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## **JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

(Established by Andhra Pradesh Act No.30 of 2008)  
Kukatpally, Hyderabad – 500 085, Andhra Pradesh (India)

**B.TECH. (BME, CSE, EEE, ECE, EIE, ETM, IT/CST, ICE)**

### **R13 COURSE STRUCTURE AND SYLLABUS**

#### **I YEAR**

<b>Code</b>	<b>Subject</b>	<b>L</b>	<b>T/P/D</b>	<b>C</b>
	English	2	-	4
	Mathematics – I	3	-	6
	Mathematical Methods	3	-	6
	Engineering Physics	3	-	6
	Engineering Chemistry	3	-	6
	Computer Programming	3	-	6
	Engineering Drawing	3	3	6
	Computer Programming Lab.	-	3	4
	Engineering Physics & Engineering Chemistry Lab	-	3	4
	English Language Communication Skills Lab.	-	3	4
	Engineering Workshop / IT Workshop	-	3	4
	<b>Total</b>	<b>20</b>	<b>15</b>	<b>56</b>

## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

I Year B.Tech.

L	T/P/D	C
2	-/-	4

## ENGLISH

**1. INTRODUCTION:**

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire communicative competence, the syllabus has been designed to develop linguistic and communicative competencies of Engineering students. The prescribed books and the exercises are meant to serve broadly as students' handbooks.

In the English classes, the focus should be on the skills of reading, writing, listening and speaking and for this the teachers should use the text prescribed for detailed study. For example, the students should be encouraged to read the texts/selected paragraphs silently. The teachers can ask comprehension questions to stimulate discussion and based on the discussions students can be made to write short paragraphs/essays etc.

The text for non-detailed study is for extensive reading/reading for pleasure. Hence, it is suggested that they read it on their own the topics selected for discussion in the class. The time should be utilized for working out the exercises given after each section, as also for supplementing the exercises with authentic materials of a similar kind for example, from newspaper articles, advertisements, promotional material etc.. *However, the stress in this syllabus is on skill development, fostering ideas and practice of language skills.*

**2. OBJECTIVES:**

- To improve the language proficiency of the students in English with emphasis on LSRW skills.
- To equip the students to study academic subjects more effectively using the theoretical and practical components of the English syllabus.
- To develop the study skills and communication skills in formal and informal situations.

**SYLLABUS:****Listening Skills:**

## Objectives

- To enable students to develop their listening skill so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation
- To equip students with necessary training in listening so that they can comprehend the speech of people of different backgrounds and regions

*Students should be given practice in listening to the sounds of the language to be able to recognise them, to distinguish between them to mark stress and recognise and use the right intonation in sentences.*

- Listening for general content
- Listening to fill up information
- Intensive listening
- Listening for specific information

**Speaking Skills:**

## Objectives

- To make students aware of the role of speaking in English and its contribution to their success.
  - To enable students to express themselves fluently and appropriately in social and professional contexts.
- Oral practice
  - Describing objects/situations/people
  - Role play – Individual/Group activities (Using exercises from all the nine units of the prescribed text: *Learning English : A Communicative Approach*.)
  - Just A Minute(JAM) Sessions.

**Reading Skills:**

## Objectives

- To develop an awareness in the students about the significance of silent reading and comprehension.
  - To develop the ability of students to guess the meanings of words from context and grasp the overall message of the text, draw inferences etc.
- Skimming the text
  - Understanding the gist of an argument
  - Identifying the topic sentence
  - Inferring lexical and contextual meaning
  - Understanding discourse features
- Scanning
- Recognizing coherence/sequencing of sentences

**NOTE :** *The students will be trained in reading skills using the prescribed text for detailed study. They will be examined in reading and answering questions using 'unseen' passages which may be taken from authentic texts, such as magazines/newspaper articles.*

**Writing Skills :**

**Objectives**

1. To develop an awareness in the students about writing as an exact and formal skill
2. To equip them with the components of different forms of writing, beginning with the lower order ones.

- Writing sentences
- Use of appropriate vocabulary
- Paragraph writing
- Coherence and cohesiveness
- Narration / description
- Note Making
- Formal and informal letter writing
- Describing graphs using expressions of comparison

**TEXTBOOKS PRESCRIBED:**

**In order to improve the proficiency of the student in the acquisition of the four skills mentioned above, the following texts and course content, divided into Eight Units, are prescribed:**

**For Detailed study**

- 1 First Text book entitled “Enjoying Everyday English”, Published by Sangam Books, Hyderabad

**For Non-detailed study**

1. Second text book “Inspiring Speeches and Lives”, Published by Maruthi Publications, Guntur

The course content and study material is divided into **Five Units**.

**Unit –I:**

1. Chapter entitled ‘**Wit and Humour**’ from ‘Skills Annex’ -Functional English to Success Published by Orient Black Swan, Hyderabad
2. Chapter entitled ‘**Mokshagundam Visvesvaraya**’ from “*Epitome of Wisdom*”, Published by Maruthi Publications, Hyderabad.

and

L-Listening For Sounds, Stress and Intonation

S-Greeting and Taking Leave, Introducing Oneself and Others (Formal and Informal Situations)

R- Reading for Subject/ Theme

W- Writing Paragraphs

G-Types of Nouns and Pronouns

V- Homonyms, homophones synonyms, antonyms

**Unit –II**

1. Chapter entitled “**Cyber Age**” from “**Skills Annex -Functional English for Success**” Published by Orient Black Swan, Hyderabad.

- 2 Chapter entitled ‘**Three days To See**’ from “*Epitome of Wisdom*”, Published by Maruthi Publications, Hyderabad.

and

L – Listening for themes and facts

S – Apologizing, interrupting, requesting and making polite conversation

R- for theme and gist

W- Describing people, places, objects, events

G- Verb forms

V- noun, verb, adjective and adverb

**Unit –III**

1. Chapter entitled ‘**Risk Management**’ from “**Skills Annex -Functional English for Success**” Published by Orient Black Swan, Hyderabad

2. Chapter entitled ‘**Leela’s Friend**’ by R.K. Narayan from “*Epitome of Wisdom*”, Published by Maruthi Publications, Hyderabad and

L – for main points and sub-points for note taking

S – giving instructions and directions; Speaking of hypothetical situations

R – reading for details

W – note-making, information transfer, punctuation

G – present tense

V – synonyms and antonyms

#### Unit –IV

1. Chapter entitled '**Human Values and Professional Ethics**' from "**Skills Annex -Functional English for Success**" Published by Orient Black Swan, Hyderabad

2. Chapter entitled '**The Last Leaf**' from "**Epitome of Wisdom**", Published by Maruthi Publications, Hyderabad and

L -Listening for specific details and information

S- narrating, expressing opinions and telephone interactions

R -Reading for specific details and information

W- Writing formal letters and CVs

G- Past and future tenses

V- Vocabulary - idioms and Phrasal verbs

#### Unit –V

1. Chapter entitled '**Sports and Health**' from "**Skills Annex -Functional English for Success**" Published by Orient Black Swan, Hyderabad

2. Chapter entitled '**The Convocation Speech**' by N.R. Narayanmurthy' from "**Epitome of Wisdom**", Published by Maruthi Publications, Hyderabad and

L- Critical Listening and Listening for speaker's tone/ attitude

S- Group discussion and Making presentations

R- Critical reading, reading for reference

W-Project proposals; Technical reports, Project Reports and Research Papers

G- Adjectives, prepositions and concord

V- Collocations and Technical vocabulary

Using words appropriately

\* Exercises from the texts not prescribed shall also be used for classroom tasks.

#### REFERENCES :

1. Contemporary English Grammar Structures and Composition by David Green, MacMillan Publishers, New Delhi. 2010.
2. Innovate with English: A Course in English for Engineering Students, edited by T Samson, Foundation Books.
3. English Grammar Practice, Raj N Bakshi, Orient Longman.
4. Technical Communication by Daniel Riordan. 2011. Cengage Publications. New Delhi.
5. Effective English, edited by E Suresh Kumar, A RamaKrishna Rao, P Sreehari, Published by Pearson
6. Handbook of English Grammar & Usage, Mark Lester and Larry Beason, Tata Mc Graw –Hill.
7. Spoken English, R.K. Bansal & JB Harrison, Orient Longman.
8. Technical Communication, Meenakshi Raman, Oxford University Press
9. Objective English Edgar Thorpe & Showick Thorpe, Pearson Education
10. Grammar Games, Renuvolcuri Mario, Cambridge University Press.
11. Murphy's English Grammar with CD, Murphy, Cambridge University Press.
12. Everyday Dialogues in English, Robert J. Dixon, Prentice Hall India Pvt Ltd.,
13. ABC of Common Errors Nigel D Turton, Mac Millan Publishers.
14. Basic Vocabulary Edgar Thorpe & Showick Thorpe, Pearson Education
15. Effective Technical Communication, M Ashraf Rizvi, Tata Mc Graw –Hill.
16. An Interactive Grammar of Modern English, Shivendra K. Verma and Hemlatha Nagarajan , Frank Bros & CO
17. A Communicative Grammar of English, Geoffrey Leech, Jan Svartvik, Pearson Education
18. Enrich your English, Thakur K B P Sinha, Vijay Nicole Imprints Pvt Ltd.,
19. A Grammar Book for You And I, C. Edward Good, MacMillan Publishers

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## MATHEMATICS -I

## UNIT-I

**Theory of Matrices:** Real matrices – Symmetric, skew – symmetric, orthogonal. Complex matrices: Hermitian, Skew-Hermitian and Unitary Matrices. Idempotent matrix, Elementary row and column transformations- Elementary matrix, Finding rank of a matrix by reducing to Echelon and normal forms. Finding the inverse of a non-singular square matrix using row/ column transformations (Gauss- Jordan method). Consistency of system of linear equations (homogeneous and non- homogeneous) using the rank of a matrix. Solving  $m \times n$  and  $n \times n$  linear system of equations by Gauss elimination.

Cayley-Hamilton Theorem (without proof) – Verification. Finding inverse of a matrix and powers of a matrix by Cayley-Hamilton theorem, Linear dependence and Independence of Vectors. Linear Transformation – Orthogonal Transformation. Eigen values and eigen vectors of a matrix. Properties of eigen values and eigen vectors of real and complex matrices. Finding linearly independent eigen vectors of a matrix when the eigen values of the matrix are repeated.

Diagonalization of matrix – Quadratic forms up to three variables. Rank – Positive definite, negative definite, semi definite, index, signature of quadratic forms. Reduction of a quadratic form to canonical form.

## UNIT – II

**Differential calculus methods.** Rolle's Mean value Theorem – Lagrange's Mean Value Theorem – Cauchy's mean value Theorem – (all theorems without proof but with geometrical interpretations), verification of the Theorems and testing the applicability of these theorem to the given function.

Functions of several variables: Functional dependence- Jacobian- Maxima and Minima of functions of two variables without constraints and with constraints-Method of Lagrange multipliers.

## UNIT – III

**Improper integration, Multiple integration & applications:** Gamma and Beta Functions –Relation between them, their properties – evaluation of improper integrals using Gamma / Beta functions

Multiple integrals – double and triple integrals – change of order of integration- change of variables (polar, cylindrical and spherical) Finding the area of a region using double integration and volume of a region using triple integration.

## UNIT – IV

**Differential equations and applications** Overview of differential equations- exact, linear and Bernoulli (NOT TO BE EXAMINED). Applications of first order differential equations – Newton's Law of cooling, Law of natural growth and decay, orthogonal trajectories.

Linear differential equations of second and higher order with constant coefficients, Non-homogeneous term of the type  $f(x) = e^{ax}$ ,  $\sin ax$ ,  $\cos ax$ , and  $x^n$ ,  $e^{ax} V(x)$ ,  $x^n V(x)$ , method of variation of parameters. Applications to bending of beams, Electrical circuits and simple harmonic motion.

## UNIT – V

**Laplace transform and its applications to Ordinary differential equations** Definition of Integral transform, Domain of the function and Kernel for the Laplace transforms. Existence of Laplace transform. Laplace transform of standard functions, first shifting Theorem, Laplace transform of functions when they are multiplied or divided by "t". Laplace transforms of derivatives and integrals of functions. – Unit step function – second shifting theorem – Dirac's delta function, Periodic function – Inverse Laplace transform by Partial fractions( Heaviside method) Inverse Laplace transforms of functions when they are multiplied or divided by "s", Inverse Laplace Transforms of derivatives and integrals of functions, Convolution theorem — Solving ordinary differential equations by Laplace transforms.

## TEXT BOOKS:

1. Advanced engineering Mathematics by Kreyszig, John Wiley & Sons Publishers.
2. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.

## REFERENCES:

1. Advanced Engineering Mathematics by R.K. Jain & S.R.K. Iyengar, 3<sup>rd</sup> edition, Narosa Publishing House, Delhi.
2. Engineering Mathematics – I by T.K. V. Iyengar, B. Krishna Gandhi & Others, S. Chand.
3. Engineering Mathematics – I by D. S. Chandrasekhar, Prison Books Pvt. Ltd.
4. Engineering Mathematics – I by G. Shanker Rao & Others I.K. International Publications.
5. Advanced Engineering Mathematics with MATLAB, Dean G. Duffy, 3<sup>rd</sup> Edi, CRC Press Taylor & Francis Group.
6. Mathematics for Engineers and Scientists, Alan Jeffrey, 6th Edi, 2013, Chapman & Hall/ CRC
7. Advanced Engineering Mathematics, Michael Greenberg, Second Edition. Pearson Education.

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## MATHEMATICAL METHODS

**UNIT – I: Interpolation and Curve fitting**

**Interpolation:** Introduction- Errors in Polynomial Interpolation – Finite differences- Forward Differences- Backward differences –Central differences – Symbolic relations and separation of symbols- Difference Equations – Differences of a polynomial-Newton's formulae for interpolation – Central difference interpolation Formulae – Gauss Central Difference Formulae –Interpolation with unevenly spaced points-Lagrange's Interpolation formula. B. Spline interpolation – Cubic spline.

**Curve fitting:** Fitting a straight line –Second degree curve-exponential curve-power curve by method of least squares.

**UNIT – II : Numerical techniques****Solution of Algebraic and Transcendental Equations and Linear system of equations.**

Introduction – Graphical interpretation of solution of equations .The Bisection Method – The Method of False Position – The Iteration Method – Newton-Raphson Method .

Solving system of non-homogeneous equations by L-U Decomposition method(Crout's Method)Jacobi's and Gauss-Seidel Iteration method

**Numerical Differentiation, Integration, and Numerical solutions of First order differential equations:**

Numerical differentiation, Numerical integration - Trapezoidal rule, Simpson's  $1/3^{rd}$  and  $3/8$  Rule , Generalized Quadrature.

Numerical solution of Ordinary Differential equations: Solution by Taylor's series method –Picard's Method of successive Approximation- single step methods-Euler's Method-Euler's modified method, Runge-Kutta Methods ,Predictor –corrector methods(Milne's Method and Adams-Bashforth methods only).

**UNIT – III: Fourier series and Fourier Transforms**

Definition of periodic function. Fourier expansion of periodic functions in a given interval of length  $2\pi$  Determination of Fourier coefficients – Fourier series of even and odd functions – Fourier series in an arbitrary interval – even and odd periodic continuation – Half-range Fourier sine and cosine expansions.

Fourier integral theorem - Fourier sine and cosine integrals. Fourier transforms – Fourier sine and cosine transforms – properties – inverse transforms – Finite Fourier transforms.

**UNIT-IV: Partial differential equations**

Introduction and Formation of partial differential equation by elimination of arbitrary constants and arbitrary functions, solutions of first order linear (Lagrange) equation and non-linear equations (Charpit's method), Method of separation of variables for second order equations –Applications of Partial differential equations-Two dimensional wave equation., Heat equation.

**UNIT – V Vector Calculus**

Vector Calculus: Scalar point function and vector point function, Gradient- Divergence- Curl and their related properties, - Laplacian operator, Line integral – work done – Surface integrals -Volume integral. Green's Theorem, Stoke's theorem and Gauss's Divergence Theorems (Statement & their Verification). Solenoidal and irrotational vectors, Finding Potential function.

**TEXT BOOKS:**

1. Advanced Engineering Mathematics by Kreyszig, John Wiley & Sons.
2. Higher Engineering Mathematics by Dr. B.S. Grewal, Khanna Publishers.

**REFERENCES:**

- 1.
2. Mathematical Methods by T.K.V. Iyengar, B.Krishna Gandhi & Others, S. Chand.
3. Introductory Methods by Numerical Analysis by S.S. Sastry, PHI Learning Pvt. Ltd.
4. Mathematical Methods by G.Shankar Rao, I.K. International Publications, N.Delhi
5. Higher Engineering Mathematics by B.S. Grewal, Khanna Publications.
6. Mathematical Methods by V. Ravindranath, Etl, Himalaya Publications.
7. Advanced Engineering Mathematics with MATLAB, Dean G. Duffy, 3<sup>rd</sup> Edi, 2013, CRC Press Taylor & Francis Group.
8. Mathematics for Engineers and Scientists, Alan Jeffrey, 6th Edi, 2013, Chapman & Hall/ CRC
9. Advanced Engineering Mathematics, Michael Greenberg, Second Edition. Pearson Education.

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## ENGINEERING PHYSICS

## UNIT-I

**1. Crystallography:** Ionic Bond, Covalent Bond, Metallic Bond, Hydrogen Bond, Vander-Waal's Bond, Calculation of Cohesive Energy of diatomic molecule- Space Lattice, Unit Cell, Lattice Parameters, Crystal Systems, Bravais Lattices, Atomic Radius, Co-ordination Number and Packing Factor of SC, BCC, FCC, Miller Indices, Crystal Planes and Directions, Inter Planar Spacing of Orthogonal Crystal Systems, Structure of Diamond and NaCl.

**2.X-ray Diffraction & Defects in Crystals:** Bragg's Law, X-Ray diffraction methods: Laue Method, Powder Method: Point Defects: Vacancies, Substitutional, Interstitial, Frenkel and Schottky Defects, line defects (Qualitative) & Burger's Vector.

## UNIT-II

**3. Principles of Quantum Mechanics:** Waves and Particles, de Broglie Hypothesis, Matter Waves, Davisson and Germer's Experiment, Heisenberg's Uncertainty Principle, Schrödinger's Time Independent Wave Equation - Physical Significance of the Wave Function – Infinite square well potential extension to three dimensions

**4. Elements of Statistical Mechanics& Electron theory of Solids:** Phase space, Ensembles, Micro Canonical, Canonical and Grand Canonical Ensembles - Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac Statistics (Qualitative Treatment), Concept of Electron Gas, Density of States, Fermi Energy- Electron in a periodic Potential, Bloch Theorem, Kronig-Penny Model (Qualitative Treatment), E-K curve, Origin of Energy Band Formation in Solids, Concept of Effective Mass of an Electron, Classification of Materials into Conductors, Semi Conductors & Insulators.

