE OUTCOMES

After Completion of the Course Students are able to

1 The Students Learn Wireless Transmission Protocols
2 The students Learn Medium Access Control
3 The Students Learn Dynamic Host Configuration Protocol
4 The Students Learn Transaction Oriented TCP
5 The Students Learn Mobile Ad hoc Networks(MANETS)

UNIT - I

Introduction to Mobile Computing : Mobile Computing (MC) : Introduction to MC, novel applications, limitations, and architecture.

GSM : Mobile services, System architecture, Protocols, Localization and calling, Handover, Security, and New data services.

(Wireless) Medium Access Control : Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA.

UNIT - II

Mobile Network Layer : Mobile IP (Goals, assumptions, entities and terminology, IP packet delivery, agent advertisement and discovery, registration, tunnelling and encapsulation, optimizations).

Mobile Transport Layer : Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/fast recovery, Transmission /time-out freezing, Selective retransmission, Transaction oriented TCP.

UNIT - III

Mobile Ad hoc Networks (MANETs): Overview, Properties of a MANET, spectrum of MANET applications, routing and various routing algorithms, security in MANETs.

Ad Hoc Wireless networks: Introduction, Issues in Ad Hoc Wireless networks, Routing Protocols: Table Driven**:** DSDV, WRP, On Demand: AODV, DSR.

UNIT –IV

Introduction to Android: What is Android? Setting up development environment, Dalvik Virtual Machine & .apk file extension**,** Fundamentals: Basic Building blocks Activities,Services,Broadcast Receivers & Content providers, UI Components - Views & notifications, Components for communication -Intents & Intent Filters, Android API levels (versions & version names)

Application Structure (in detail)

AndroidManifest.xml, uses-permission & uses-sdk, Resources & R.java, Assets, Layouts & Drawable Resources, Activities and Activity lifecycle, First sample Application

UNIT –V

Protocols and Tools : VOIP(what is voip? voip issues, voip architectures, voip protocol stack),Wireless Application Protocol-WAP. (Introduction, protocol architecture, and treatment of protocols of all layers), Bluetooth (User scenarios, physical layer, MAC layer, networking, security, link management), IOS: What is ios? history, features, applications

TEXT BOOKS

1. Jochen Schiller,"Mobile Communications", *Addison-Wesley 2004*, second edition.
2. C. Siva Ram Murthy, B.S. Manoj, " Ad Hoc Wireless Networks: Architectures and Protocols", Pearson Education 2004
3. "Android for Programmers An App-Driven Approach", 1st Edition
4. "Voice Over IP Fundamentals", Cisco Press; Cisco Press, 2006, 2nd Edition.

REFERENCES

1. Reza Behravanfar, "Mobile Computing Principles: Designing and Developing Mobile Applications withUML and XML", Cambridge University Press,October 2004,
2. Adelstein, Frank, Gupta, Sandeep KS, Richard III, Golden , Schwiebert, Loren, "Fundamentals of Mobile and Pervasive Computing", ISBN: 0071412379, McGraw-Hill Professional, 2005.
3. Stefano Basagni, Marco Conti, Silvia Giordano, Ivan Stojmenović, "Mobile ad hoc networking", IEEE Press, Wiley InterScience, 2004.

VIII SEMESTER

S326 - OBJECT ORIENTED SOFTWARE ENGINEERING

(Common to CSE, IT)

Course Educational Objectives:

The course aims to provide a basic introduction to software object oriented engineering principles. The course introduces

1. a basic set of programming fundamentals such as input/output techniques,
2. selection statements, iterative loops, recursion and basic data structures.
3. It teaches formal class design techniques to address programming tasks and emphasizes error elimination and testing strategies in code development.
4. Practical work is central to learning on the course both in supervised sessions and during the participants own time.