## UNIT-III

**5. Dielectric Properties:** Electric Dipole, Dipole Moment, Dielectric Constant, Polarizability, Electric Susceptibility, Displacement Vector, Electronic, Ionic and Orientation Polarizations and Calculation of Polarizabilities: Ionic and Electronic - Internal Fields in Solids, Clausius - Mossotti Equation, Piezo -electricity and Ferro- electricity.

**6. Magnetic Properties & Superconducting Properties:** Permeability, Field Intensity, Magnetic Field Induction, Magnetization, Magnetic Susceptibility, Origin of Magnetic Moment, Bohr Magneton, Classification of Dia, Para and Ferro Magnetic Materials on the basis of Magnetic Moment, Domain Theory of Ferro Magnetism on the basis of Hysteresis Curve, Soft and Hard Magnetic Materials, Properties of Anti-Ferro and Ferri Magnetic Materials and their Applications, Superconductivity, Meissner Effect, Effect of Magnetic field, Type-I & Type-II Superconductors, Applications of Superconductors

## UNIT-IV

**7.Optics:** Interference-Interference in thin films(Reflected light), Newton rings experiment- Fraunhofer diffraction due to single slit, N-slits, Diffraction grating experiment, Double refraction-construction and working, Nicol's Prism

**8. Lasers & Fiber Optics:** Characteristics of Lasers, Spontaneous and Stimulated Emission of Radiation, Einstein's Coefficients and Relation between them, Population Inversion, Lasing Action, Ruby Laser, Helium-Neon Laser, Semiconductor Diode Laser, Applications of Lasers- Principle of Optical Fiber, Construction of fiber, Acceptance Angle and Acceptance Cone, Numerical Aperture, Types of Optical Fibers: Step Index and Graded Index Fibers, Attenuation in Optical Fibers, Application of Optical Fiber in communication systems.

## UNIT-V:

**9. Semiconductor Physics:** Fermi Level in Intrinsic and Extrinsic Semiconductors, Calculation of carrier concentration in Intrinsic & Extrinsic Semiconductors, Direct and Indirect Band gap semiconductors, Hall Effect-Formation of PN Junction, Open Circuit PN Junction, Energy Diagram of PN Diode, Diode Equation, I-V Characteristics of PN Junction diode, Solar cell, LED & Photo Diodes. **Acoustics of Buildings & Acoustic Quieting:**, Reverberation and Time of Reverberation, Sabine's Formula for Reverberation Time, Measurement of Absorption Coefficient of a Material, Factors Affecting The Architectural Acoustics and their Remedies

**10. Nanotechnology:** Origin of Nanotechnology, Nano Scale, Surface to Volume Ratio, Quantum Confinement, Bottom-up Fabrication: Sol-gel, Top-down Fabrication: Chemical Vapour Deposition, Characterization by TEM.

**TEXT BOOKS:**

1. Engineering Physics, K. Malik, A. K. Singh, Tata Mc Graw Hill Book Publishers
2. Engineering Physics, V. Rajendran, Tata Mc Graw Hill Book Publishers

**REFERENCES:**

1. Fundamentals of Physics, David Halliday, Robert Resnick, Jearl Walker by John Wiley & Sons
2. Sears and Zemansky's University Physics (10th Edition) by Hugh D. Young Roger A. Freedman, T. R. Sandin, A. Lewis Ford Addison-Wesley Publishers;
3. Applied Physics for Engineers – P. Madhusudana Rao (Academic Publishing company, 2013)
4. Solid State Physics – M. Armugam (Anuradha Publications).
5. Modern Physics – R. Murugesan & K. Siva Prasath – S. Chand & Co. (for Statistical Mechanics).
6. A Text Book of Engg Physics – M. N. Avadhanulu & P. G. Khsirsagar– S. Chand & Co. (for acoustics).
7. Modern Physics by K. Vijaya Kumar, S. Chandralingam: S. Chand & Co.Ltd
8. Nanotechnology – M. Ratner & D. Ratner (Pearson Ed.).
9. Introduction to Solid State Physics – C. Kittel (Wiley Eastern).
10. Solid State Physics – A.J. Dekker (Macmillan).
11. Applied Physics – Mani Naidu Pearson Education



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## ENGINEERING CHEMISTRY

**UNIT I: Electrochemistry & Corrosion:**

Electro Chemistry – Conductance - Specific, Equivalent and Molar conductance and their Units; Applications of Conductance ( Conductometric titrations). **EMF:** Galvanic Cells, types of Electrodes – ( Calomel, Quinhydrone and glass electrodes); Nernst equation and its applications ; concept of concentration cells, electro chemical series, Potentiometric titrations, determination of  $P^H$  using glass electrode-Numerical problems.

**Batteries:** Primary cells ( dry cells) and secondary cells (lead-Acid cell, Ni-Cd cell, Lithium cells). Applications of batteries. **Fuel cells** – Hydrogen – Oxygen fuel cell; methanol – oxygen fuel cell ; Advantages and Applications.

**Corrosion and its control:** Causes and effects of corrosion; Theories of corrosion – Chemical & Electrochemical corrosion; Types of corrosion ( Galvanic, Water line, Pitting and Intergranular); Factors affecting rate of corrosion – Nature of metal and Nature of Environment – Corrosion control methods – Cathodic protection (sacrificial anodic and impressed current). Surface coatings: Metallic coatings & methods of application of metallic coatings - hot dipping (galvanization & tinning), Cementation, cladding, electroplating ( copper plating ) Electroless plating ( Ni plating) - Organic coatings – Paints - constituents and their functions.

**UNIT II: Engineering Materials:**

**Polymers:**Types of Polymerization (Chain & Step growth).**Plastics:** Thermoplastic & Thermo setting resins; Compounding & fabrication of plastics (Compression and injection moulding ).Preparation, properties, engineering applications of PVC, Teflon and Bakelite.

**Fibers-** Characteristics of fibers – preparation, properties and uses of Nylon – 6,6 and Dacron – Fiber Reinforced Plastics (FRP) – applications. **Rubbers** – Natural rubber and its vulcanization. Elastomers – Buna-s, Butyl rubber and Thiokol rubber.

**Conducting polymers:** Polyacetylene, Polyaniline, Mechanism of Conduction, doping; applications of Conducting polymers. **Bio-degradable Polymers-** preparation and Applications of Poly vinyl acetate and Poly lactic acid -

**Cement:** composition of Portland cement, setting & hardening of cement (reactions), **Lubricants:** Classification with examples- Characteristics of a good lubricant & mechanism of lubrication (thick film , thin film and extreme pressure) – properties of lubricants: viscosity , Cloud point, flash and fire points. **Refractories:** Classification, characteristics of a good refractory and applications.

**Nanomaterials:** Introduction, preparation by sol-gel & chemical vapour deposition methods. Applications of nanomaterials.

**UNIT III: Water and its Treatment:**

Hardness of Water: Causes of hardness, expression of hardness – units – types of hardness, estimation of temporary & permanent hardness of water by EDTA method - numerical problems. Boiler troubles – Scale & sludges, Priming and foaming, caustic embrittlement and boiler corrosion; Treatment of boiler feed water – Internal treatment ( Phosphate, Colloidal and calgon conditioning) – External treatment – Lime Soda process, Zeolite process and ion exchange process. Numerical Problems. **Potable Water-** Its Specifications – Steps involved in treatment of potable water – Disinfection of water by chlorination and ozonisation. Reverse osmosis & its significance.

**Unit – IV : Fuels & Combustion**

**Fuels** – Classification – solid fuels : coal – analysis of coal - proximate and ultimate analysis and their significance. Liquid fuels – petroleum and its refining – cracking – types – fixed bed catalytic cracking. Knocking – octane and cetane rating, synthetic petrol, Bergius and Fischer-Tropsch's process: Gaseous fuels - constituents, characteristics and applications of natural gas, LPG and CNG. Analysis of flue gas by Orsat's apparatus – Numerical Problems.

**Combustion** – Definition, Calorific value of fuel – HCV , LCV; Determination of calorific value by Junker's gas calorimeter – theoretical calculation of Calorific value by Dulong's formula – Numerical problems on combustion.

**UNIT V: Phase Rule & Surface Chemistry :**

**Phase Rule:** Definition of terms : Phase, component, degree of freedom, phase rule equation. Phase diagrams – one component system- water system. Two component system Lead- Silver, cooling curves, heat treatment based on iron-carbon phase diagram - hardening, annealing and normalization.

**Surface Chemistry: Adsorption** – Types of Adsorption, Isotherms – Freundlich and Langmuir adsorption isotherm, applications of adsorption; **Colloids:** Classification of Colloids; Electrical & optical properties, micelles, applications of colloids in industry.

**TEXT BOOKS:**

1. Engineering Chemistry by R.P. Mani, K.N. Mishra, B. Rama Devi /CENGAGE learning.
2. Engineering Chemistry by P.C Jain & Monica Jain, Dhanpatrai Publishing Company (2008).

**REFERENCE BOOKS**

1. Engineering Chemistry by B. Siva Shankar Mc.Graw Hill Publishing Company Limited, New Delhi (2006)
2. Engineering Chemistry J.C. Kuriacase & J. Rajaram, Tata McGraw Hills Publishing Company Limited, New Delhi (2004).
3. Text Book of Engineering Chemistry by S.S. Dara & Mukkati S. Chand & Co Publishers, New Delhi(2006)
4. Chemistry of Engineering Materials by CV Agarwal,C.P Murthy, A.Naidu, BS Publications.

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**COMPUTER PROGRAMMING****Objectives:**

- To understand the various steps in Program development.
- To understand the basic concepts in C Programming Language.
- To learn how to write modular and readable C Programs
- To learn to write programs (using structured programming approach) in C to solve problems.
- To introduce the students to basic data structures such as lists, stacks and queues.
- To make the student understand simple sorting and searching methods.

**Outcomes:****UNIT - I**

Introduction to Computers – Computer Systems, Computing Environments, Computer Languages, Creating and running programs, Program Development.

Introduction to the C Language – Background, C Programs, Identifiers, Types, Variables, Constants, Input / Output, Operators(Arithmetic, relational, logical, bitwise etc.), Expressions, Precedence and Associativity, Expression Evaluation, Type conversions, Statements- Selection Statements(making decisions) – if and switch statements, Repetition statements ( loops)-while, for, do-while statements, Loop examples, other statements related to looping – break, continue, goto, Simple C Program examples.

**UNIT - II**

Functions-Designing Structured Programs, Functions, user defined functions, inter function communication, Standard functions, Scope, Storage classes-auto, register, static, extern, scope rules, type qualifiers, recursion- recursive functions, Limitations of recursion, example C programs, Preprocessor commands.

Arrays – Concepts, using arrays in C, inter function communication, array applications, two – dimensional arrays, multidimensional arrays, C program examples.

**UNIT - III**

Pointers – Introduction (Basic Concepts), Pointers for inter function communication, pointers to pointers, compatibility, Pointer Applications-Arrays and Pointers, Pointer Arithmetic and arrays, Passing an array to a function, memory allocation functions, array of pointers, programming applications, pointers to void, pointers to functions.

Strings – Concepts, C Strings, String Input / Output functions, arrays of strings, string manipulation functions, string / data conversion, C program examples.

**UNIT - IV**

Enumerated, Structure ,and Union Types– The Type Definition(typedef), Enumerated types, Structures –Declaration, initialization, accessing structures, operations on structures, Complex structures, structures and functions, Passing structures through pointers, self referential structures, unions, bit fields, C programming examples, command –line arguments,

Input and Output – Concept of a file, streams, text files and binary files, Differences between text and binary files, State of a file, Opening and Closing files, file input / output functions (standard library input / output functions for files), file status functions (error handling), Positioning functions, C program examples.

**UNIT – V**

Searching and Sorting – Sorting- selection sort, bubble sort, Searching-linear and binary search methods.

Lists- Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks- Push and Pop Operations, Queues- Enqueue and Dequeue operations.

**TEXT BOOKS:**

1. Computer Science: A Structured Programming Approach Using C, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.
2. Programming in C. P. Dey and M Ghosh , Oxford University Press.

**REFERENCE BOOKS:**

1. C& Data structures – P. Padmanabham, Third Edition, B.S. Publications.
2. C for All, S. Thamarai Selvi, R.Murugesan, Anuradha Publications.
3. Problem Solving and Program Design in C, J.R. Hanly and E.B. Koffman, 7<sup>th</sup> Edition, Pearson education.
4. Programming in C, Ajay Mittal, Pearson.
5. Programming with C, B.Gottfried, 3<sup>rd</sup> edition, Schaum's outlines, TMH.
6. Problem solving with C, M.T.Somasekhara, PHI
7. Programming with C, R.S.Bickar, Universities Press.
8. Computer Programming & Data Structures, E.Balagurusamy, 4<sup>th</sup> edition, TMH.
9. Programming in C – Stephen G. Kochan, III Edition, Pearson Education.
10. The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI.
11. C Programming with problem solving, J.A. Jones & K. Harrow,Dreamtech Press.

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## ENGINEERING DRAWING

## UNIT – I

**INTRODUCTION TO ENGINEERING DRAWING:** Principles of Engineering Drawing/Graphics – Various Drawing Instruments – Conventions in Drawing – **Lettering practice** – BIS Conventions.

**Curves:** Constructions of Curves used in Engineering Practice:

- a) Conic Sections including the Rectangular Hyperbola – General method only.
- b) Cycloid, Epicycloid and Hypocycloid
- c) Involute.

**Scales:** Construction of different types of Scales, Plain, Diagonal, Vernier scale.

## UNIT – II

## ORTHOGRAPHIC PROJECTIONS IN FIRST ANGLE

**PROJECTION:** Principles of Orthographic Projections – Conventions – First and Third Angle projections.

**Projections of Points.** including Points in all four quadrants.

**Projections of Lines** - Parallel, perpendicular, inclined to one plan and inclined to both planes. True length and true angle of a line. Traces of a line.

**PROJECTIONS OF PLANES:** Plane parallel, perpendicular and inclined to one reference plane. Plane inclined to both the reference planes.

## UNIT – III

**PROJECTIONS OF SOLIDS:** Projections of regular solids, cube, prisms, pyramids, tetrahedron, cylinder and cone, axis inclined to both planes.

**SECTIONS AND SECTIONAL VIEWS:** Right Regular Solids – Prism, Cylinder, Pyramid, Cone – use of Auxiliary views.

## UNIT – IV

**DEVELOPMENT OF SURFACES:** Development of Surfaces of Right, Regular Solids – Prisms, Cylinder, Pyramids, Cone and their parts. frustum of solids.

**INTERSECTION OF SOLIDS:-** Intersection of Cylinder Vs Cylinder, Cylinder Vs Prism, Cylinder Vs Cone.

## UNIT – V

**ISOMETRIC PROJECTIONS :** Principles of Isometric Projection – Isometric Scale – Isometric Views– Conventions – Plane Figures, Simple and Compound Solids – Isometric Projection of objects having non- isometric lines. Isometric Projection of parts with Spherical surface.

**TRANSFORMATION OF PROJECTIONS :** Conversion of Isometric Views to Orthographic Views. Conversion of orthographic views to isometric views – simple objects.

**PERSPECTIVE PROJECTIONS :** Perspective View : Points, Lines and Plane Figures, Vanishing Point Methods (General Method only).

## TEXT BOOKS

- 1.Engineering Drawing – Basant, Agrawal, TMH
2. Engineering Drawing, N.D. Bhatt

## REFERENCES :

1. Engineering Graphics. P I Varghese Tata McGraw Hill Education Pvt. Ltd.
2. Engineering drawing – P.J. Shah .S.Chand Publishers.
3. Engineering Drawing- Johle/Tata Macgraw Hill Book Publishers.
4. Engineering Drawing – M.B. Shah and B.C. Rana, Pearson.
- 5 .Engineering Drawing by K.Venu Gopal& V.Prabu Raja New Age Publications.
6. Engineering Drawing By John. PHI Learning Publisher.

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## COMPUTER PROGRAMMING LAB

## Objectives:

- To write programs in C to solve the problems.
- To implement linear data structures such as lists, stacks, queues.
- To implement simple searching and sorting methods.

## Outcomes:

## Recommended Systems/Software Requirements:

- Intel based desktop PC
- ANSI C Compiler with Supporting Editors

## Week 1

- a) Write a C program to find the sum of individual digits of a positive integer.
- b) A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
- c) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

## Week 2

- a) Write a C program to calculate the following Sum:  

$$\text{Sum} = 1 - x^2/2! + x^4/4! - x^6/6! + x^8/8! - x^{10}/10!$$
- b) Write a C program to find the roots of a quadratic equation.

## Week 3

- a) The total distance travelled by vehicle in 't' seconds is given by distance  $= ut + 1/2at^2$  where 'u' and 'a' are the initial velocity (m/sec.) and acceleration (m/sec<sup>2</sup>). Write C program to find the distance travelled at regular intervals of time given the values of 'u' and 'a'. The program should provide the flexibility to the user to select his own time intervals and repeat the calculations for different values of 'u' and 'a'.
- b) Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +, -, \*, /, % and use Switch Statement)

## Week 4

- a) Write C programs that use both recursive and non-recursive functions
- To find the factorial of a given integer.
  - To find the GCD (greatest common divisor) of two given integers.

## Week 5

- a) Write a C program to find the largest integer in a list of integers.
- b) Write a C program that uses functions to perform the following:
- Addition of Two Matrices
  - Multiplication of Two Matrices

## Week 6

- a) Write a C program that uses functions to perform the following operations:
- To insert a sub-string in to a given main string from a given position.
  - To delete n Characters from a given position in a given string.
- b) Write a C program to determine if the given string is a palindrome or not

## Week 7

- a) Write a C program that displays the position or index in the string S where the string T begins, or - 1 if S doesn't contain T.
- b) Write a C program to count the lines, words and characters in a given text.

## Week 8

- a) Write a C program to generate Pascal's triangle.
- b) Write a C program to construct a pyramid of numbers.

## Week 9

Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression:

$$1 + x + x^2 + x^3 + \dots + x^n$$

For example: if n is 3 and x is 5, then the program computes 1+5+25+125.

Print x, n, the sum

Perform error checking. For example, the formula does not make sense for negative exponents – if n is less than 0. Have your program print an error message if n<0, then go back and read in the next pair of numbers of without computing the sum. Are any values of x also illegal? If so, test for them too.

## Week 10

a) 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C program to find the 2's complement of a binary number.

b) Write a C program to convert a Roman numeral to its decimal equivalent.

**Week 11**

Write a C program that uses functions to perform the following operations:

- i) Reading a complex number
- ii) Writing a complex number
- iii) Addition of two complex numbers
- iv) Multiplication of two complex numbers

(Note: represent complex number using a structure.)

**Week 12**

a) Write a C program which copies one file to another.

b) Write a C program to reverse the first n characters in a file.

(Note: The file name and n are specified on the command line.)

**Week 13**

a) Write a C program to display the contents of a file.

b) Write a C program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file)

**Week 14**

a) Write a C program that uses non recursive function to search for a Key value in a given list of integers using Linear search.

b) Write a C program that uses non recursive function to search for a Key value in a given sorted list of integers using Binary search.

**Week 15**

a) Write a C program that implements the Selection sort method to sort a given array of integers in ascending order.

b) Write a C program that implements the Bubble sort method to sort a given list of names in ascending order.

**Week 16**

Write a C program that uses functions to perform the following operations:

- i) Create a singly linked list of integer elements.
- ii) Traverse the above list and display the elements.

**Week 17**

Write a C program that implements stack (its operations) using a singly linked list to display a given list of integers in reverse order. Ex. input: 10 23 4 6 output: 6 4 23 10

**Week 18**

Write a C program that implements Queue (its operations) using a singly linked list to display a given list of integers in the same order. Ex. input: 10 23 4 6 output: 10 23 4 6

**Week 19**

Write a C program to implement the linear regression algorithm.

**Week 20**

Write a C program to implement the polynomial regression algorithm.

**Week 21**

Write a C program to implement the Lagrange interpolation.

**Week 22**

Write C program to implement the Newton- Gregory forward interpolation.

**Week 23**

Write a C program to implement Trapezoidal method.

**Week 24**

Write a C program to implement Simpson method.

**TEXT BOOKS:**

1. C programming and Data Structures, P. Padmanabham, Third Edition, BS Publications
2. Computer Programming in C, V. Rajaraman, PHI Publishers.
3. C Programming, E.Balagurusamy, 3<sup>rd</sup> edition, TMH Publishers.
4. C Programming, M.V.S.S.N.Prasad, ACME Learning Pvt. Ltd.
5. C and Data Structures, N.B.Venkateswarlu and E.V.Prasad,S.Chand Publishers
6. Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publishers.

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## ENGINEERING PHYSICS / ENGINEERING CHEMISTRY LAB

**ENGINEERING PHYSICS LAB**  
**(Any TEN experiments compulsory)**

1. Dispersive power of the material of a prism – Spectrometer
2. Determination of wavelength of a source – Diffraction Grating.
3. Newton's Rings - Radius of curvature of plano convex lens.
4. Melde's experiment – Transverse and longitudinal modes.
5. Time constant of an R-C circuit.
6. L-C-R circuit.
7. Magnetic field along the axis of current carrying coil – Stewart and Gees method.
8. Study the characteristics of LED and LASER sources.
9. Bending losses of fibres & Evaluation of numerical aperture of a given fibre.
10. Energy gap of a material of p-n junction.
11. Torsional pendulum.
12. Wavelength of light –diffraction grating - using laser.
13. Characteristics of a solar cell

**LABORATORY MANUAL:**

1. Laboratory Manual of Engineering Physics by Dr.Y.Aparna & Dr.K.Venkateswara Rao (V.G.S Publishers)

**OBJECTIVES**

This course on Physics lab is designed with 13 experiments in an academic year. It is common to all branches of Engineering in B.Tech Ist year.

The objective of the course is that the student will have exposure to various experimental skills which is very essential for an Engineering student.

The experiments are selected from various area of Physics like Physical Optics, Lasers, Fiber Optics, Sound, Mechanics, Electricity & Magnetism and Basic Electronics.

Also the student is exposed to various tools like Screw gauge, Vernier Callipers, Physics Balance , Spectrometer and Microscope.

**OUTCOME**

The student is expected to learn from this laboratory course the concept of error and its analysis. It also allows the student to develop experimental skills to design new experiments in Engineering.

With the exposure to these experiments the student can compare the theory and correlate with experiment.

**ENGINEERING CHEMISTRY LAB**

List of Experiments ( Any 12 of the following) :

**Titrimetry:**

1. Estimation of ferrous iron by dichrometry.
2. Estimation of hardness of water by EDTA method.

**Mineral analysis:**

3. Determination of percentage of copper in brass.
4. Estimation of manganese dioxide in pyrolusite.

**Instrumental Methods:****Colorimetry:**

5. Determination of ferrous iron in cement by colorimetric method
6. Estimation of copper by colorimetric method.

**Conductometry:**

7. Conductometric titration of strong acid vs strong base.
8. Conductometric titration of mixture of acids vs strong base.

**Potentiometry:**

9. Titration of strong acid vs strong base by potentiometry.
10. Titration of weak acid vs strong base by potentiometry.

**Physical properties:**

11. Determination of viscosity of sample oil by redwood / oswald's viscometer.



12. Determination of Surface tension of lubricants.

**Preparations:**

13. Preparation of Aspirin
14. Preparation of Thiokol rubber

**Adsorption:**

15. Adsorption of acetic acid on charcoal.

**TEXT BOOKS:**

1. Practical Engineering Chemistry by K. Mukkanti, et al, B.S. Publications, Hyderabad.
2. Inorganic quantitative analysis, Vogel.

**REFERENCE BOOKS:**

1. Text Book of engineering chemistry by R. N. Goyal and Harmendra Goel, Ane Books Private Ltd.,
2. A text book on experiments and calculation Engg. S.S. Dara.
3. Instrumental methods of chemical analysis, Chatwal, Anand, Himalaya Publications.

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## ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

The **Language Lab** focuses on the production and practice of sounds of language and familiarises the students with the use of English in everyday situations and contexts.

**Objectives**

- ✗ To facilitate computer-aided multi-media instruction enabling individualized and independent language learning
- ✗ To sensitise the students to the nuances of English speech sounds, word accent, intonation and rhythm
- ✗ To bring about a consistent accent and intelligibility in their pronunciation of English by providing an opportunity for practice in speaking
- ✗ To improve the fluency in spoken English and neutralize mother tongue influence
- ✗ To train students to use language appropriately for interviews, group discussion and public speaking

**Syllabus: English Language Communication Skills Lab shall have two parts:**

- a. **Computer Assisted Language Learning (CALL) Lab**
- b. **Interactive Communication Skills (ICS) Lab**

The following course content is prescribed for the **English Language Communication Skills Lab**

**Exercise – I**

**CALL Lab:** Introduction to Phonetics – Speech Sounds – Vowels and Consonants

**ICS Lab:** Ice-Breaking activity and JAM session

Articles, Prepositions, Word formation- Prefixes & Suffixes, Synonyms & Antonyms

**Exercise – II**

**CALL Lab:** Structure of Syllables - Past Tense Marker and Plural Marker – Weak Forms and Strong Forms - Consonant Clusters.

**ICS Lab:** Situational Dialogues – Role-Play- Expressions in Various Situations – Self-introduction and Introducing Others – Greetings – Apologies – Requests – Social and Professional Etiquette - Telephone Etiquette.

Concord (Subject in agreement with verb) and Words often misspelt- confused/misused

**Exercise - III**

**CALL Lab:** Minimal Pairs- Word accent and Stress Shifts- Listening Comprehension.

**ICS Lab:** Descriptions- Narrations- Giving Directions and guidelines.

Sequence of Tenses, Question Tags and One word substitutes.

**Exercise – IV**

**CALL Lab:** Intonation and Common errors in Pronunciation.

**ICS Lab:** Extempore- Public Speaking

Active and Passive Voice, –Common Errors in English, Idioms and Phrases

**Exercise – V**

**CALL Lab:** Neutralization of Mother Tongue Influence and Conversation Practice

**ICS Lab:** Information Transfer- Oral Presentation Skills

Reading Comprehension and Job Application with Resume preparation.

**Minimum Requirement of infra structural facilities for ELCS Lab:**

1. **Computer Assisted Language Learning (CALL) Lab:**

**The Computer aided Language Lab** for 40 students with 40 systems, one master console, LAN facility and English language software for self- study by learners.

**System Requirement (Hardware component):**

*Computer network with Lan with minimum 60 multimedia systems with the following specifications:*

- i) P – IV Processor
  - a) Speed – 2.8 GHZ
  - b) RAM – 512 MB Minimum
  - c) Hard Disk – 80 GB
- ii) Headphones of High quality

2. **Interactive Communication Skills (ICS) Lab :**

**The Interactive Communication Skills Lab:** A Spacious room with movable chairs and audio-visual aids with a Public Address System, a T. V., a digital stereo –audio & video system and camcorder etc.

**Books Suggested for English Language Lab Library (to be located within the lab in addition to the CDs of the text book which are loaded on the systems):**

1. Suresh Kumar, E. & Sreehari, P. 2009. *A Handbook for English Language Laboratories*. New Delhi: Foundation
2. *Speaking English Effectively* 2<sup>nd</sup> Edition by Krishna Mohan and N. P. Singh, 2011. Macmillan Publishers India Ltd. Delhi.
3. Sasi Kumar, V & Dhamija, P.V. *How to Prepare for Group Discussion and Interviews*. Tata McGraw Hill
4. Hancock, M. 2009. *English Pronunciation in Use. Intermediate*. Cambridge: CUP
5. Spoken English: A Manual of Speech and Phonetics by R. K. Bansal & J. B. Harrison. 2013. Orient Blackswan. Hyderabad.
6. Hewings, M. 2009. *English Pronunciation in Use. Advanced*. Cambridge: CUP
7. Marks, J. 2009. *English Pronunciation in Use. Elementary*. Cambridge: CUP
8. Nambiar, K.C. 2011. *Speaking Accurately. A Course in International Communication*. New Delhi : Foundation
9. Soundararaj, Francis. 2012. *Basics of Communication in English*. New Delhi: Macmillan
10. **Spoken English** (CIEFL) in 3 volumes with 6 cassettes, OUP.
11. **English Pronouncing Dictionary** Daniel Jones Current Edition with CD.
12. **A textbook of English Phonetics for Indian Students** by T. Balasubramanian (Macmillan)

**DISTRIBUTION AND WEIGHTAGE OF MARKS**

***English Language Laboratory Practical Examination:***

1. The practical examinations for the English Language Laboratory shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the Language lab sessions, there shall be a continuous evaluation during the year for 25 sessional marks and 50 year-end Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The year- end Examination shall be conducted by the teacher concerned with the help of another member of the staff of the same department of the same institution.

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## IT WORKSHOP / ENGINEERING WORKSHOP

**Objectives:**

The IT Workshop for engineers is a training lab course spread over 54 hours. The modules include training on PC Hardware, Internet & World Wide Web and Productivity tools including Word, Excel and Power Point.

**Outcomes:**

**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, newsgroups and discussion forums would be covered. In addition, awareness of cyber hygiene, i.e., protecting the personal computer from getting infected with the viruses, worms and other cyber attacks would be introduced.

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

**PC Hardware**

**Week 1 – Task 1 :** Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

**Week 2 – Task 2 :** Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video would be given as part of the course content.

**Week 3 – Task 3 :** Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.

**Week 4 – Task 4 :** Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot with both windows and Linux. Lab instructors should verify the installation and follow it up with a Viva

**Week 5 – Task 5: Hardware Troubleshooting:** Students have to be given a PC which does not boot due to improper assembly or defective peripherals. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva

**Week 6 – Task 6 : Software Troubleshooting :** Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva.

**Internet & World Wide Web**

**Week 7 - Task 1 : Orientation & Connectivity Boot Camp :** Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

**Week 8 - Task 2 : Web Browsers, Surfing the Web :** Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.

**Week 9 - Task 3 : Search Engines & Netiquette :** Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated to the instructors by the student.

**Week 10 - Task 4: Cyber Hygiene:** Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to first install antivirus software, configure their personal firewall and windows update on their computer. Then they need to customize their browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

**Week 11- Task 5:** Develop your home page using HTML Consisting of your photo, name, address and education details as a table and your skill set as a list.

### **Productivity tools**

#### **LaTeX and Word**

**Week 12 – Word Orientation:** The mentor needs to give an overview of LaTeX and Microsoft (MS) office 2007/ equivalent (FOSS) tool word: Importance of LaTeX and MS office 2007/ equivalent (FOSS) tool Word as word Processors, Details of the three tasks and features that would be covered in each, using LaTeX and word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter.

**Task 1 : Using LaTeX and Word** to create project certificate. Features to be covered:-Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both LaTeX and Word.

**Week 13 - Task 2: Creating project abstract** Features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

**Week 14 - Task 3 : Creating a Newsletter :** Features to be covered:- Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.

#### **Excel**

**Week 15 - Excel Orientation:** The mentor needs to tell the importance of MS office 2007/ equivalent (FOSS) tool Excel as a Spreadsheet tool, give the details of the two tasks and features that would be covered in each. Using Excel – Accessing, overview of toolbars, saving excel files, Using help and resources.

**Task 1: Creating a Scheduler** - Features to be covered:- Gridlines, Format Cells, Summation, auto fill, Formatting Text

**Week 16 - Task 2 : Calculating GPA** - .Features to be covered:- Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, LOOKUP/VLOOKUP, Sorting, Conditional formatting

#### **LaTeX and MS/equivalent (FOSS) tool Power Point**

**Week 17 - Task1:** Students will be working on basic power point utilities and tools which help them create basic power point presentation. Topic covered during this week includes :- PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in both LaTeX and Power point. Students will be given model power point presentation which needs to be replicated (exactly how it's asked).

**Week 18- Task 2:** Second week helps students in making their presentations interactive. Topic covered during this week includes: Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts

**Week 19 - Task 3:** Concentrating on the in and out of Microsoft power point and presentations in LaTeX. Helps them learn best practices in designing and preparing power point presentation. Topic covered during this week includes: - Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), Inserting – Background, textures, Design Templates, Hidden slides.

### **REFERENCE BOOKS:**

1. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.

2. LaTeX Companion – Leslie Lamport, PHI/Pearson.
3. Introduction to Computers, Peter Norton, 6/e Mc Graw Hill Publishers.
4. Upgrading and Repairing, PC's 18<sup>th</sup> e, Scott Muller QUE, Pearson Education
5. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dreamtech
6. IT Essentials PC Hardware and Software Companion Guide Third Edition by David Anfinson and Ken Quamme. – CISCO Press, Pearson Education.
7. PC Hardware and A+Handbook – Kate J. Chase PHI (Microsoft)

### **ENGINEERING WORKSHOP**

#### **1. TRADES FOR EXERCISES:**

##### **At least two exercises from each trade:**

1. Carpentry
2. Fitting
3. Tin-Smithy and Development of jobs carried out and soldering.
4. Black Smithy
5. House-wiring
6. Foundry
7. Welding
8. Power tools in construction, wood working, electrical engineering and mechanical Engineering.

#### **2. TRADES FOR DEMONSTRATION & EXPOSURE:**

1. Plumbing
2. Machine Shop
3. Metal Cutting (Water Plasma)

#### **TEXT BOOK:**

1. Work shop Manual - P.Kannaiah/ K.L.Narayana/ Scitech Publishers.
2. Workshop Manual / Venkat Reddy/ BS Publications/Sixth Edition

## PROBABILITY AND STATISTICS

### Objectives: To learn

- Understand a random variable that describes randomness or an uncertainty in certain realistic situation. It can be of either discrete or continuous type.
- In the discrete case, study of the binomial and the Poisson random variables and the Normal random variable for the continuous case predominantly describe important probability distributions. Important statistical properties for these random variables provide very good insight and are essential for industrial applications.
- Most of the random situations are described as functions of many single random variables. In this unit, the objective is to learn functions of many random variables through joint distributions.
- The types of sampling, Sampling distribution of means, Sampling distribution of variance, Estimations of statistical parameters, Testing of hypothesis of few unknown statistical parameters.
- The mechanism of queuing system, The characteristics of queue, The mean arrival and service rates
- The expected queue length, The waiting line
- The random processes, The classification of random processes, Markov chain, Classification of states
- Stochastic matrix ( transition probability matrix ), Limiting probabilities, Applications of Markov chains

### UNIT-I

**Single Random variables and probability distributions:** Random variables – Discrete and continuous. Probability distributions, mass function/ density function of a probability distribution. Mathematical Expectation, Moment about origin, Central moments Moment generating function of probability distribution. Binomial, Poisson & normal distributions and their properties. Moment generating functions of the above three distributions, and hence finding the mean and variance.

### UNIT-II

**Multiple Random variables, Correlation & Regression:** Joint probability distributions- Joint probability mass / density function, Marginal probability mass / density functions, Covariance of two random variables, Correlation - Coefficient of correlation, The rank correlation.

Regression- Regression Coefficient, The lines of regression and multiple correlation & regression.

### UNIT-III

#### Sampling Distributions and Testing of Hypothesis

**Sampling:** Definitions of population, sampling, statistic, parameter. Types of sampling, Expected values of Sample mean and variance, sampling distribution, Standard error, Sampling distribution of means and sampling distribution of variance.

**Parameter estimations** – likelihood estimate, interval estimations.

**Testing of hypothesis:** Null hypothesis, Alternate hypothesis, type I, & type II errors – critical region, confidence interval, Level of significance. One sided test, two sided test,

#### Large sample tests:

- Test of Equality of means of two samples equality of sample mean and population mean (cases of known variance & unknown variance, equal and unequal variances)
- Tests of significance of difference between sample S.D and population S.D.
- Tests of significance difference between sample proportion and population proportion & difference between two sample proportions.

#### Small sample tests:

Student t-distribution, its properties; Test of significance difference between sample mean and population mean; difference between means of two small samples

Snedecor's F- distribution and its properties. Test of equality of two population variances

Chi-square distribution, its properties, Chi-square test of goodness of fit

### UNIT-IV

**Queuing Theory:** Structure of a queuing system, Operating Characteristics of queuing system, Transient and steady states, Terminology of Queuing systems, Arrival and service processes- Pure Birth-Death process Deterministic queuing models- M/M/1 Model of infinite queue, M/M/1 model of finite queue.

### UNIT-V

**Stochastic processes:** Introduction to Stochastic Processes – Classification of Random processes, Methods of description of random processes, Stationary and non-stationary random process, Average values of single random process and two or more random processes. Markov process, Markov chain, classification of states – Examples of Markov Chains, Stochastic Matrix.

**TEXT BOOKS:**

- 1) Higher Engineering Mathematics by Dr. B.S. Grewal, Khanna Publishers
- 2) Probability and Statistics for Engineers and Scientists by Sheldon M. Ross, Academic Press
- 3) Operations Research by S.D. Sarma,

**REFERENCE BOOKS:**

1. Mathematics for Engineers by K.B. Datta and M.A.S. Srinivas, Cengage Publications
2. Probability and Statistics by T.K.V. Iyengar & B. Krishna Gandhi Et
3. Fundamentals of Mathematical Statistics by S.C. Gupta and V.K. Kapoor
4. Probability and Statistics for Engineers and Scientists by Jay I. Devore.