Course Outcomes:

After completion of the course students are able to:

1. Understand the fundamental principles underlying Object-Oriented software design.
2. Employ formal methods to produce effective software designs as solutions to specific tasks.
3. Develop structured sets of simple user-defined classes using Object-Oriented principles to achieve overall programming goals.
4. Write simple programs in Java to undertake basic Input/Output and to perform simple data manipulation.
5. Develop error identification and testing strategies for code development.
6. Locate, read and summarise relevant literature, from both traditional and electronic media, to extend your understanding of the topic.
7. Develop reasoned arguments, firmly grounded in the available literature.
8. Plan and write assignments, within the specified parameters and to a professional standard.
9. Take responsibility for your own learning through reading and the preparation of assignments, and reflect upon your learning experience

UNIT - I

INTRODUCTION

System Concepts – Software Engineering Concepts – DevelopmentActivities – Managing Software Development – Unified Modelling Language – Overview –modelling concepts – deeper view into UML - Project Organization – Communication

UNIT - II

ANALYSIS

Requirements Elicitation – Concepts – Activities – Management – Arena CaseStudy - Analysis Object Model – Analysis – Concepts – activities - Managing analysis – CaseStudy

UNIT - III

SYSTEM DESIGN

Decomposing the system – Overview of System Design – System DesignConcepts – System Design Activities – Addressing Design Goals – Managing System Design –Case Study

UNIT - IV

OBJECT DESIGN AND IMPLEMENTATION ISSUES

Reusing Pattern Solutions – Concepts– Activities – Managing Reuse – Case Study - Specifying Interfaces – Concepts – Activities –Management – Case Study - Mapping Models to Code – Concepts – Activities – Management –Case Study – Testing – Concepts – Activities – Management

UNIT - V

MANAGING CHANGE

Rationale Management – Concepts – Activities – Management -Configuration Management – Concepts – Activities – Management - Project Management -Concepts – Activities – Management – Software Life Cycle

TEXT BOOKS

1. Bernd Bruegge and Alan H Dutoit, "Object-Oriented Software Engineering", Pearson Education 2010, 2nd edition.
2. Timothy Lethbridge and Robert Laganiere,"Object-oriented Software Engineering :Practical Software Development using UML and Java", McGraw Hill Publication, 2010.
3. Waman S Jawadekar: **"**Software Engineering Principles and Practice", The McGraw Hill Publications V edition.

VIII SEMESTER

S320 - NATURAL LANGUAGE PROCESSING

COURSE EDUCATION OBJECTIVES:

- Understands the process of translation from human understandable language to machine understandable language.
- Gets familiarized with the tools used in the translation process.
- Understands how principles of compiler design are extended and applied in Natural Language Processing.

COURSE OUTCOMES

After Completion of the Course Students are able to

- Understands various classification techniques.
- Understand principles and applications of markov models.

UNIT - I

Introduction and Overview What is Natural Language Processing, hands-on demonstrations.Ambiguity and uncertainty in language. The Turing test. **Regular Expressions** Chomsky hierarchy,regular languages, and their limitations. Finite-state automata. Practical regular expressions for finding and counting language phenomena. A little morphology. Exploring a large corpus with regex tools. P**rogramming in Python** An introduction to programming in Python. Variables numbers,strings,arrays,dictionaries, conditionals, iteration. The NLTK (Natural Language Toolkit) **String Edit Distance and Alignment** Key algorithmic tool: dynamic programming, a simple example, use inoptimal alignment of sequences. String edit operations, edit distance, and examples of use in spelling correction, and machine translation.

UNIT - II

Context Free Grammars : Constituency, CFG definition, use and limitations. Chomsky Normal Form. Top-down parsing, bottom-up parsing, and the problems with each. The desirability of combining evidence from both directions **Non-probabilistic Parsing:** Efficient CFG parsing with CYK, another dynamic programming algorithms. Early parser. Designing a little grammar, and parsing with it on some test data.**Probability** Introduction to probability theory Joint and conditional probability, marginals, independence, Bayes rule, combining evidence. Examples of applications in naturallanguage.**Information Theory:** The "Shannon game"--motivated by language! Entropy, crossentropy, information gain. Its application to some language phenomena

UNIT - III

Language modeling and Naive Bayes: Probabilistic language modeling and its applications. Markov models. N-grams. Estimating the probability of a word, and smoothing. Generative models of language. Part of Speech Tagging and Hidden Markov Models**,** Viterbi Algorithm for Finding Most Likely HMM Path Dynamic programming with Hidden Markov Models, and its use for part-of-speech tagging, Chinese word segmentation, prosody, information extraction, etc.