**Outcomes:**

- Students would be able to identify distribution in certain realistic situation. It is mainly useful for circuit as well as non-circuit branches of engineering. Also able to differentiate among many random variable involved in the probability models. It is quite useful for all branches of engineering.
- The student would be able to calculate mean and proportions (small and large sample) and to make important decisions from few samples which are taken out of unmanageably huge populations. It is mainly useful for non-circuit branches of engineering.
- The students would be able to find the expected queue length, the ideal time, the traffic intensity and the waiting time. These are very useful tools in many engineering and data management problems in the industry. It is useful for all branches of engineering.
- The student would be able to understand about the random process, Markov process and Markov chains which are essentially models of many time dependent processes such as signals in communications, time series analysis, queuing systems. The student would be able to find the limiting probabilities and the probabilities in  $n^{\text{th}}$  state. It is quite useful for all branches of engineering



## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

II Year B.Tech. IT/CST -I Sem

L	T/P/D	C
4	-/-	4

### MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

#### Objectives:

- To explain with examples the basic terminology of functions, relations, and sets.
- To perform the operations associated with sets, functions, and relations.
- To relate practical examples to the appropriate set, function, or relation model, and interpret the associated operations and terminology in context.
- To describe the importance and limitations of predicate logic.
- To relate the ideas of mathematical induction to recursion and recursively defined structures.
- To use Graph Theory for solving problems

#### UNIT-I

**Mathematical Logic** : Statements and notations, Connectives, Well formed formulas, Truth Tables, tautology, equivalence implication, Normal forms, Quantifiers, universal quantifiers. **Predicates**: Predicative logic, Free & Bound variables, Rules of inference, Consistency, proof of contradiction, Automatic Theorem Proving.

#### UNIT-II

**Relations**: Properties of Binary Relations, equivalence, transitive closure, compatibility and partial ordering relations, Lattices, Hasse diagram. Functions: Inverse Function Composition of functions, recursive Functions, Lattice and its Properties, **Algebraic structures** : Algebraic systems Examples and general properties, Semi groups and monads, groups sub groups' homomorphism, Isomorphism.

#### UNIT-III

**Elementary Combinatorics**: Basis of counting, Combinations & Permutations, with repetitions, Constrained repetitions, Binomial Coefficients, Binomial Multinomial theorems, the principles of Inclusion – Exclusion. Pigeon hole principles and its application.

#### UNIT-IV

**Recurrence Relation** : Generating Functions, Function of Sequences Calculating Coefficient of generating function, Recurrence relations, Solving recurrence relation by substitution and Generating funds. Characteristics roots solution of In homogeneous Recurrence Relation.

#### UNIT-V

**Graph Theory** : Representation of Graph, DFS, BFS, Spanning Trees, planar Graphs. Graph Theory and Applications, Basic Concepts Isomorphism and Sub graphs, Multi graphs and Euler circuits, Hamiltonian graphs, Chromatic Numbers.

#### TEXT BOOKS :

1. Elements of DISCRETE MATHEMATICS- A computer Oriented Approach- C L Liu, D P Mohapatra. Third Edition, Tata McGraw Hill.
2. Discrete Mathematics for Computer Scientists & Mathematicians, J.L. Mott, A. Kandel, T.P. Baker, PHI.

#### REFERENCE BOOKS:

1. Discrete Mathematics and its Applications, Kenneth H. Rosen, Fifth Edition. TMH.
2. Discrete Mathematical structures Theory and application-Malik & Sen, Cengage.
3. Discrete Mathematics with Applications, Thomas Koshy, Elsevier
4. Logic and Discrete Mathematics, Grass Man & Trembley, Pearson Education.

#### Outcomes:

- Ability to Illustrate by examples the basic terminology of functions, relations, and sets and demonstrate knowledge of their associated operations.
- Ability to Demonstrate in practical applications the use of basic counting principles of permutations, combinations, inclusion/exclusion principle and the pigeonhole methodology.
- Ability to represent and Apply Graph theory in solving computer science problems

## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

II Year B.Tech. IT/CST -I Sem

<b>L</b>	<b>T/P/D</b>	<b>C</b>
<b>4</b>	<b>-/-/-</b>	<b>4</b>

### DATA STRUCTURES

#### Objectives:

- To understand the basic concepts such as Abstract Data Types, Linear and Non Linear Data structures.
- To understand the notations used to analyze the Performance of algorithms.
- To understand the behaviour of data structures such as stacks, queues, trees, hash tables, search trees, Graphs and their representations.
- To choose the appropriate data structure for a specified application.
- To understand and analyze various searching and sorting algorithms.
- To write programs in C to solve problems using data structures such as arrays, linked lists, stacks, queues, trees, graphs, hash tables, search trees.

#### UNIT- I

Basic concepts- Algorithm Specification-Introduction, Recursive algorithms, Data Abstraction Performance analysis- time complexity and space complexity, Asymptotic Notation-Big O, Omega and Theta notations, Introduction to Linear and Non Linear data structures.

Singly Linked Lists-Operations-Insertion, Deletion, Concatenating singly linked lists, Circularly linked lists-Operations for Circularly linked lists, Doubly Linked Lists- Operations- Insertion, Deletion.

Representation of single, two dimensional arrays, sparse matrices-array and linked representations.

#### UNIT- II

Stack ADT, definition, operations, array and linked implementations in C, applications-infix to postfix conversion, Postfix expression evaluation, recursion implementation, Queue ADT, definition and operations ,array and linked Implementations in C, Circular queues-Insertion and deletion operations, Deque (Double ended queue)ADT, array and linked implementations in C.

#### UNIT- III

Trees – Terminology, Representation of Trees, Binary tree ADT, Properties of Binary Trees, Binary Tree Representations-array and linked representations, Binary Tree traversals, Threaded binary trees, Max Priority Queue ADT-implementation-Max Heap-Definition, Insertion into a Max Heap, Deletion from a Max Heap.

Graphs – Introduction, Definition, Terminology, Graph ADT, Graph Representations- Adjacency matrix, Adjacency lists, Graph traversals- DFS and BFS

#### UNIT- IV

Searching- Linear Search, Binary Search, Static Hashing-Introduction, hash tables, hash functions, Overflow Handling.

Sorting-Insertion Sort, Selection Sort, Radix Sort, Quick sort, Heap Sort, Comparison of Sorting methods.

#### UNIT- V

Search Trees-Binary Search Trees, Definition, Operations- Searching, Insertion and Deletion, AVL Trees-Definition and Examples, Insertion into an AVL Tree ,B-Trees, Definition, B-Tree of order m, operations-Insertion and Searching, Introduction to Red-Black and Splay Trees(Elementary treatment-only Definitions and Examples), Comparison of Search Trees.

Pattern matching algorithm- The Knuth-Morris-Pratt algorithm, Tries (examples only).

#### TEXT BOOKS:

1. Fundamentals of Data structures in C, 2<sup>nd</sup> Edition, E.Horowitz, S.Sahni and Susan Anderson-Freed, Universities Press.
2. Data structures A Programming Approach with C, D.S.Kushwaha and A.K.Misra, PHI.

#### REFERENCE BOOKS:

1. Data structures: A Pseudocode Approach with C, 2<sup>nd</sup> edition, R.F.Gilberg And B.A.Forouzan, Cengage Learning.
2. Data structures and Algorithm Analysis in C, 2<sup>nd</sup> edition, M.A.Weiss, Pearson.
3. Data Structures using C, A.M.Tanenbaum,Y. Langsam, M.J.Augenstein, Pearson.
4. Data structures and Program Design in C, 2<sup>nd</sup> edition, R.Kruse, C.L.Tondo and B.Leung,Pearson.
5. Data Structures and Algorithms made easy in JAVA, 2<sup>nd</sup> Edition, Narsimha Karumanchi, CareerMonk Publications.
6. Data Structures using C, R.Thareja, Oxford University Press.
7. Data Structures, S.Lipscutz,Schaum's Outlines, TMH.
8. Data structures using C, A.K.Sharma, 2<sup>nd</sup> edition, Pearson..
9. Data Structures using C &C++, R.Shukla, Wiley India.
10. Classic Data Structures, D.Samanta, 2<sup>nd</sup> edition, PHI.

11. Advanced Data structures, Peter Brass, Cambridge.

**Outcomes:**

- Learn how to use data structure concepts for realistic problems.
- Ability to identify appropriate data structure for solving computing problems in respective language.
- Ability to solve problems independently and think critically.

## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

II Year B.Tech. IT/CST -I Sem

L	T/P/D	C
4	-/-	4

### DIGITAL LOGIC DESIGN AND COMPUTER ORGANIZATION

#### Objectives:

- To understand the basic theoretical concepts of digital systems like the binary system and Boolean algebra.
- To express real life problem in logic design terminology.
- To use Boolean algebraic formulations to design digital systems.
- To design using combinational/sequential circuits
- To understand the Instruction execution stages.
- To explain the functions of the various computer hardware components.

#### UNIT- I

**Basic Structure of Computers :** Computer Types, Functional units, Basic operational concepts, Bus structures, Software, Performance, multiprocessors and multi computers, Computer Generations.

**Data Representation:** Binary Numbers, Fixed Point Representation. Floating – Point Representation. Number base conversions, Octal and Hexadecimal Numbers, complements, Signed binary numbers, Binary codes.

#### UNIT- II

**Digital Logic Circuits-I:** Basic Logic Functions, Logic gates, universal logic gates, Minimization of Logic expressions. Flip-flops, Combinational Circuits.

**Digital Logic Circuits -II:** Registers, Shift Registers, Binary counters, Decoders, Multiplexers, Programmable Logic Devices.

#### UNIT- III

**Computer Arithmetic:** Algorithms for fixed point and floating point addition, subtraction, multiplication and division operations. Hardware Implementation of arithmetic and logic operations, High performance arithmetic.

**Instruction Set & Addressing:** Memory Locations and Addresses, Machine addresses and sequencing, Various Addressing Modes, Instruction Formats, Basic Machine Instructions. IA-32 Pentium example.

#### UNIT- IV

**Processor Organization:** Introduction to CPU, Register Transfers, Execution of Instructions, Multiple Bus Organization, Hardwired Control, Microprogrammed Control

**Memory Organization:** Concept of Memory, RAM, ROM memories, memory hierarchy, cache memories, virtual memory, secondary storage, memory management requirements.

#### UNIT- V

**Input / Output Organization:** Introduction to I/O, Interrupts- Hardware, Enabling and disabling Interrupts, Device Control, Direct memory access, buses, interface circuits, standard I/O Interfaces.

#### TEXT BOOKS:

1. Computer Organization – Carl Hamacher, Zvonko Vranesic, Safwat Zaky, fifth edition, McGraw Hill.
2. Computer Architecture and Organization- An Integrated Approach, Miles Murdocca, Vincent Heuring, Second Edition, Wiley India.
3. Computer Systems Architecture – M.Moris Mano, IIIrd Edition, Pearson.

#### REFERENCE BOOKS:

1. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson
2. Computer- organization and Design- David A. Paterson and John L.Hennessy-Elsevier.
3. Fundamentals or Computer Organization and Design, - Sivarama Dandamudi Springer Int. Edition.
4. Digital Design – Third Edition, M.Morris Mano, Pearson Education/PHI.
5. Fundamentals of Logic Design, Roth, 5th Edition, Thomson.

#### Outcomes:

- Student could able to design, understand the number systems, combinational sequential circuits. And they should be in a position to continue with computer organization.
- Students understand in a better way the I/O and memory organization in depth. They should be in a position to write assembly language programs for various applications.

## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

II Year B.Tech. IT/CST -I Sem

L	T/P/D	C
4	-/-	4

### ELECTRONIC DEVICES AND CIRCUITS

#### Objectives:

This is a fundamental course, basic knowledge of which is required by all the circuit branch engineers. This course focuses:

- To familiarize the student with the principle of operation, analysis and design of Junction diode, BJT and FET amplifier circuits, transistors and field effect transistors.
- To understand diode as rectifier.
- To study basic principle of filter circuits and various types.

#### UNIT -I

**P-N Junction Diode:** Qualitative Theory of P-N Junction, P-N Junction as a Diode, Diode Equation, Volt-Ampere Characteristics, Temperature dependence of VI characteristic, Ideal versus Practical – Resistance levels (Static and Dynamic), Transition and Diffusion Capacitances, Diode Equivalent Circuits, Load Line Analysis, Breakdown Mechanisms in Semiconductor Diodes, Zener Diode Characteristics.

**Special Purpose Electronic Devices:** Principle of Operation and Characteristics of Tunnel Diode (with the help of Energy Band Diagram), Varactor Diode, SCR and Semiconductor Photo Diode.

#### UNIT -II

**Rectifiers and Filters :** The P-N junction as a Rectifier, Half wave Rectifier, Full wave Rectifier, Bridge Rectifier, Harmonic components in a Rectifier Circuit, Inductor Filters, Capacitor Filters, L- Section Filters,  $\pi$ - Section Filters, Comparison of Filters, Voltage Regulation using Zener Diode.

#### UNIT -III

**Bipolar Junction Transistor and UJT:** The Junction Transistor, Transistor Current Components, Transistor as an Amplifier, Transistor Construction, BJT Operation, BJT Symbol, Common Base, Common Emitter and Common Collector Configurations, Limits of Operation, BJT Specifications, BJT Hybrid Model, Determination of h-parameters from Transistor Characteristics, Comparison of CB, CE, and CC Amplifier Configurations, UJT and Characteristics.

#### UNIT -IV

**Transistor Biasing and Stabilization:** Operating Point, The DC and AC Load lines, Need for Biasing, Fixed Bias, Collector Feedback Bias, Emitter Feedback Bias, Collector - Emitter Feedback Bias, Voltage Divider Bias, Bias Stability, Stabilization Factors, Stabilization against variations in  $V_{BE}$  and  $\beta$ , Bias Compensation using Diodes and Transistors, Thermal Runaway, Thermal Stability, Analysis of a Transistor Amplifier Circuit using h-Parameters.

#### UNIT -V

##### Field Effect Transistor and FET Amplifiers

**Field Effect Transistor:** The Junction Field Effect Transistor (Construction, principle of operation, symbol) – Pinch-off Voltage - Volt-Ampere characteristics, The JFET Small Signal Model, MOSFET (Construction, principle of operation, symbol), MOSFET Characteristics in Enhancement and Depletion modes.

##### FET Amplifiers:

FET Common Source Amplifier, Common Drain Amplifier, Generalized FET Amplifier, Biasing FET, FET as Voltage Variable Resistor, Comparison of BJT and FET.

##### TEXT BOOKS:

1. Millman's Electronic Devices and Circuits – J. Millman, C.C.Halkias, and Satyabrata Jit, 2 Ed.,1998, TMH.
2. Electronic Devices and Circuits – Mohammad Rashid, Cengage Learning, 2013
3. Electronic Devices and Circuits – David A. Bell, 5 Ed, Oxford

##### REFERENCE BOOKS:

1. Integrated Electronics – J. Millman and Christos C. Halkias, 1991 Ed., 2008, TMH.
2. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, 9 Ed., 2006, PEI/PHI.
3. Electronic Devices and Circuits – B. P. Singh, Rekha Singh, Pearson, 2 Ed, 2013.
4. Electronic Devices and Circuits - K. Lal Kishore, 2 Ed., 2005, BSP.
5. Electronic Devices and Circuits – Anil K. Maini, Varsha Agarwal, 1 Ed., 2009, Wiley India Pvt. Ltd.
6. Electronic Devices and Circuits – S.Salivahanan, N.Suresh Kumar, A.Vallavaraj, 2 Ed., 2008, TMH.

##### Outcomes:

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

- Understand and Analyse the different types of diodes, operation and its characteristics
- Design and analyse the DC bias circuitry of BJT and FET
- Design biasing circuits using diodes and transistors.
- To analyze and design diode application circuits, amplifier circuits and oscillators employing BJT, FET devices.

## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

II Year B.Tech. IT/CST -I Sem

L	T/P/D	C
4	-/-	4

### BASIC ELECTRICAL ENGINEERING

#### Objectives:

This course introduces the concepts of basic electrical engineering parameters, quantities, analysis of AC and DC circuits, the construction operation and analysis of transformers, DC and AC machines. It also gives knowledge about measuring instruments operation in detail.

#### UNIT – I

**Introduction to Electrical Engineering:** Ohm's law, basic circuit components, Kirchhoff's laws. Simple problems.

**Network Analysis:** Basic definitions, types of elements, types of sources, resistive networks, inductive networks, capacitive networks, and series parallel circuits, star delta and delta star transformation. , Network theorems- Superposition, Thevenin's, Maximum power transfer theorems and simple problems.

#### UNIT-II

**Alternating Quantities:** Principle of ac voltages, waveforms and basic definitions, root mean square and average values of alternating currents and voltage, form factor and peak factor, phasor representation of alternating quantities, the J operator and phasor algebra, analysis of ac circuits with single basic network element, single phase series circuits.

#### UNIT-III

**Transformers :** Principles of operation, Constructional Details, Ideal Transformer and Practical Transformer, Losses, Transformer Test, Efficiency and Regulation Calculations (All the above topics are only elementary treatment and simple problems).

#### UNIT-IV

##### D.C. and A.C. Machines:

**D.C generators:** Principle of operation of dc machines, types of D.C generators, EMF equation in D.C generator.

**D.C motors:** Principle of operation of dc motors, types of D.C motors, losses and torque equation, losses and efficiency calculation in D.C generator. **A.C Machines:** Three phase induction motor, principle of operation, slip and rotor frequency, torque (simple problems).

#### UNIT- V

**Basic Instruments:** Introduction, classification of instruments, operating principles, essential features of measuring instruments, Moving coil permanent magnet (PMMC) instruments, Moving Iron of Ammeters and Voltmeters (elementary Treatment only)

#### TEXT BOOKS:

1. Basic concepts of Electrical Engineering, PS Subramanyam, BS Publications.
2. Basic Electrical Engineering, S.N. Singh, PHI.

#### REFERENCE BOOKS:

1. Basic Electrical Engineering, Abhijit Chakrabarti, Sudipta nath, Chandrakumar Chanda, Tata-McGraw-Hill.
2. Principles of Electrical Engineering, V.K Mehta, Rohit Mehta, S.Chand Publications.
3. Basic Electrical Engineering, T.K.Nagasarkar and M.S. Sukhija, Oxford University Press.
4. Fundamentals of Electrical Engineering, RajendraPrasad, PHI.
5. Basic Electrical Engineering by D.P.Kothari, I.J. Nagrath, McGraw-Hill.

#### Outcomes:

After going through this course the student gets a thorough knowledge on basic electrical circuits, parameters, and operation of the transformers in the energy conversion process, electromechanical energy conversion, construction operation characteristics of DC and AC machines and the constructional features and operation of operation measuring instruments like voltmeter, ammeter, wattmeter etc...With which he/she can able to apply the above conceptual things to real-world electrical and electronics problems and applications.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**II Year B.Tech. IT/CST -I Sem**

<b>L</b>	<b>T/P/D</b>	<b>C</b>
-	-/3/-	2

**ELECTRICAL AND ELECTRONICS LAB**

**PART - A**

1. Verification of Superposition and Reciprocity theorems.
2. Verification of Maximum power transfer theorem.
3. Verification of Thevenin's and Norton's theorems.
4. Magnetization characteristics of D.C. Shunt generator.
5. Swinburne's Test on DC shunt machine.
6. Brake test on DC shunt motor.
7. OC and SC tests on Single-phase transformer.
8. Brake test on 3-phase Induction motor.

**PART - B**

1. PN Junction Diode Characteristics (Forward bias, Reverse bias)
2. Zener Diode Characteristics
3. Transistor CE Characteristics (Input and Output)
4. Rectifier without Filters (Full wave & Half wave)
5. Rectifier with Filters (Full wave & half wave).

## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

II Year B.Tech. IT/CST -I Sem

L	T/P/D	C
-	-/3/-	2

### DATA STRUCTURES LAB

#### Objectives:

- To Write and execute programs in C to solve problems using data structures such as arrays, linked lists, stacks, queues, trees, graphs, hash tables and search trees.
- To write and execute programs in C to implement various sorting and searching methods.

#### Recommended Systems/Software Requirements:

- Intel based desktop PC with minimum of 166 MHZ or faster processor with at least 64 MB RAM and 100 MB free disk space
- C compiler.

#### Week1:

Write a C program that uses functions to perform the following:

- a) Create a singly linked list of integers.
- b) Delete a given integer from the above linked list.
- c) Display the contents of the above list after deletion.

#### Week2:

Write a C program that uses functions to perform the following:

- a) Create a doubly linked list of integers.
- b) Delete a given integer from the above doubly linked list.
- c) Display the contents of the above list after deletion.

#### Week3:

Write a C program that uses stack operations to convert a given infix expression into its postfix Equivalent, Implement the stack using an array.

#### Week 4:

Write C programs to implement a double ended queue ADT using i)array and ii)doubly linked list respectively.

#### Week 5 :

Write a C program that uses functions to perform the following:

- a) Create a binary search tree of characters.
- b) Traverse the above Binary search tree recursively in Postorder.

#### Week 6 :

Write a C program that uses functions to perform the following:

- a) Create a binary search tree of integers.
- b) Traverse the above Binary search tree non recursively in inorder.

#### Week 7:

Write C programs for implementing the following sorting methods to arrange a list of integers in Ascending order:

- a) Insertion sort
- b) Merge sort

#### Week 8 :

Write C programs for implementing the following sorting methods to arrange a list of integers in ascending order:

- a) Quick sort
- b) Selection sort

#### Week 9:

i) Write a C program to perform the following operation:

- a) Insertion into a B-tree.

ii) Write a C program for implementing Heap sort algorithm for sorting a given list of integers in ascending order.

#### Week 10:

Write a C program to implement all the functions of a dictionary (ADT) using hashing.

#### Week 11:

Write a C program for implementing Knuth-Morris- Pratt pattern matching algorithm.

#### Week 12:

Write C programs for implementing the following graph traversal algorithms:

- a) Depth first traversal
- b) Breadth first traversal

#### TEXT BOOKS:

1. C and Data Structures, Third Edition, P.Padmanabham, BS Publications.
2. C and Data Structures, Prof. P.S.Deshpande and Prof. O.G. Kakde, dreamtech Press.
3. Data structures using C, A.K.Sharma, 2<sup>nd</sup> edition, Pearson.
4. Data Structures using C, R.Thareja, Oxford University Press.
5. C and Data Structures, N.B.Venkateswarlu and E.V.Prasad, S.Chand.
6. C Programming and Data Structures, P. Radha Krishna, Hi-Tech Publishers.

#### Outcomes:

- Ability to identify the appropriate data structure to given problem.
- Graduate able to design and analyze the time and space complexity of algorithm or program.
- Ability to effectively use compilers includes library functions, debuggers and trouble shooting.







Grams: "TECHNOLOGY"  
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## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

(Established by Andhra Pradesh Act No.30 of 2008)

Kukatpally, Hyderabad – 500 085, Andhra Pradesh (India)

### B. TECH. INFORMATION TECHNOLOGY /COMPUTER SCIENCE AND TECHNOLOGY

#### II YEAR II SEMESTER

Code	Subject	L	T/P/D	C
	Principles of Programming Languages	4	-	4
	Database Management Systems	4	-	4
	Java Programming	4	-	4
	Environmental Studies	4	-	4
	Data Communication	4	-	4
	Design and Analysis of Algorithms	4	-	4
	Java Programming Lab	-	3	2
	Database Management Systems Lab	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

**(A40511) PRINCIPLES OF PROGRAMMING LANGUAGES****Objectives:**

- To briefly describe various programming paradigms.
- To provide conceptual understanding of High level language design and implementation.
- To introduce the power of scripting languages

**UNIT- I**

**Preliminary Concepts:** Reasons for studying, concepts of programming languages, Programming domains, Language Evaluation Criteria, influences on Language design, Language categories, Programming Paradigms – Imperative, Object Oriented, functional Programming, Logic Programming. Programming Language Implementation – Compilation and Virtual Machines, programming environments. Syntax and Semantics: general Problem of describing Syntax and Semantics, formal methods of describing syntax - BNF, EBNF for common programming languages features, parse trees, ambiguous grammars, attribute grammars, denotational semantics and axiomatic semantics for common programming language features.

**UNIT- II**

**Data types:** Introduction, primitive, character, user defined, array, associative, record, union, pointer and reference types, design and implementation uses related to these types. Names, Variable, concept of binding, type checking, strong typing, type compatibility, named constants, variable initialization. Expressions and Statements: Arithmetic relational and Boolean expressions, Short circuit evaluation mixed mode assignment, Assignment Statements, Control Structures – Statement Level, Compound Statements, Selection, Iteration, Unconditional Statements, guarded commands.

**UNIT-III**

**Subprograms and Blocks:** Fundamentals of sub-programs, Scope and lifetime of variable, static and dynamic scope, Design issues of subprograms and operations, local referencing environments, parameter passing methods, overloaded sub-programs, generic sub-programs, parameters that are sub-program names, design issues for functions user defined overloaded operators, co routines.

**UNIT- IV**

**Abstract Data types:** Abstractions and encapsulation, introductions to data abstraction, design issues, language examples, C++ parameterized ADT,

object oriented programming in small talk, C++, Java, C#, Ada 95

**Concurrency:** Subprogram level concurrency, semaphores, monitors, message passing, Java threads, C# threads.

**Exception handling :** Exceptions, exception Propagation, Exception handler in Ada, C++ and Java.

**Logic Programming Language :** Introduction and overview of logic programming, basic elements of prolog, application of logic programming.

#### UNIT- V

**Functional Programming Languages:** Introduction, fundamentals of FPL, LISP, ML, Haskell, application of Functional Programming Languages and comparison of functional and imperative Languages.

**Scripting Language:** Pragmatics, Key Concepts, Case Study : Python – Values and Types, Variables , Storage and Control, Bindings and Scope, Procedural Abstraction, Data Abstraction, Separate Compilation, Module Library.

#### TEXT BOOKS:

1. Concepts of Programming Languages Robert .W. Sebesta 8/e, Pearson Education,2008.
2. Programming Language Design Concepts, D. A. Watt, Wiley dreamtech, rp-2007.

#### REFERENCE BOOKS:

1. Programming Languages, 2nd Edition, A.B. Tucker, R.E. Noonan, TMH.
2. Programming Languages, K. C.Louden, 2nd Edition, Thomson, 2003.
3. LISP, Patric Henry Winston and Paul Horn, Pearson Education.
4. Programming in Prolog, W.F. Clocksin, & C.S.Mellish, 5th Edition, Springer.
5. Programming Python, M.Lutz, 3rd Edition, O'reilly,SPD, rp-2007.
6. Core Python Programming, Chun, II Edition, Pearson Education, 2007.
7. Guide to Programming with Python, Michael Dawson, Thomson, 2008

#### Outcomes:

- Ability to express syntax and semantics in formal notation.
- Ability to apply suitable programming paradigm for the application.
- Gain Knowledge and comparison of the features programming languages.

## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

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### (A40507) DATABASE MANAGEMENT SYSTEMS

#### Objectives:

- To understand the basic concepts and the applications of database systems.
- To master the basics of SQL and construct queries using SQL.
- To understand the relational database design principles.
- To become familiar with the basic issues of transaction processing and concurrency control.
- To become familiar with database storage structures and access techniques.

#### UNIT- I

Introduction-Database System Applications, Purpose of Database Systems, View of Data – Data Abstraction, Instances and Schemas, Data Models, Database Languages – DDL, DML, Database Access from Application Programs, Transaction Management, Data Storage and Querying, Database Architecture, Database Users and Administrators, History of Data base Systems.

Introduction to Data base design, ER diagrams, Beyond ER Design, Entities, Attributes and Entity sets, Relationships and Relationship sets, Additional features of ER Model, Conceptual Design with the ER Model, Conceptual Design for Large enterprises. Relational Model: Introduction to the Relational Model – Integrity Constraints over Relations, Enforcing Integrity constraints, Querying relational data, Logical data base Design, Introduction to Views – Destroying /altering Tables and Views.

#### UNIT- II

Relational Algebra and Calculus: Relational Algebra – Selection and Projection, Set operations, Renaming, Joins, Division, Examples of Algebra Queries, Relational calculus – Tuple relational Calculus – Domain relational calculus – Expressive Power of Algebra and calculus.

Form of Basic SQL Query – Examples of Basic SQL Queries, Introduction to Nested Queries, Correlated Nested Queries, Set – Comparison Operators, Aggregate Operators, NULL values – Comparison using Null values – Logical connectives – AND, OR and NOT – Impact on SQL Constructs, Outer Joins, Disallowing NULL values, Complex Integrity Constraints in SQL Triggers and Active.



**UNIT- III**

Introduction to Schema Refinement – Problems Caused by redundancy, Decompositions – Problem related to decomposition, Functional Dependencies - Reasoning about FDS, Normal Forms – FIRST, SECOND, THIRD Normal forms – BCNF –Properties of Decompositions- Loss less-join Decomposition, Dependency preserving Decomposition, Schema Refinement in Data base Design – Multi valued Dependencies – FOURTH Normal Form, Join Dependencies, FIFTH Normal form, Inclusion Dependencies.

**UNIT- IV**

Transaction Management-Transaction Concept- Transaction State-Implementation of Atomicity and Durability – Concurrent – Executions – Serializability- Recoverability – Implementation of Isolation – Testing for serializability.

Concurrency Control- Lock –Based Protocols – Timestamp Based Protocols-Validation- Based Protocols – Multiple Granularity.

Recovery System-Failure Classification-Storage Structure-Recovery and Atomicity – Log – Based Recovery – Recovery with Concurrent Transactions – Buffer Management – Failure with loss of nonvolatile storage-Advance Recovery systems- Remote Backup systems.

**UNIT- V**

Overview of Storage and Indexing: Data on External Storage, File Organization and Indexing – Clustered Indexes, Primary and Secondary Indexes, Index data Structures – Hash Based Indexing, Tree based Indexing, Comparison of File Organizations.

Tree Structured Indexing: Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM) B+ Trees: A Dynamic Index Structure, Search, Insert ,Delete.

Hash Based Indexing: Static Hashing, Extendable hashing, Linear Hashing, Extendible vs. Linear Hashing.

**TEXT BOOKS:**

1. Data base Management Systems, Raghu Ramakrishnan, Johannes Gehrke, TMH, 3<sup>rd</sup> Edition,2003.
2. Data base System Concepts, A.Silberschatz, H.F. Korth, S.Sudarshan, McGraw hill, VI edition,2006.

**REFERENCE BOOKS:**

1. Database Systems, 6<sup>th</sup> edition., Ramez Elmasri, Shamkant B.Navathe, Pearson Education,2013.

2. Database Principles, Programming, and Performance, P.O'Neil, E.O'Neil, 2<sup>nd</sup> ed., ELSEVIER
3. Database Systems, A Practical approach to Design Implementation and Management Fourth edition, Thomas Connolly, Carolyn Begg, Pearson education.
4. Database System Concepts, Peter Rob & Carlos Coronel, Cengage Learning, 2008.
5. Fundamentals of Relational Database Management Systems, S.Sumathi, S.Esakkirajan, Springer.
6. Database Management System Oracle SQL and PL/SQL, P.K.Das Gupta, PHI.
7. Introduction to Database Management, M.L.Gillenson and others, Wiley Student Edition.
8. Database Development and Management, Lee Chao, Auerbach publications, Taylor & Francis Group.
9. Introduction to Database Systems, C.J.Date, Pearson Education.
10. Database Management Systems, G.K.Gupta, TMH.

**Outcomes:**

- Demonstrate the basic elements of a relational database management system.
- Ability to identify the data models for relevant problems.
- Ability to design entity relationship and convert entity relationship diagrams into RDBMS and formulate SQL queries on the respect data.
- Apply normalization for the development of application software's.

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**(A40503) JAVA PROGRAMMING****Objectives:**

- To understand object oriented programming concepts, and apply them in problem solving
- To learn the basics of java Console and GUI based programming

**UNIT- I**

**OOP concepts** – Data abstraction, encapsulation, inheritance, benefits of inheritance, polymorphism, classes and objects, Procedural and object oriented programming paradigms

**Java programming** - History of Java, comments, data types, variables, constants, scope and life time of variables, operators, operator hierarchy, expressions, type conversion and casting, enumerated types, control flow - block scope, conditional statements, loops, break and continue statements, simple java stand alone programs, arrays, console input and output, formatting output, constructors, methods, parameter passing, static fields and methods, access control, this reference, overloading methods and constructors, recursion, garbage collection, building strings, exploring string class.

**UNIT- II**

**Inheritance** - Inheritance hierarchies, super and sub classes, Member access rules, super keyword, preventing inheritance: final classes and methods, the Object class and its methods

**Polymorphism**- dynamic binding, method overriding, abstract classes and methods.

**Interfaces** – Interfaces vs. Abstract classes, defining an interface, implementing interfaces, accessing implementations through interface references, extending interface.

**Inner classes** – Uses of inner classes, local inner classes, anonymous inner classes, static inner classes, examples.

**Packages** - Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages.

**UNIT- III**

**Exception handling** – Dealing with errors, benefits of exception handling

the classification of exceptions- exception hierarchy, checked exceptions and unchecked exceptions, usage of try, catch, throw, throws and finally, re-throwing exceptions, exception specification, built in exceptions, creating own exception sub classes.

**Multithreading** - Differences between multiple processes and multiple threads, thread states, creating threads, interrupting threads, thread priorities, synchronizing threads, inter-thread communication, producer consumer pattern.

**UNIT- IV**

**Collection Framework in Java** – Introduction to Java Collections, Overview of Java Collection frame work, Generics, Commonly used Collection classes– Array List, Vector, Hashtable, Stack, Enumeration, Iterator, StringTokenizer, Random, Scanner, calendar and Properties.

**Files** – streams- byte streams, character streams, text Input/output, binary input/output, random access file operations, File management using File class.

**Connecting to Database** - JDBC Type 1 to 4 drivers, connecting to a database, querying a database and processing the results, updating data with JDBC.

**UNIT- V**

**GUI Programming with Java** - The AWT class hierarchy, Introduction to Swing, Swing vs. AWT, Hierarchy for Swing components, Containers – JFrame, JApplet, JDialog, JPanel, Overview of some swing components- JButton, JLabel, JTextField, JTextArea, simple swing applications, Layout management - Layout manager types – border, grid and flow

**Event handling** - Events, Event sources, Event classes, Event Listeners, Relationship between Event sources and Listeners, Delegation event model, Examples: handling a button click, handling mouse events, Adapter classes.

**Applets** – Inheritance hierarchy for applets, differences between applets and applications, life cycle of an applet, passing parameters to applets, applet security issues.

**TEXT BOOK:**

- Java Fundamentals – A comprehensive Introduction, Herbert Schildt and Dale Skrien, TMH.

**REFERENCE BOOKS:**

- Java for Programmers, P.J.Deitel and H.M.Deitel, Pearson education (OR) Java: How to Program P.J.Deitel and H.M.Deitel, PHI.



2. Object Oriented Programming through Java, P.Radha Krishna, Universities Press.
3. Thinking in Java, Bruce Eckel, Pearson Education
4. Programming in Java, S.Malhotra and S.Choudhary, Oxford Univ. Press.

#### Outcomes:

- Understanding of OOP concepts and basics of java programming (Console and GUI based)
- The skills to apply OOP and Java programming in problem solving
- Should have the ability to extend his knowledge of Java programming further on his/her own.

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### (A40009) ENVIRONMENTAL STUDIES

1. Understanding the importance of ecological balance for sustainable development.
2. Understanding the impacts of developmental activities and mitigation measures.
3. Understanding of environmental policies and regulations

#### UNIT-I :

**Ecosystems:** Definition, Scope and Importance of ecosystem, Classification, structure and function of an ecosystem, Food chains, food webs and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnification, ecosystem value, services and carrying capacity, Field visits.

#### UNIT-II:

**Natural Resources: Classification of Resources:** Living and Non-Living resources, **water resources:** use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. **Mineral resources:** use and exploitation, environmental effects of extracting and using mineral resources, **Land resources:** Forest resources, **Energy resources:** growing energy needs, renewable and non renewable energy sources, use of alternate energy source, case studies.

#### UNIT-III:

**Biodiversity and Biotic Resources:** Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation. National Biodiversity act.

#### UNIT-IV:

**Environmental Pollution and Control Technologies: Environmental Pollution:** Classification of pollution, **Air Pollution:** Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. **Water pollution:** Sources and types of pollution, drinking water quality standards. **Soil Pollution:** Sources and types, Impacts of modern agriculture, degradation of soil. **Noise Pollution:** Sources and Health hazards, standards, **Solid waste:** Municipal Solid Waste management, composition and characteristics of e-Waste and its management. **Pollution control**

**technologies:** Wastewater Treatment methods: Primary, secondary and Tertiary.

Overview of air pollution control technologies, Concepts of bioremediation. **Global Environmental Problems And Global Efforts:** Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol and Montréal Protocol.

#### UNIT-V:

**Environmental Policy, Legislation & EIA:** Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio-economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP). **Towards Sustainable Future:** Concept of Sustainable Development, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics. Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA), Low carbon life style.

#### SUGGESTED TEXT BOOKS:

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

#### REFERENCE BOOKS:

- a. Environmental Science: towards a sustainable future by Richard T.Wright. 2008 PHL Learning Private Ltd. New Delhi.
- b. Environmental Engineering and science by Gilbert M.Masters and Wendell P. Ela .2008 PHI Learning Pvt. Ltd.
- c. Environmental Science by Daniel B.Botkin & Edward A.Keller, Wiley INDIA edition.
- d. Environmental Studies by Anubha Kaushik, 4<sup>th</sup> Edition, New age international publishers.
- e. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.

#### Outcomes:

Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which inturn helps in sustainable development.