UNIT - IV

Probabilistic Context Free Grammars: Weighted context free grammars. Weighted CYK. Pruning and beam search. **Parsing with PCFGs:** A tree bank and what it takes to create one. The probabilistic version of CYK. Also: How do humans parse?, Experiments with eye-tracking. Modern parsers. **Maximum Entropy Classifiers:**The maximum entropy principle and its relation to maximum likelihood. Maximum entropy classifiers and their application to document classification, sentence segmentation, and other language tasks

UNIT - V

Maximum Entropy Markov Models & Conditional Random Fields: Part-of-speech tagging, noun-phrase segmentation and information extraction models that combine maximum entropy and finite-state machines. State-of-the-art models for NLP.

Lexical Semantics: Mathematics of Multinomial and Dirichlet distributions, Dirichlet as a smoothing for multinomial's

Information Extraction & Reference Resolution: Various methods, including HMMs. Models of anaphora resolution. Machine learning methods for co reference.

TEXT BOOKS

1. Jurafsky and Martin ,"Speech and Language Processing", Prentice Hall
2. Manning and Schutze ,"Statistical Natural Language Processing", MIT Press
3. James Allen "Natural Language Understanding", The Benjamin's/Cummings Publishing Company

REFERENCES

1. Cover, T. M. and J. A. Thomas: "Elements of Information Theory", Wiley.
2. Charniak, E," Statistical Language Learning", The MIT Press.

VIII SEMESTER

S249 - FAULT TOLERANT SYSTEMS

(Common to CSE, IT)

Course Educational Objectives

- To provide basic/Fundamentals understanding of Fault Tolerance.
- To make the students familiar with factors of fault tolerance.
- To know the Measures of fault tolerance.
- How to attain fault tolerance using different techniques like redundancy and codes.
- To provide fault tolerance using software systems techniques.

Course Outcomes

- Ability to identify principles of fault tolerance.
- Ability to calculate or measure different factors of fault tolerance.
- Ability to implement different techniques for improving fault tolerance.
- Ability to evaluate fault tolerance of a system using different techniques.
- Ability to Design self-checking software in the fault tolerance.

Pre requisite: Knowledge of software engineering.

UNIT - I

Introduction

Definition of fault tolerance, Redundancy, Applications of fault-tolerance, Fundamentals of dependability.

UNIT - II

Attributes

Reliability, availability, safety, Impairments: faults, errors and failures, Means: fault prevention, removal and forecasting.

UNIT - III

Dependability evaluation

Common measures: failures rate, mean time to failure, mean time to repair, etc. Reliability block diagrams ,Markov processes.

UNIT - IV

Redundancy

Hardware redundancy, Redundancy schemes, Evaluation and comparison, Applications , I1nformation redundancy ,Codes: linear, Hamming, cyclic, unordered, arithmetic, etc., Encoding and decoding techniques ,Applications , Time redundancy.

UNIT - V

Programming

Software fault tolerance, Specific features, Software fault tolerance techniques: N-version 1programming, recovery blocks, self-checking software, etc.

TEXT BOOKS

1. Anderson, T., and P.A. Lee, “Fault-Tolerant Principles and Practices”, Prentice-Hall
2 Hwang, K., and F.A. Briggs,” Computer Architecture and Parallel Processing”, McGraw-Hill.
3 Jalote, P,” Fault-Tolerance in Distributed Systems, Prentice-Hall.

REFERNCES

1. Johnson, B.W,” Design and Analysis of Fault-Tolerant Systems”, Addison Wesely
2. Leveson, Nancy G,”Safe ware system safety and computers”, Addison Wesely.
3. Pradhan, D.K,” Fault-Tolerant Computing Theory and Techniques”, Prentice-Hall.
4. Pradhan, Dhiraj K,” Fault-Tolerant Computer System Design”, Prentice-Hall PTR

VIII SEMESTER

S328 - OPERATIONS MANAGEMENT

Course Educational Objectives:

1. To get acquainted with the basic aspects of Production Management.
2. To provide the students about the important of planning, organizing and controlling aspects of Operation Management.
3. Study of different operational issues in manufacturing and service organizations.
4. Developing a focus and critical thinking important to solve problems in operations of business.
5. To understand and apply the tools of management.