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### (A40409) DATA COMMUNICATION

#### Objectives:

- To introduce a comprehensive idea on the basic concepts of communication system, data communications and transmissions of digital signals. This subject will be a pre requisition for computer networks i.e., the students can easily understand the concept of computer networks.

#### UNIT- I

**Introduction To Data Communications And Networking:** Standards Organizations for Data Communications, Layered Network Architecture, Open Systems Interconnection, Data Communications Circuits, Serial and parallel Data Transmission, Data communications Circuit Arrangements, Data communications Networks, Alternate Protocol Suites.

**Signals, noise, modulation, and demodulation:** Signal Analysis, Electrical Noise and Signal-to-Noise Ratio, Analog Modulation Systems, Information Capacity, Bits, Bit Rate, Baud, and M-ary Encoding, Digital Modulation.

#### UNIT- II

**Multiplexers:** Advantage of multiplexers, Frequency division multiplexing, Time division multiplexing, Statistical Time division multiplexing, Concentrators, Switching Techniques.

**Transmission Media:** Introduction, Communication Channel- Channel Bands, Channel Services, Channel Standard Interfaces, Open wirelines, Twisted pair wires/cables, Coaxial cables, Optical fiber communication advantages and disadvantages of optical fiber communication, wireless communication-satellite and cellular radio communication, Typical broadband LANs.

#### UNIT-III

**Telephone Instruments and Signals:** The Subscriber Loop, Standard telephone Set, Basic Telephone Call Procedures, Call Progress Tones and signals, Cordless Telephones, Caller ID, Electronic Telephones, Paging systems.

**The Telephone Circuit:** The Local Subscriber Loop, Telephone Message-Channel Noise and Noise Weighting, Units of Powers Measurement, Transmission Parameters and Private-Line Circuits, Voice-Frequency Circuit Elements, Crosstalk.



**UNIT- IV**

**Cellular Telephone Systems:** First- Generation Analog Cellular Telephone, Personal Communications system, Second-Generation Cellular Telephone Systems, N-AMPS, Digital Cellular Telephone, Interim Standard, North American Cellular and PCS Summary, Global system for Mobile Communications, Personal Communications Satellite System.

**Data Communications Codes, Error Control, And Data Formats:** Data Communications Character Codes, Bar Codes, Error Control, Error Detection, Error Correction, Character Synchronization.

**UNIT- V**

**Data Communications Equipment:** Digital Service Unit and Channel Service Unit, Voice- Band Data Communication Modems, Bell Systems-Compatible Voice- Band Modems, Voice- Band Modem Block Diagram, Voice- Band Modem Classifications, Asynchronous Voice-Band Modems, Synchronous Voice-Band Modems, Modem Synchronization, ITU-T Voice-Band Modem Specifications, 56K Modems, Modem Control: The AT Command Set, Cable Modems, Probability of Error and Bit Error Rate.

**TEXT BOOKS:**

1. Introduction to Data Communications and Networking, Wayne Tomas, Pearson Education.
2. Data and Computer Communications, Gurudeep S. Hura, Mukesh singhal , CRC Press

**REFERENCE BOOKS:**

1. Data Communications and Networking, Behrouz A Forouzan, Fourth Edition.TMH.
2. Understanding Data Communications And Networks, 3<sup>rd</sup> Edition, William A Shay, B.S Publications.
3. Computer Communications and Networking Technologies, Gallow, Second Edition Thomson.
4. Computer Networking and Internet, Fred Halsll, Lingana Gouda Kulkarni, Fifth Edition, Pearson Education

**Outcomes:**

- The student will know the functioning of various ways of different communication systems. He will be in a position to practical understanding the working mechanism of telephone, satellite and other communication systems.

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**(A40508) DESIGN AND ANALYSIS OF ALGORITHMS****Objectives:**

- Learn to evaluate and compare different algorithms using worst, average and best case analysis.
- Understand the algorithm design methods such as divide and conquer, greedy method, dynamic programming, backtracking, branch and bound.
- Choose an appropriate algorithm design method for a specified application.
- Understand the differences between tractable and intractable problems and identify the basic classes, such as P, NP and NP-complete.

**UNIT- I**

Introduction: Algorithm, Pseudo code for expressing algorithms, Performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big oh notation, Omega notation, Theta notation and Little oh notation, Probabilistic analysis, Amortized complexity.

Sets and Disjoint set Union –Introduction, Union and find operations and algorithms, Connected Components and Spanning trees, Bi-connected components.

Divide and conquer: General method, applications-Binary search, Quick sort, Merge sort, Strassen's Matrix Multiplication.

**UNIT- II**

Greedy method: General method, applications-Job sequencing with dead lines, 0/1 knapsack problem, Minimum cost spanning trees-Prim's and Kruskal's algorithms, Single source shortest path problem.

**UNIT- III**

Dynamic Programming: General method, applications-Multistage graphs, Optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem, Traveling sales person problem, Reliability design.

**UNIT- IV**

Backtracking: General method, applications-8-queens problem, sum of subsets problem, graph coloring, Hamiltonian cycles.

Branch and Bound: General method, applications - Traveling sales person problem, 0/1 knapsack problem-LC Branch and Bound solution, FIFO Branch

and Bound solution.

## UNIT- V

NP-Hard and NP-Complete problems: Basic concepts, Non-deterministic algorithms, NP - Hard and NP- Complete classes, NP-Hard problems, Cook's theorem.

### TEXT BOOKS:

1. Fundamentals of Computer Algorithms, 2nd Edition, Ellis Horowitz, Satraj Sahni and S.Rajasekharan, Universities Press.
2. Design and Analysis of Algorithms, P.H.Dave and H.B.Dave, 2<sup>nd</sup> edition, Pearson Education.
3. Algorithm Design: Foundations, Analysis and Internet examples, M.T.Goodrich and R.Tomassia, John Wiley and sons.

### REFERENCE BOOKS:

1. Foundations of Algorithms, 4<sup>th</sup> edition, R.Neapolitan and K.Naimipour, Jones and Bartlett Learning.
2. Introduction to Algorithms, 3<sup>rd</sup> Edition, T.H.Cormen, C.E.Leiserson, R.L.Rivest, and C.Stein, PHI Pvt.Ltd.
3. Design and Analysis of algorithms, Aho, Ullman and Hopcroft, Pearson Education.
4. Computer Algorithms, Introduction to Design and Analysis, 3rd Edition, Sara Baase, Allen, Van Gelder, Pearson Education.
5. Introduction to the Design and Analysis of Algorithms, A.Levitin, Pearson Education.

### Outcomes:

- Ability to analyze algorithms and improve the efficiency of algorithms
- Apply different designing methods for development of algorithms to realistic problems, such as divide and conquer, greedy and etc.
- Ability to understand and estimate the performance of algorithm.

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### (A40585) JAVA PROGRAMMING LAB

#### Objectives:

- To introduce java compiler and eclipse platform
- To impart hand on experience with java programming

#### Note:

1. *Use Linux and MySQL for the Lab Experiments. Though not mandatory, encourage the use of Eclipse platform*
2. *The list suggests the minimum program set. Hence, the concerned staff is requested to add more problems to the list as needed*
- 1) Use Eclipse or Netbean platform and acquaint with the various menus. Create a test project, add a test class and run it. See how you can use auto suggestions, auto fill. Try code formatter and code refactoring like renaming variables, methods and classes. Try debug step by step with a small program of about 10 to 15 lines which contains at least one if else condition and a for loop.
- 2) Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -, \*, % operations. Add a text field to display the result. Handle any possible exceptions like divided by zero
- a) Develop an applet in Java that displays a simple message.
- b) Develop an applet in Java that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named "Compute" is clicked.
- i) Write a Java program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception. Display the exception in a message dialog box.
- ii) Write a Java program that implements a multi-thread application that has three threads. First thread generates random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of cube of the number.



- 6) Write a Java program that connects to a database using JDBC and does add, delete, modify and retrieve operations.
- 7) Write a Java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with "Stop" or "Ready" or "Go" should appear above the buttons in selected color. Initially, there is no message shown.
- 8) Write a Java program to create an abstract class named Shape that contains two integers and an empty method named printArea(). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method printArea() that prints the area of the given shape.
- 9) Suppose that a table named Table.txt is stored in a text file. The first line in the file is the header, and the remaining lines correspond to rows in the table. The elements are separated by commas. Write a java program to display the table using Labels in Grid Layout.
- 10) Write a Java program that handles all mouse events and shows the event name at the center of the window when a mouse event is fired (Use Adapter classes).
- 11) Write a Java program that loads names and phone numbers from a text file where the data is organized as one line per record and each field in a record are separated by a tab (t). It takes a name or phone number as input and prints the corresponding other value from the hash table (hint: use hash tables).
- 12) Implement the above program with database instead of a text file.
- 13) Write a Java program that takes tab separated data (one record per line) from a text file and inserts them into a database.
- 14) Write a java program that prints the meta-data of a given table

#### TEXT BOOK:

1. Java Fundamentals – A comprehensive Introduction, Herbert Schildt and Dale Skrien, TMH.

#### REFERENCE BOOKS:

1. Java for Programmers, P.J.Deitel and H.M.Deitel, Pearson education (OR) Java: How to Program P.J.Deitel and H.M.Deitel, PHI.
2. Object Oriented Programming through Java, P.Radha Krishna Universities Press.
3. Thinking in Java, Bruce Eckel, Pearson Education
4. Programming in Java, S.Malhotra and S.Choudhary, Oxford Univ Press.

#### Outcomes:

- Basics of java programming, multi-threaded programs and Exception handling
- The skills to apply OOP in Java programming in problem solving
- Ability to access data from a DB with Java programs
- Use of GUI components (Console and GUI based)

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- -/3/- 2**(A40584) DATABASE MANAGEMENT SYSTEMS LAB****Objectives:**

This lab enables the students to practice the concepts learnt in the subject DBMS by developing a database for an example company named "Roadway Travels" whose description is as follows. The student is expected to practice the designing, developing and querying a database in the context of example database "Roadway travels". Students are expected to use "Mysql" database.

**Roadway Travels**

"Roadway Travels" is in business since 1997 with several buses connecting different places in India. Its main office is located in Hyderabad.

The company wants to **computerize its operations** in the following areas:

- Reservations and Ticketing
- Cancellations

**Reservations & Cancellation:**

Reservations are directly handled by booking office. Reservations can be made 30 days in advance and tickets issued to passenger. One Passenger/person can book many tickets (to his/her family).

Cancellations are also directly handed at the booking office.

In the process of **computerization of Roadway Travels** you have to design and develop a Database which consists the data of Buses, Passengers, Tickets, and Reservation and cancellation details. You should also develop query's using SQL to retrieve the data from the database.

The above process involves many steps like 1. Analyzing the problem and identifying the Entities and Relationships, 2. E-R Model 3. Relational Model 4. Normalization 5. Creating the database 6. Querying. **Students are supposed to work on these steps week wise and finally create a complete "Database System" to Roadway Travels.** Examples are given at every experiment for guidance to students.

**Experiment 1: E-R Model**

Analyze the problem carefully and come up with the entities in it. Identify what data has to be persisted in the database. This contains the entities, attributes etc.

Identify the primary keys for all the entities. Identify the other keys like candidate keys, partial keys, if any.

Example: **Entities:**

1. BUS
2. Ticket
3. Passenger

**Relationships:**

1. Reservation
2. Cancellation

**PRIMARY KEY ATTRIBUTES:**

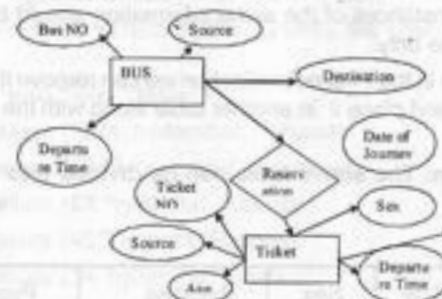
1. Ticket ID (Ticket Entity)
2. Passport ID (Passenger Entity)
3. Bus\_NO (Bus Entity)

Apart from the above mentioned entities you can identify more. The above mentioned are few.

**Note:** The student is required to submit a document by writing the Entities and Keys to the lab teacher.

**Experiment 2: Concept design with E-R Model**

Relate the entities appropriately. Apply cardinalities for each relationship. Identify strong entities and weak entities (if any). Indicate the type of relationships (total / partial). Try to incorporate generalization, aggregation, specialization etc wherever required.

**Example: E-R diagram for bus**

**Note:** The student is required to submit a document by drawing the E-R Diagram to the lab teacher.

**Experiment 3: Relational Model**

Represent all the entities (Strong, Weak) in tabular fashion. Represent relationships in a tabular fashion. There are different ways of representing



relationships as tables based on the cardinality. Represent attributes as columns in tables or as tables based on the requirement. Different types of attributes (Composite, Multi-valued, and Derived) have different way of representation.

Example: The passenger tables look as below. This is an example. You can add more attributes based on your E-R model. This is not a normalized table.

Passenger

Name	Age	Sex	Address	Ticket_id	Passport ID

**Note:** The student is required to submit a document by Represent relationships in a tabular fashion to the lab teacher.

#### Experiment 4: Normalization

Database normalization is a technique for designing relational database tables to minimize duplication of information and, in so doing, to safeguard the database against certain types of logical or structural problems, namely data anomalies. For example, when multiple instances of a given piece of information occur in a table, the possibility exists that these instances will not be kept consistent when the data within the table is updated, leading to a loss of data integrity. A table that is sufficiently normalized is less vulnerable to problems of this kind, because its structure reflects the basic assumptions for when multiple instances of the same information should be represented by a single instance only.

For the above table in the First normalization we can remove the multi valued attribute Ticket\_id and place it in another table along with the primary key of passenger.

**First Normal Form:** The above table can be divided into two tables as shown below.

Passenger

Name	Age	Sex	Address	Passport ID

Passport ID	Ticket_id

You can do the second and third normal forms if required. Any how Normalized tables are given at the end.

#### Experiment 5: Installation of Mysql and practicing DDL commands

Installation of MySQL. In this week you will learn Creating databases, How to create tables, altering the database, dropping tables and databases if not required. You will also try truncate, rename commands etc.

Example for creation of a normalized "Passenger" table.

CREATE TABLE Passenger (

Passport\_id INTEGER PRIMARY KEY,

Name VARCHAR (50) Not NULL,

Age Integer Not NULL,

Sex Char,

Address VARCHAR (50) Not NULL);

Similarly create all other tables.

**Note:** Detailed creation of tables is given at the end.

#### Experiment 6: Practicing DML commands

DML commands are used to for managing data within schema objects. Some examples:

- SELECT - retrieve data from the a database
- INSERT - insert data into a table
- UPDATE - updates existing data within a table
- DELETE - deletes all records from a table, the space for the records remain

#### Inserting values into "Bus" table:

Insert into Bus values (1234,'hyderabad', 'tirupathi');

Insert into Bus values (2345,'hyderabad','Banglore');

Insert into Bus values (23,'hyderabad','Kolkata');

Insert into Bus values (45,'Tirupathi','Banglore');

Insert into Bus values (34,'hyderabad','Chennai');

#### Inserting values into "Passenger" table:

Insert into Passenger values (1, 45,'ramesh', 45,'M','abc123');

Insert into Passenger values (2, 78,'geetha', 36,'F','abc124');

Insert into Passenger values (45, 90,'ram', 30,'M','abc12');

Insert into Passenger values (67, 89,'ravi', 50,'M','abc14');

Insert into Passenger values (56, 22,'seetha', 32,'F','abc55');

**Few more Examples of DML commands:**

Select \* from Bus; (selects all the attributes and display)

UPDATE BUS SET Bus No = 1 WHERE BUS NO=2;

**Experiment 7: Querying**

In this week you are going to practice queries (along with sub queries) using ANY, ALL, IN, Exists, NOT EXISTS, UNION, INTERSECT, Constraints etc.

**Practice the following Queries:**

1. Display unique PNR\_no of all passengers.
2. Display all the names of male passengers.
3. Display the ticket numbers and names of all the passengers.
4. Find the ticket numbers of the passengers whose name start with 'r' and ends with 'h'.
5. Find the names of passengers whose age is between 30 and 45.
6. Display all the passengers names beginning with 'A'
7. Display the sorted list of passengers names

**Experiment 8 and Experiment 9: Querying (continued...)**

You are going to practice queries using Aggregate functions (COUNT, SUM, AVG, and MAX and MIN), GROUP BY, HAVING and Creation and dropping of Views.

1. Write a Query to display the Information present in the Passenger and cancellation tables. **Hint:** Use UNION Operator.
2. Display the number of days in a week on which the 9W01 bus is available.
3. Find number of tickets booked for each PNR\_no using GROUP BY CLAUSE. **Hint:** Use GROUP BY on PNR\_No.
4. Find the distinct PNR numbers that are present.
5. Find the number of tickets booked by a passenger where the number of seats is greater than 1. **Hint:** Use GROUP BY, WHERE and HAVING CLAUSES.
6. Find the total number of cancelled seats.

**Experiment 10: Triggers**

In this week you are going to work on Triggers. Creation of insert trigger, delete trigger, update trigger. Practice triggers using the above database.

Eg: **CREATE TRIGGER updcheck BEFORE UPDATE ON passenger  
FOR EACH ROW  
BEGIN**

**IF NEW.TicketNO > 60 THEN**

**SET New.Ticket no = Ticket no;**

**ELSE**

**SET New.Ticketno = 0;**

**END IF;**

**END;**

**Experiment 11: Procedures**

In this session you are going to learn Creation of stored procedure, Execution of procedure and modification of procedure. Practice procedures using the above database.

Eg: **CREATE PROCEDURE myProc()**

**BEGIN**

**SELECT COUNT(Tickets) FROM Ticket WHERE age>=40;**

**End;**

**Experiment 12: Cursors**

In this week you need to do the following: Declare a cursor that defines a result set.

Open the cursor to establish the result set. Fetch the data into local variables as needed from the cursor, one row at a time. Close the cursor when done

**CREATE PROCEDURE myProc(in\_customer\_id INT)**

**BEGIN**

**DECLARE v\_id INT;**

**DECLARE v\_name VARCHAR(30);**

**DECLARE c1 CURSOR FOR SELECT stdId,stdFirstname FROM students WHERE stdId=in\_customer\_id;**

**OPEN c1;**

**FETCH c1 into v\_id, v\_name;**

**Close c1;**

**END;**

**Tables****BUS**

Bus No: Varchar: PK (public key)

Source : Varchar

Destination : Varchar

**Passenger**

PPNO: Varchar(15)) : PK



Name: Varchar(15)

Age : int (4)

Sex:Char(10) : Male / Female

Address: VarChar(20)

### Passenger\_Tickets

PPNO: Varchar(15)) : PK

Ticket\_No: Numeric (9)

### Reservation

PNR\_No: Numeric(9) : FK

Journey\_date : datetime(8)

No\_of\_seats : int (8)

Address : Varchar (50)

Contact\_No: Numeric (9) → Should not be less than 9 and Should not accept any other character other than Integer

Status: Char (2) : Yes / No

### Cancellation

PNR\_No: Numeric(9) : FK

Journey\_date : datetime(8)

No\_of\_seats : int (8)

Address : Varchar (50)

Contact\_No: Numeric (9) → Should not be less than 9 and Should not accept any other character other than Integer

Status: Char (2) : Yes / No

### Ticket

Ticket\_No: Numeric (9): PK

Journey\_date : datetime(8)

Age : int (4)

Sex:Char(10) : Male / Female

Source : Varchar

Destination : Varchar

Dep\_time : Varchar

### REFERENCE BOOKS:

1. Introduction to SQL, Rick F.Vander Lans, Pearson education.
2. Oracle PL/SQL, B.Rosenzweig and E.Silvestrova, Pearson education.
3. Oracle PL/SQL Programming,Steven Feuerstein,SPD.

4. SQL & PL/SQL for Oracle 10g,Black Book, Dr.P.S.Deshpande, Dream Tech.
5. Oracle Database 11g PL/SQL Programming, M.Mc Laughlin, TMH.
6. SQL Fundamentals, J.J.Patrick, Pearson Education.

### Outcomes:

- Ability to design and implement a database schema for given problem.
- Be capable to Design and build a GUI application.
- Apply the normalization techniques for development of application software to realistic problems.
- Ability to formulate queries using SQL DML/DDDL/DCL commands



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## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

(Established by Andhra Pradesh Act No.30 of 2008)

Kukatpally, Hyderabad – 500 085, Andhra Pradesh (India)

### B. TECH. INFORMATION TECHNOLOGY /COMPUTER SCIENCE AND TECHNOLOGY

#### III YEAR I SEMESTER

Code	Subject	L	T/P/D	C
	Automata and Compiler Design	4	-	4
	Linux Programming	4	-	4
	Software Engineering	4	-	4
	Operating Systems	4	-	4
	Computer Networks	4	-	4
	Managerial Economics and Financial Analysis	4	-	4
	Operating Systems Lab	-	3	2
	Computer Networks Lab (Through Linux)	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>



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L	T/P/D	C
4	-/-	4

**(A50513) AUTOMATA AND COMPILER DESIGN****Objectives:**

Automata and compiler Design mainly deals with the languages which are formal and regular and also deals with grammar present in the machine. A compiler is a program that accepts a program in source language and converts it into a machine understandable format. The push down automata is the major one it's a five tuple set containing states, alphabets, transition function and accept states

**UNIT-I**

**Formal Language and Regular Expressions:** Languages, Definition Languages regular expressions, Finite Automata – DFA, NFA. Conversion of regular expression to NFA, NFA to DFA. Applications of Finite Automata to lexical analysis, lex tools.

**Context Free grammars and parsing :** Context free grammars, derivation, parse trees, ambiguity LL(K) grammars and LL(1) parsing

**UNIT-II**

Bottom up parsing handle pruning LR Grammar Parsing, LALR parsing, parsing ambiguous grammars, YACC programming specification.

**Semantics :** Syntax directed translation, S-attributed and L-attributed grammars, Intermediate code – abstract syntax tree, translation of simple statements and control flow statements.

**UNIT-III**

Context Sensitive features – Chomsky hierarchy of languages and recognizers. Type checking, type conversions, equivalence of type expressions, overloading of functions and operations.

**UNIT-IV**

**Run time storage:** Storage organization, storage allocation strategies scope access to now local names, parameters, language facilities for dynamics storage allocation.

**Code optimization:** Principal sources of optimization, optimization of basic blocks, peephole optimization, flow graphs, Data flow analysis of flow graphs.

**UNIT-V**

**Code generation:** Machine dependent code generation, object code forms, generic code generation algorithm, Register allocation and assignment. Using DAG representation of Block.

**TEXT BOOKS:**

1. Introduction to Theory of computation. Sipser, 2nd Edition, Thomson.
2. Compilers Principles, Techniques and Tools Aho, Ullman, Ravisethi, Pearson Education.

**REFERENCES:**

1. Modern Compiler Construction in C , Andrew W.Appel Cambridge University Press.
2. Compiler Construction, LOUDEN, Cengage Learning.
3. Elements of Compiler Design, A.Meduna, Auerbach Publications, Taylor and Francis Group.
4. Principles of Compiler Design, V.Raghavan, TMH.
5. Engineering a Compiler, K.D.Cooper, L.Torczon, ELSEVIER.
6. Introduction to Formal Languages and Automata Theory and Computation – Kamala Krithivasan and Rama R, Pearson.
7. Modern Compiler Design, D.Grune and others,Wiley-India.
8. A Text book on Automata Theory, S.F.B.Nasir, P.K.Srimani, Cambridge Univ. Press.
9. Automata and Languages, A.Meduna, Springer.

**Outcomes:**

- o Graduate should be able to understand the concept of abstract machines and their power to recognize the languages.
- o Attains the knowledge of language classes & grammars relationship among them with the help of Chomsky hierarchy.
- o Ability to understand the design of a compiler given features of the languages.
- o Ability to implement practical aspects of automata theory.
- o Gain Knowledge of powerful compiler generation tools.

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**(A50517) LINUX PROGRAMMING****Objectives:**

- To understand and make effective use of Linux utilities and Shell scripting language (bash) to solve Problems.
- To implement in C some standard Linux utilities such as ls, mv, cp etc. using system calls.
- To develop the skills necessary for systems programming including file system programming, process and signal management, and interprocess communication.
- To develop the basic skills required to write network programs using Sockets.

**UNIT- I**

Linux Utilities-File handling utilities, Security by file permissions, Process utilities, Disk utilities, Networking commands, Filters, Text processing utilities and Backup utilities.

Sed-Scripts, Operation, Addresses, Commands, , awk-Execution, Fields and Records,

Scripts, Operation, Patterns, Actions, Associative Arrays, String and Mathematical functions, System commands in awk, Applications.

Shell programming with Bourne again shell(bash)- Introduction, shell responsibilities, pipes and 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-II**

Files and Directories- File Concept, File types, File System Structure, file metadata-Inodes, kernel support for files, system calls for file I/O operations-open, create, read, write, close, lseek, dup2, file status information-stat family, file and record locking- fcntl function, file permissions - chmod, fchmod, file ownership-chown, lchown, fchown, links-soft links and hard links - symlink, link, unlink.

Directories-Creating, removing and changing Directories-mkdir, rmdir, chdir, obtaining current working directory-getcwd, Directory contents, Scanning Directories-opendir, readdir, closedir, rewinddir functions.

**UNIT- III**

Process – Process concept, Layout of a C program image in main memory, Process environment-environment list, environment variables, getenv, setenv, Kernel support for process, process identification, process control - process creation, replacing a process image, waiting for a process, process termination, zombie process, orphan process, system call interface for process management-fork, vfork, exit, wait, waitpid, exec family, Process Groups, Sessions and Controlling Terminal, Differences between threads and processes.

Signals – Introduction to signals, Signal generation and handling, Kernel support for signals, Signal function, unreliable signals, reliable signals, kill, raise , alarm, pause, abort, sleep functions.

**UNIT IV**

Interprocess Communication - Introduction to IPC, IPC between processes on a single computer system, IPC between processes on different systems, pipes-creation, IPC between related processes using unnamed pipes, FIFOs-creation, IPC between unrelated processes using FIFOs(Named pipes), differences between unnamed and named pipes, popen and pclose library functions.

Message Queues- Kernel support for messages, APIs for message queues, client/server example.

Semaphores-Kernel support for semaphores, APIs for semaphores, file locking with semaphores.

**UNIT- V**

Shared Memory- Kernel support for shared memory, APIs for shared memory, shared memory example.

Sockets-Introduction to Berkeley Sockets, IPC over a network, Client-Server model, Socket address structures (Unix domain and Internet domain),Socket system calls for connection oriented protocol and connectionless protocol, example-client/server programs-Single Server-Client connection, Multiple simultaneous clients, Socket options-setsockopt and fcntl system calls, Comparison of IPC mechanisms.

**TEXT BOOKS:**

1. Unix System Programming using C++, T.Chan, PHI.
2. Unix Concepts and Applications, 4th Edition, Sumitabha Das, TMH.
3. Unix Network Programming,W.R.Stevens,PHI.

**REFERENCE BOOKS:**

1. Beginning Linux Programming, 4<sup>th</sup> Edition, N.Matthew, R.Stones,Wrox, Wiley India Edition.



2. Unix for programmers and users, 3<sup>rd</sup> Edition, Graham Glass, King Able, Pearson.
3. System Programming with C and Unix, A.Hoover, Pearson.
4. Unix System Programming, Communication, Concurrency and Threads, K.A.Robbins and S.Robbins, Pearson Education.
5. Unix shell Programming, S.G.Kochan and P.Wood, 3<sup>rd</sup> edition, Pearson Education.
6. Shell Scripting, S.Parker, Wiley India Pvt. Ltd.
7. Advanced Programming in the Unix Environment, 2<sup>nd</sup> edition, W.R.Stevens and S.A.Rago, Pearson Education.
8. Unix and Shell programming, B.A.Forouzan and R.F.Gilberg, Cengage Learning.
9. Linux System Programming, Robert Love, O'Reilly, SPD.
10. C Programming Language, Kernighan and Ritchie, PHI

**Outcomes:**

- Work confidently in Linux environment.
- Work with shell script to automate different tasks as Linux administration.

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**(A50518) SOFTWARE ENGINEERING****Objectives:**

- To understanding of software process models such as waterfall and evolutionary models.
- To understanding of software requirements and SRS document.
- To understanding of different software architectural styles.
- To understanding of software testing approaches such as unit testing and integration testing.
- To understanding on quality control and how to ensure good quality software.

**UNIT- I**

Introduction to Software Engineering: The evolving role of software, Changing Nature of Software, legacy software, Software myths.

A Generic view of process: Software engineering- A layered technology, a process framework, The Capability Maturity Model Integration (CMMI), Process patterns, process assessment, personal and team process models.

Process models: The waterfall model, Incremental process models, Evolutionary process models, Specialized process models, The Unified process.

**UNIT- II**

Software Requirements: Functional and non-functional requirements, User requirements, System requirements, Interface specification, the software requirements document.

Requirements engineering process: Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management.

System models: Context Models, Behavioural models, Data models, Object models, structured methods.

**UNIT- III**

Design Engineering: Design process and Design quality, Design concepts, the design model, pattern based software design.

Creating an architectural design: software architecture, Data design, Architectural styles and patterns, Architectural Design, assessing alternative architectural designs, mapping data flow into a software architecture.

Modelling component-level design : Designing class-based components, conducting component-level design, Object constraint language, designing conventional components.

Performing User interface design: Golden rules, User interface analysis and design, interface analysis, interface design steps, Design evaluation.

#### UNIT- IV

Testing Strategies: A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing, the art of Debugging.

Product metrics: Software Quality, Frame work for Product metrics, Metrics for Analysis Model, Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance.

Metrics for Process and Products: Software Measurement, Metrics for software quality.

#### UNIT- V

Risk management: Reactive vs Proactive Risk strategies, software risks, Risk identification, Risk projection, Risk refinement, RMMM, RMMM Plan.

Quality Management: Quality concepts, Software quality assurance, Software Reviews, Formal technical reviews, Statistical Software quality Assurance, Software reliability, The ISO 9000 quality standards.

#### TEXT BOOKS:

1. Software Engineering, A practitioner's Approach, Roger S Pressman, sixth edition. McGrawHill International Edition.
2. Software Engineering, Ian Sommerville, seventh edition, Pearson education.

#### REFERENCE BOOKS:

1. Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India, 2010.
2. Software Engineering : A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008
3. Fundamentals of Software Engineering, Rajib Mall, PHI, 2005
4. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.
5. Software Engineering1: Abstraction and modeling, Diner Bjorner, Springer International edition, 2006.
6. Software Engineering2: Specification of systems and languages, Diner Bjorner, Springer International edition , 2006.
7. Software Engineering Foundations, Yingxu Wang, Auerbach

Publications, 2008.

8. Software Engineering Principles and Practice, Hans Van Vliet, 3<sup>rd</sup> edition, John Wiley & Sons Ltd.
9. Software Engineering 3: Domains, Requirements, and Software Design, D. Bjorner, Springer International Edition.
10. Introduction to Software Engineering, R.J. Leach, CRC Press.

#### Outcomes:

- Ability to identify the minimum requirements for the development of application.
- Ability to develop, maintain, efficient, reliable and cost effective software solutions
- Ability to critically thinking and evaluate assumptions and arguments.



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**(A50510) OPERATING SYSTEMS****Objectives:**

- To understand main components of OS and their working
- To study the operations performed by OS as a resource manager
- To understand the scheduling policies of OS
- To understand the different memory management techniques
- To understand process concurrency and synchronization
- To understand the concepts of input/output, storage and file management
- To study different OS and compare their features

**UNIT- I**

Operating System Introduction: Operating Systems objectives and functions, Computer System Architecture, OS Structure, OS Operations, Evolution of Operating Systems - Simple Batch, Multi programmed, time-shared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems, Special - Purpose Systems, Operating System services, User OS Interface, System Calls, Types of System Calls, System Programs, Operating System Design and Implementation, OS Structure, Virtual Machines.

**UNIT- II**

Process and CPU Scheduling - Process concepts-The Process, Process State, Process Control Block, Threads, Process Scheduling-Scheduling Queues, Schedulers, Context Switch, Pre-emptive Scheduling, Dispatcher, Scheduling Criteria, Scheduling algorithms, Multiple-Processor Scheduling, Real-Time Scheduling, Thread scheduling, Case studies: Linux, Windows.

Process Coordination - Process Synchronization, The Critical Section Problem, Peterson's solution, Synchronization Hardware, Semaphores, and Classic Problems of Synchronization, Monitors.

**UNIT- III**

Memory Management and Virtual Memory - Logical & Physical Address Space, Swapping, Contiguous Allocation, Paging, Structure of Page Table, Segmentation, Segmentation with Paging, Virtual Memory, Demand Paging, Performance of Demanding Paging, Page Replacement Page Replacement Algorithms, Allocation of Frames, Thrashing.

**UNIT- IV**

File System Interface - The Concept of a File, Access methods, Directory

Structure, File System Mounting, File Sharing, Protection, File System Structure, File System Implementation, Allocation methods, Free-space Management, Directory Implementation, Efficiency and Performance.

Mass Storage Structure - Overview of Mass Storage Structure, Disk Structure, Disk Attachment, Disk Scheduling, Disk Management, Swap space Management

**UNIT- V**

Deadlocks - System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection and Recovery from Deadlock.

Protection - System Protection, Goals of Protection, Principles of Protection, Domain of Protection, Access Matrix, Implementation of Access Matrix, Access Control, Revocation of Access Rights, Capability-Based Systems, Language-Based Protection.

**TEXT BOOKS:**

1. Operating System Principles , Abraham Silberchatz, Peter B. Galvin, Greg Gagne, 8th Edition, Wiley Student Edition
2. Operating Systems - Internals and Design Principles, W. Stallings, 6th Edition, Pearson.

**REFERENCE BOOKS:**

1. Modern Operating Systems, Andrew S Tanenbaum, 3rd Edition, PHI
2. Operating Systems A concept-based Approach, 2nd Edition, D.M.Dhamdhare, TMH.
3. Principles of Operating Systems , B.L.Stuart, Cengage learning, India Edition.
4. Operating Systems, A.S.Godbole, 2nd Edition, TMH
5. An Introduction to Operating Systems, P.C.P. Bhatt, PHI.
6. Operating Systems, S.Haldar and A.A.Aravind, Pearson Education.
7. Operating Systems, R.Elmasri, A.G.Carrick and D.Levine, Mc Graw Hill.
8. Operating Systems in depth, T.W. Doeppner, Wiley.

**Outcomes:**

- Apply different techniques for the improvement of system performance.
- Ability to understand the synchronous and asynchronous communication mechanisms in their respective OS.
- Learn about minimization of turnaround time, waiting time and response time and also maximization of throughput with keeping CPU as busy as possible.
- Ability to compare the different OS

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**(A50515) COMPUTER NETWORKS****Objectives:**

- To introduce the fundamental various types of computer networks.
- To demonstrate the TCP/IP and OSI models with merits and demerits.
- To explore the various layers of OSI Model.
- To introduce UDP and TCP Models.

**UNIT-I**

Overview of the Internet: Protocol, Layering Scenario, TCP/IP Protocol Suite: The OSI Model, Internet history standards and administration; Comparison of the OSI and TCP/IP reference model.

**Physical Layer:** Guided transmission media, wireless transmission media.

**Data Link Layer** – design issues, CRC Codes, Elementary Data link Layer protocols, sliding window protocol

**UNIT-II**

Multiple Access Protocols –ALOHA, CSMA, Collision free protocols, Ethernet- Physical Layer, Ethernet Mac Sub layer, data link layer switching & use of bridges, learning bridges, spanning tree bridges, repeaters, hubs, bridges, switches, routers and gateways.

**UNIT-III**

**Network Layer:** Network Layer Design issues, store and forward packet switching connection less and connection oriented networks-routing algorithms-optimality principle, shortest path, flooding, Distance Vector Routing, Count to Infinity Problem, Hierarchical Routing, Congestion control algorithms, admission control.

**UNIT-IV**

Internetworking: Tunneling, Internetwork Routing, Packet fragmentation, IPv4, Ipv6 Protocol, IP addresses, CIDR, ICMP, ARP, RARP, DHCP.

**Transport Layer:** Services provided to the upper layers elements of transport protocol-addressing connection establishment, connection release, Connection Release, Crash Recovery.

**UNIT-V**

The Internet Transport Protocols UDP-RPC, Real Time Transport Protocols, The Internet Transport Protocols- Introduction to TCP, The TCP Service Model, The TCP Segment Header, The Connection Establishment, The TCP

Connection Release, The TCP Connection Management Modeling, The TCP Sliding Window, The TCP Congestion Control, The future of TCP.

Application Layer-Introduction, providing services, Applications layer paradigms, Client server model, Standard client-server application-HTTP, FTP, electronic mail, TELNET, DNS, SSH

**TEXT BOOKS:**

1. Data Communications and Networking – Behrouz A. Forouzan, Fifth Edition TMH, 2013.
2. Computer Networks — Andrew S Tanenbaum, 4th Edition, Pearson Education.

**REFERENCE BOOKS:**

1. An Engineering Approach to Computer Networks-S.Keshav, 2nd Edition, Pearson Education.
2. Understanding communications and Networks, 3rd Edition, W.A.Shay, Cengage Learning.
3. Introduction to Computer Networks and Cyber Security, Chwan-Hwa (John) Wu, J. David Irwin, CRC Press.
4. Computer Networks, L.L.Peterson and B.S.Davie, 4<sup>th</sup> edition, ELSEVIER.
5. Computer Networking: A Top-Down Approach Featuring the Internet, James F.Kurose,K.W.Ross,3<sup>rd</sup> Edition, Pearson Education.