Course Outcomes:

After completion of the course students are able to:

1. Understand the operation process, be able to analyze and solve problems pertaining to operations.
2. Understand some the mathematical models of production management.
3. Appraise how other functional areas of business are integrated with operations management.
4. Understand some of the interrelations between the disciplines within management.
5. Demonstrate and understanding of relevant systems thinking and problem-solving concepts and frameworks.

UNIT – I

OVERVIEW OF PRODUCTION SYSTEM: Objectives of Operation Management, Scope of Operations Management, Operation Management Frame Work, Relationship of operations with other Functional areas, Manufacturing Vs Service sector, Operations Decision making.

UNIT – II

PRODUCTION DESIGN PROCESS and process choices measures of capacity**,** Factors affecting capacity, Capacity planning, Systematic approach to capacity planning, Long-term and short-term capacity decisions, Tools for capacity, Capacity Requirement planning.

UNIT – III

BUSINESS PROCESS OUTSOURCING, Aggregate Planning strategies and methods – Pure and mixed strategies.

UNIT – IV

TRANSPORTATION METHOD: PP method Master Production Schedule, MRP-Lot sizing methods, MRP II, CRP Assembly.

UNIT – V

LINE BALANCING ALGORITHMS: Group technology – Production Flow analysis – Rank order clustering, Business Process Reengineering-JIT.

TEXT BOOK

1. Elsayed A Elsayed, Thomas O.Boucher, “Analysis and Control of Production System”, Prentice Hall Publications 1993.
2. Buffa. E.S,”Modern Production Operations Management”, John Wiley sons, 2007, 7th Edition.

REFERENCES

1. Krajervaki and Ritzman, “Operation Management”, Addison Wesley Publications, 2007.
2. Norman Gaither, Greg Frazier, “Operation Management”, Thomson Learning 2009, 9th Edition.
3. Monks J.G., “Operation Management”, McGraw Hill, 2004.

VIII SEMESTER

S329 - OPERATIONS RESEARCH

(Common to AE, CSE, IT, ME)

COURSE EDUCATIONAL OBJECTIVES:

- ability to understand and analyze managerial problems in industry so that they are able to use resources (capitals, materials, staffing, and machines) more effectively;
- knowledge of formulating mathematical models for quantitative analysis of managerial problems in industry;
- skills in the use of Operations Research approaches and computer tools in solving real problems in industry;
- mathematical models for analysis of real problems in Operations Research.

COURSE OUTCOMES:

Upon completion of the subject, students will be able to

a. recognize the importance and value of Operations Research and mathematical modeling in solving practical problems in industry;
b. formulate a managerial decision problem into a mathematical model;
c. understand Operations Research models and apply them to real-life problems;
d. use computer tools to solve a mathematical model for a practical problem.

UNIT - I

INTRODUCTION: Operations Research, operations research models, applications, Linear Programming Problem Formulation, Graphical solution, Simplex method, Two Phase simplex

UNIT - II

TRANSPORTATION PROBLEM: Formulation, Optimal solution, unbalanced transportation problem, Degeneracy. Assignment problem, optimal solution, Variants of Assignment Problem-Traveling Salesman problem.

UNIT - III

THEORY OF GAMES: Minimax (maximin) Criterion and optimal strategy, Solution of games with saddle points, Rectangular games without saddle points, 2 X 2 games – dominance principle – m X 2 & 2 X n games, and graphical method.

INVENTORY CONTROL: EOQ model, Shortages not allowed, Deterministic models, Probabilistic models, Price breaks

UNIT - IV

THEORY OF REPLACEMENT: Introduction, Replacement of Equipment that Deteriorates Gradually, Replacement of Equipment that fails suddenly, Group Replacement.

WAITING LINES: Single Channel – Poisson arrivals – exponential service times – with infinite population and finite population models– Multichannel – Poisson arrivals – exponential service times with infinite population single channel Poisson arrivals.

UNIT - V

Dynamic Programming: Bellman's Principle of optimality, Applications of dynamic programming, capital budgeting problem, linear programming problem.

IntroductiontoOptimization: Introduction, Engineering Applications of Optimization, Problem Statement – Design Vector, Design Constraints, Constraint surface, Objective function, Objective function Surfaces. Classification of optimization problems, Optimization Techniques – Introduction, Single-variableOptimization.

TEXT BOOKS

1. Kantiswarup. P.K.Gupta, Man Mohan, "Operations Research", Sultan Chand& Sons, Educational Publications, New Delhi 2008, 14th Edition.
2. Hiller &Libermann, "Introduction to Operations Research" TMH 2009, 9TH EDITION.

REFERENCES

1. Singiresu S Rao, "Engineering Optimization: Theory and Practice", A Wiley-Interscience Publication 2009, 4th edition.
2. A.M.Natarajan, P.Balasubramani, A. Tamilarasi,"Operations Research", Pearson Education 2014, 2nd edition.
3. Taha, "Introduction to O.R .PHI", 9th edition, 2010.

VIII SEMESTER

S370 - RENEWABLE ENERGY SOURCES

(Common to EIE, IT, ME)

Course Educational Objectives

The course will introduce a wide range of renewable energy technologies. Renewable Energy Systems are an important technology that has the potential to advance environmental goals and eventually support a sustainable future. In this subject students are exposed to solar, wind, fuel cells and biomass energy systems.

The key objectives of the course will be to:

- Provide coverage of Renewable power system generation
- Describe the impact of energy usage on society.
- Understand the design, planning, and operation of renewable power systems.
- Provide an understanding of the conventional and sustainable energy resources and their operation and control methods
- Provides with knowledge and skills needed for continued learning and education in the power systems and renewable energy fields.
- Evaluate the financial costs and benefits of renewable energy projects.

Course Outcomes

The course contributes to the following learning outcomes:

- Identify the issues facing the renewable energy industry.
- Identify planning and environmental issues related to renewable energy plants.
- Determine the sun position and angles and shading.
- Describe the main features of solar hot water systems.
- Describe analyse main features of photo voltaic systems.
- Describe the factors to consider when selecting site for wind power generation
- Evaluate the financial costs and benefits of renewable energy projects.

UNIT - I

INTRODUCTION: Energy Scenario – Survey of Energy Resources – Classification – Need for Non-Conventional Energy Resources.

SOLAR ENERGY: The Sun - Sun-Earth Relationship –Solar radiation – Attention – Radiation measuring Instruments.

SOLAR ENERGY APPLICATIONS: Solar water Heating, Space Heating – Active and Passive heating – Energy storage – selective surface – solar stills and ponds – solar refrigeration – photovoltaic generation.

UNIT - II

WIND ENERGY: Wind – characteristics – wind energy conversion systems – types – Betz model – Interference Factor – Power Coefficient – Torque Coefficient and thrust coefficient – Lift machines and drag machines – matching – electricity generation..

GEOTHERMAL ENERGY: Structure of Earth – Geothermal Regions – Hot springs – Hot Rocks – Hot Aquifers – Analytical Methods to estimate Thermal Potential – Harnessing Techniques – Electricity Generation Systems.

UNIT - III

ENERGY FROM OCEANS: Tidal Energy; Tides – Diurnal and Semi – Diurnal Nature – Power from Tides.

WAVE ENERGY : Waves – Theoretical Energy Available – Calculation of period and phase velocity of waves – wave power systems – submerged devices.

OCEAN THERMAL ENERGY: Principles – Heat Exchangers – Pumping requirements – Practical Considerations.

UNIT - IV

BIO – ENERGY: Biomass Energy Sources – Plant Productivity, Biomass Wastes – Aerobic and Anaerobic bio-conversion processes – Raw Materials and properties of Bio-gas-
Bio-gas plant Technology and Status – The Energetic and Economics of Biomass systems – Biomass gasification

UNIT - V

DIRECT ENERGY CONVERSION SYSTEMS: Introduction to direct energy conversion systems, Peltier effect, seebeck effect, Thomson effect, Fuel Cells, efficiency of Fuel Cells, and Solar Cells–Thermionic and Thermoelectric Generation – MHD Generator-Open and Closed Systems, applications of direct energy energy conversion systems.

TEXTBOOK

1. G.D.Rai," Non-Conventional Energy Sources", Khanna Publishers, New Delhi, India 2011, 5th Edition.
2. Kreith, F and Kreider, J. F.," Principles of Solar Engineering", McGraw-Hill, 1978.

REFERENCES

1. John Twidell &Tony Weir, "Renewable Energy Resources", 2nd Edition
2. Malcolm Flesher & Chrris Lawis," Biological Energy Resources", Routledge Publishers
3. G.N.Tiwari, "Solar Energy – Fundamentals, Design, Modelling and Applications" Narosa Publication Ltd.,2000.
4. Ashok V Desai, "Non-Conventional Energy", Wiley Eastern, 2000.
5. Godfrey Boyle, "Renewable Energy Power for a Sustainable Future", Oxford University Press, U.K, 1996.
6. Veziroglu, T.N., "Alternative Energy Sources", Vol 5 and 6, McGraw-Hill, 1990
7. Khandelwal K.C, Mahdi S.S.," Biogas Technology A Practical Handbook", Tata McGraw Hill,

VIII SEMESTER

S254 - FUZZY LOGIC

COURSE EDUCATIONAL OBJECTIVES:

- Provide an understanding of the basic mathematical elements of the theory of fuzzy sets.
- Provide an emphasis on the differences and similarities between fuzzy sets and classical sets theories.
- Cover fuzzy logic inference with emphasis on their use in the design of intelligent or humanistic systems.
- Provide a brief introduction to fuzzy arithmetic concepts
- Provide an insight into fuzzy inference applications in the area of control and robotics.

COURSE OUTCOMES:

At the end of this course student will able to,

- Be able to distinguish between the crisp set and fuzzy set concepts through the learned differences between the crisp set characteristic function and the fuzzy set membership function.
- Be able to draw a parallelism between crisp set operations and fuzzy set operations through the use of characteristic and membership functions respectively.
- Be able to define fuzzy sets using linguistic words and represent these sets by membership functions.
- Know how to perform mapping of fuzzy sets by a function and also use the α-level sets in such instances.
- Know fuzzy-set-related notions; such as α-level sets, convexity, normality, support, etc.
- Know the concept of a fuzzy number and how it is defined.
- Become familiar with the extension principle, its compatibility with the α-level sets and the usefulness of the principle in performing fuzzy number arithmetic operations (Additions, multiplications, etc.)
- Become familiar with fuzzy relations and the properties of these relations.
- Become capable of drawing a distinction between binary logic and fuzzy logic at the conceptual level

UNIT - I

Classical and Fuzzy Sets: Overview of Classical Sets, Membership Function, α-cuts, Properties of α-cuts, Decomposition Theorems, Extension Principle.

Operations on Fuzzy Sets: Compliment, Intersections, Unions, Combinations of Operations, Aggregation Operations.

UNIT - II

Fuzzy Arithmetic: Fuzzy Numbers, Linguistic Variables, Arithmetic Operations on intervals & Numbers, Lattice of Fuzzy Numbers, Fuzzy Equations.

UNIT - III

Fuzzy Relations: Crisp & Fuzzy Relations, Projections & Cylindric Extensions, Binary Fuzzy Relations, Binary Relations on single set, Equivalence, Compatibility & Ordering Relations, Morphisms, Fuzzy Relation Equations.

UNIT - IV

Possibility Theory: Fuzzy Measures, Evidence & Possibility Theory, Possibility versus Probability Theory. **Fuzzy Logic**: Classical Logic, Multivalued Logics, Fuzzy Propositions, Fuzzy Qualifiers, Linguistic Hedges.

UNIT - V

Unertainty based Information: Information & Uncertainity, Nonspecificity of Fuzzy & Crisp sets, Fuzziness of Fuzzy Sets.Applications of Fuzzy Logic

TEXT BOOKS

G.J.Klir and B.Yuan,"Fuzzy Sets and Fuzzy Logic Theory and applications", PHI,97.

REFERENCES

1. Rajashekaran and Pai, "Neural Networks,Fuzzy Logic,Genetic Alogotithms:Synthesis and applications",PHI Publications.
2. Bark Kosko ,"Neural networks and Fuzzy Logic Systems" ,PHI Publications
3. John Yen and Reza Langan,"Fuzzy Logic :Intelligence,control and information",Pearson Education.
4. Timothy J.Ross,"Fuzzy Logic with Engineering Applications",McGramHill Inc1997.