**Outcomes:**

- Students should be understand and explore the basics of Computer Networks and Various Protocols. He/She will be in a position to understand the World Wide Web concepts.
- Students will be in a position to administrate a network and flow of information further he/she can understand easily the concepts of network security, Mobile and ad hoc networks.



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**(A50010) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS****Objectives:**

To enable the student to understand and appreciate, with a practical insight, the importance of certain basic issues governing the business operations namely: demand and supply, production function, cost analysis, markets, forms of business organisations, capital budgeting and financial accounting and financial analysis.

**Unit I :**

**Introduction & Demand Analysis:** Definition, Nature and Scope of Managerial Economics. Demand Analysis: Demand Determinants, Law of Demand and its exceptions. *Elasticity of Demand:* Definition, Types, Measurement and Significance of Elasticity of Demand. *Demand Forecasting:* Factors governing demand forecasting, methods of demand forecasting.

**Unit II :**

**Production & Cost Analysis:** *Production Function* – Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale. *Cost Analysis:* Cost concepts, Break-even Analysis (BEA)-Determination of Break-Even Point (simple problems) - Managerial Significance.

**Unit III :**

**Markets & New Economic Environment:** Types of competition and Markets, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly. *Pricing:* Objectives and Policies of Pricing. Methods of Pricing. *Business:* Features and evaluation of different forms of Business Organisation: Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types, *New Economic Environment:* Changing Business Environment in Post-liberalization scenario.

**Unit IV :**

**Capital Budgeting:** Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising capital - Trading Forecast, Capital Budget, Cash Budget. Capital Budgeting: features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (simple problems).

**Unit V :**

**Introduction to Financial Accounting & Financial Analysis:** Accounting concepts and Conventions - Introduction IFRS - Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments). *Financial Analysis:* Analysis and Interpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability ratios. Du Pont Chart.

**TEXT BOOK:**

1. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2009.
2. S.A. Siddiqui & A.S. Siddiqui, Managerial Economics and Financial Analysis, New Age international Publishers, Hyderabad 2013.
3. M. Kasi Reddy & Saraswathi, Managerial Economics and Financial Analysis, PHI New Delhi, 2012.

**REFERENCES:**

1. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi.2012.
2. H. Craig Peterson & W. Cris Lewis, Managerial Economics, Pearson, 2012.
3. Lipsey & Chrystel, Economics, Oxford University Press, 2012
4. Domnick Salvatore: Managerial Economics in a Global Economy, Thomson, 2012.
5. Narayanaswamy: Financial Accounting—A Managerial Perspective, Pearson, 2012.
6. S.N.Maheswari & S.K. Maheswari, Financial Accounting, Vikas, 2012.
7. Truet and Truet: Managerial Economics: Analysis, Problems and Cases, Wiley, 2012.
8. Dwivedi: Managerial Economics, Vikas, 2012.
9. Shailaja & Usha : MEFA, University Press, 2012.
10. Aryasri: Managerial Economics and Financial Analysis, TMH, 2012.
11. Vijay Kumar & Appa Rao, Managerial Economics & Financial Analysis, Cengage 2011.
12. J. V. Prabhakar Rao & P.V. Rao, Managerial Economics & Financial Analysis, Maruthi Publishers, 2011.

**Outcomes:**

At the end of the course, the student will

- Understanding the market dynamics namely, demand and supply, demand forecasting , elasticity of demand and supply, pricing methods and pricing in different market structures.

- Gain an insight into how production function is carried out to achieve least cost combination of inputs and cost analysis
- Develop an understanding of
- Analyse how capital budgeting decisions are carried out
- Understand the framework for both manual and computerised accounting process
- Know how to analyse and interpret the financial statements through ratio analysis.

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### (A50589) OPERATING SYSTEMS LAB

#### Objectives:

- To use Linux operating system for study of operating system concepts.
- To write the code to implement and modify various concepts in operating systems using Linux.

#### List of Programs:

1. Simulate the following CPU scheduling algorithms  
a) Round Robin b) SJF c) FCFS d) Priority
2. Simulate all file allocation strategies  
a) Sequential b) Indexed c) Linked
3. Simulate MVT and MFT
4. Simulate all File Organization Techniques  
a) Single level directory b) Two level c) Hierarchical d) DAG
5. Simulate Bankers Algorithm for Dead Lock Avoidance
6. Simulate Bankers Algorithm for Dead Lock Prevention
7. Simulate all page replacement algorithms  
a) FIFO b) LRU c) LFU etc. ...
8. Simulate Paging Technique of memory management.

#### Outcomes:

- The course objectives ensure the development of students applied skills in operating systems related areas.
- Students will gain knowledge in writing software routines, modules for implementing various concepts of operating systems.



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III Year B.Tech. IT/CST-I Sem

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## (A50588) COMPUTER NETWORKS LAB (THROUGH LINUX)

### Objectives:

- To Understand the functionalities of various layers of OSI model
- To understand the operating System functionalities

### System/ Software Requirement

- Intel based desktop PCs LAN CONNECTED with minimum of 166 MHZ or faster processor with atleast 64 MB RAM and 100 MB free disk space

### Computer Networks Lab:

1. Implement the data link layer framing methods such as character, character stuffing and bit stuffing.
2. Implement on a data set of characters the three CRC polynomials – CRC 12, CRC 16 and CRC CCIP .
3. Implement Dijkstra's algorithm to compute the Shortest path thru a graph.
4. Take an example subnet graph with weights indicating delay between nodes. Now obtain Routing table at each node using distance vector routing algorithm
5. Take an example subnet of hosts. Obtain broadcast tree for it.
6. Take a 64 bit playing text and encrypt the same using DES algorithm.
7. Write a program to break the above DES coding
8. Using RSA algorithm Encrypt a text data and Decrypt the same.

### Outcomes:

Ability to understand the encryption and decryption concepts in Linux environment

Ability to apply appropriate algorithm for the finding of shortest route.

Ability to configure the routing

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD  
 (Established by Andhra Pradesh Act No.30 of 2008)  
 Kukatpally, Hyderabad – 500 085, TELANGANA (India)

**ADD-ON COURSE STRUCTURE FOR III AND IV YEARS EFFECTIVE AFTER OCTOBER 2015**  
**B. TECH. INFORMATION TECHNOLOGY /COMPUTER SCIENCE AND TECHNOLOGY**

**III YEAR II SEMESTER**

Code	Subject	L	T/P/D	C
	Web Technologies	4	-	4
	<b>OPEN ELECTIVE</b>	4	-	4
	Human Values and Professional Ethics			
	Intellectual Property Rights			
	Disaster Management			
	<i>Introduction to Analytics (Associate Analytics-I)</i>			
	<i>Information Security Management (Security Analyst-I)</i>			
	Object Oriented Analysis and Design	4	-	4
	Data Warehousing and Data Mining	4	-	4
	Software Testing Methodologies	4	-	4
	Cloud Computing	4	-	4
	Data Mining and Web Technologies Lab	-	3	2
	Advanced Communication Skills Lab	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>

**Note :**

**1) Qualification pack for ASSOCIATE ANALYTICS includes the following three subjects**

1. Introduction to Analytics
2. Big Data Analytics
3. Predictive Analytics

**2) Qualification pack for SECURITY ANALYST includes the following three subjects**

1. Information Security Management
2. Information Security Assessments & Audits
3. Information Security Incident Response & Management

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**(A60512) WEB TECHNOLOGIES****Objectives:**

- To introduce PHP language for server side scripting
- To introduce XML and processing of XML Data with Java
- To introduce Server side programming with Java Servlets and JSP
- To introduce Client side scripting with Javascript and AJAX.

**UNIT- I**

**Introduction to PHP:** Declaring variables, data types, arrays, strings, operators, expressions, control structures, functions, Reading data from web form controls like text boxes, radio buttons, lists etc., Handling File Uploads, Connecting to database (MySQL as reference), executing simple queries, handling results, Handling sessions and cookies

**File Handling in PHP:** File operations like opening, closing, reading, writing, appending, deleting etc. on text and binary files, listing directories

**UNIT- II**

**XML:** Introduction to XML, Defining XML tags, their attributes and values, Document Type Definition, XML Schemas, Document Object Model, XHTML

**Parsing XML Data - DOM and SAX Parsers in java.**

**UNIT- III**

**Introduction to Servlets:** Common Gateway Interface (CGI), Lifecycle of a Servlet, deploying a servlet, The Servlet API, Reading Servlet parameters, Reading Initialization parameters, Handling Http Request & Responses, Using Cookies and Sessions, connecting to a database using JDBC.

**UNIT- IV**

**Introduction to JSP:** The Anatomy of a JSP Page, JSP Processing, Declarations, Directives, Expressions, Code Snippets, implicit objects, Using Beans in JSP Pages, Using Cookies and session for session tracking, connecting to database in JSP.

**UNIT- V**

**Client side Scripting:** Introduction to Javascript: Javascript language - declaring variables, scope of variables, functions, event handlers (onclick, onsubmit etc.), Document Object Model, Form validation.

Simple AJAX application.



**TEXT BOOKS:**

1. Web Technologies, Uttam K Roy, Oxford University Press
2. The Complete Reference PHP – Steven Holzner, Tata McGraw-Hill

**REFERENCE BOOKS:**

1. Web Programming, building internet applications, Chris Bates 2<sup>nd</sup> edition, Wiley Dreamtech
2. Java Server Pages –Hans Bergsten, SPD O'Reilly
3. Java Script, D.Flanagan, O'Reilly,SPD.
4. Beginning Web Programming-Jon Duckett WROX.
5. Programming world wide web, R.W.Sebesta, Fourth Edition, Pearson.
6. Internet and World Wide Web – How to program, Dietel and Nieto, Pearson.

**Outcomes:**

- gain knowledge of client side scripting, validation of forms and AJAX programming
- have understanding of server side scripting with PHP language
- have understanding of what is XML and how to parse and use XML Data with Java
- To introduce Server side programming with Java Servlets and JSP

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**(A60018) HUMAN VALUES AND PROFESSIONAL ETHICS****(Open Elective)****Objectives :** This introductory course input is intended

- a. To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
- b. To facilitate the development of a Holistic perspective among students towards life, profession and happiness, based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of Value based living in a natural way.
- c. To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually satisfying human behavior and mutually enriching interaction with Nature.

**Unit I:**

Course Introduction - Need, Basic Guidelines, Content and Process for Value Education: Understanding the need, basic guidelines, content and process for Value Education. Self Exploration-what is it? - its content and process; 'Natural Acceptance' and Experiential Validation- as the mechanism for self exploration. Continuous Happiness and Prosperity- A look at basic Human Aspirations. Right understanding, Relationship and Physical Facilities- the basic requirements for fulfillment of aspirations of every human being with their correct priority. Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario. Method to fulfill the above human aspirations: understanding and living in harmony at various levels.

**Unit II:**

Understanding Harmony in the Human Being - Harmony in Myself! : Understanding human being as a co-existence of the sentient 'I' and the material 'Body'. Understanding the needs of Self ('I') and 'Body' - Sukh and Suvridha. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer). Understanding the characteristics and activities of 'I' and harmony in 'I'. Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail. Programs to ensure Sanyam and Swasthya.

**Unit III:**

Understanding Harmony in the Family and Society- Harmony in Human -

**Human Relationship :** Understanding harmony in the Family- the basic unit of human interaction. Understanding values in human-human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; **Trust (Vishwas) and Respect (Samman) as the foundational values of relationship.** Understanding the meaning of Vishwas; Difference between intention and competence. Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship. Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astitva as comprehensive Human Goals. Visualizing a universal harmonious order in society- Undivided Society (Akhand Samaj), Universal Order (Sarvabhaum Vyawastha) - from family to world family!

#### Unit IV:

**Understanding Harmony in the Nature and Existence - Whole existence as Co-existence :** Understanding the harmony in the Nature, Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature. Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all-pervasive space. Holistic perception of harmony at all levels of existence.

#### Unit V:

**Implications of the above Holistic Understanding of Harmony on Professional Ethics :** Natural acceptance of human values. Definitiveness of Ethical Human Conduct. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order. Competence in professional ethics:

- Ability to utilize the professional competence for augmenting universal human order,
- Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems,
- Ability to identify and develop appropriate technologies and management patterns for above production systems.

**Case studies of typical holistic technologies, management models and production systems. Strategy for transition from the present state to Universal Human Order:**

- At the level of individual: as socially and ecologically responsible engineers, technologists and managers
- At the level of society: as mutually enriching institutions and organizations

#### TEXT BOOKS

- R R Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics.

- Prof. KV Subba Raju, 2013, Success Secrets for Engineering Students, Smart Student Publications, 3<sup>rd</sup> Edition.

#### REFERENCE BOOKS

- Ivan Illich, 1974, Energy & Equity, The Trinity Press, Worcester, and HarperCollins, USA
- E.F. Schumacher, 1973, Small is Beautiful: a study of economics as if people mattered, Blond & Briggs, Britain.
- A Nagraj, 1998, Jeevan Vidya ek Parichay, Divya Path Sansthan, Amarkantak.
- Sussan George, 1976, How the Other Half Dies, Penguin Press, Reprinted 1986, 1991
- PL Dhar, RR Gaur, 1990, Science and Humanism, Commonwealth Publishers.
- A.N. Tripathy, 2003, Human Values, New Age International Publishers.
- Subhas Palekar, 2000, How to practice Natural Farming, Pracheen(Vaidik) Krishi Tantra Shodh, Amravati.
- Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth – Club of Rome's report, Universe Books.
- E G Seebauer & Robert L. Berry, 2000, Fundamentals of Ethics for Scientists & Engineers, Oxford University Press
- M Govindrajran, S Natrajan & V.S. Senthil Kumar, Engineering Ethics (including Human Values), Eastern Economy Edition, Prentice Hall of India Ltd.

#### Relevant CDs, Movies, Documentaries & Other Literature:

- Value Education website, <http://www.uptu.ac.in>
- Story of Stuff, <http://www.storyofstuff.com>
- Al Gore, An Inconvenient Truth, Paramount Classics, USA
- Charlie Chaplin, Modern Times, United Artists, USA
- IIT Delhi, Modern Technology – the Untold Story



## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

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**INTRODUCTION TO ANALYTICS (ASSOCIATE ANALYTICS – I)**  
(Special Elective)

**Objectives:**

- To introduce the terminology, technology and its applications
- To introduce the concept of Analytics for Business
- To introduce the tools, technologies & programming languages which is used in day to day analytics cycle

**Unit I****Introduction to Analytics and R programming (NOS 2101):**

Introduction to R, RStudio (GUI): R Windows Environment, introduction to various data types, Numeric, Character, date, data frame, array, matrix etc., Reading Datasets, Working with different file types .txt, .csv etc. Outliers, Combining Datasets, R Functions and loops.

**Manage your work to meet requirements (NOS 9001):**

Understanding Learning objectives, Introduction to work & meeting requirements, Time Management, Work management & prioritization, Quality & Standards Adherence,

**Unit II****Summarizing Data & Revisiting Probability (NOS 2101):**

Summary Statistics - Summarizing data with R, Probability, Expected, Random, Bivariate Random variables, Probability distribution, Central Limit Theorem etc.

**Work effectively with Colleagues (NOS 9002):**

Introduction to work effectively, Team Work, Professionalism, Effective Communication skills, etc.

**Unit III****SQL using R:**

Introduction to NoSQL, Connecting R to NoSQL databases. Excel and R integration with R connector.

**Unit IV****Correlation and Regression Analysis (NOS 9001):**

Regression Analysis, Assumptions of OLS Regression, Regression Modelling, Correlation, ANOVA, Forecasting, Heteroscedasticity, Autocorrelation, Introduction to Multiple Regression etc.

**Unit V****Understand the Verticals - Engineering, Financial and others (NOS 9002):**

Understanding systems viz. Engineering Design, Manufacturing, Smart Utilities, Production lines, Automotive, Technology etc.

Understanding Business problems related to various businesses

**Requirements Gathering**

Gathering all the data related to Business objective

**TEXT BOOK:**

1. Student's Handbook for Associate Analytics.

**REFERENCE BOOKS:**

6. Introduction to Probability and Statistics Using R, ISBN: 978-0-557-24979-4, is a textbook written for an undergraduate course in probability and statistics.
7. An Introduction to R, by Venables and Ripley and the R Development Core Team. This may be downloaded for free from the R Project website (<http://www.r-project.org/>, see Manuals). There are plenty of other free references available from the R Project website.
8. Montgomery, Douglas C., and George C. Runger, Applied statistics and probability for engineers. John Wiley & Sons, 2010
9. The Basic Concepts of Time Series Analysis <http://anson.ucdavis.edu/~azari/sta137/AuNotes.pdf>
10. Time Series Analysis and Mining with R, Yanchang Zhao.

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**INFORMATION SECURITY MANAGEMENT (SECURITY ANALYST – I)**  
(Special Elective)

**Objectives:**

- To introduce the terminology, technology and its applications
- To introduce the concept of Security Analyst
- To introduce the tools, technologies & programming languages which is used in day to day security analyst job role.

**Unit I****Information Security Management:**

Information Security Overview, Threats and Attack Vectors, Types of Attacks, Common Vulnerabilities and Exposures (CVE), Security Attacks, Fundamentals of Information Security, Computer Security Concerns, Information Security Measures etc.

**Manage your work to meet requirements (NOS 9001).**

**Unit II****Fundamentals of Information Security:**

Key Elements of Networks, Logical Elements of Network, Critical Information Characteristics, Information States etc.

**Work effectively with Colleagues (NOS 9002).**

**Unit III****Data Leakage:**

What is Data Leakage and statistics, Data Leakage Threats, Reducing the Risk of Data Loss, Key Performance Indicators (KPI), Database Security etc.

**Unit IV****Information Security Policies, Procedures and Audits:**

Information Security Policies-necessity-key elements & characteristics, Security Policy Implementation, Configuration, Security Standards-Guidelines & Frameworks etc.

**Unit V****Information Security Management – Roles and Responsibilities:**

Security Roles & Responsibilities, Accountability, Roles and Responsibilities of Information Security Management, team-responding to emergency situation-risk analysis process etc.

**TEXT BOOK:**

1. Management of Information Security by Michael E. Whitman and Herbert J. Mattord

**REFERENCES:**

1. <http://www.iso.org/iso/home/standards/management-standards/iso27001.htm>
2. <http://csrc.nist.gov/publications/nistpubs/800-55-Rev1/SP800-55-rev1.pdf>



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**(A60017) INTELLECTUAL PROPERTY RIGHTS****(Open Elective)****UNIT – I**

Introduction to Intellectual property: Introduction, types of intellectual property, international organizations, agencies and treaties, importance of intellectual property rights.

**UNIT – II**

Trade Marks : Purpose and function of trade marks, acquisition of trade mark rights, protectable matter, selecting and evaluating trade mark, trade mark registration processes.

**UNIT – III**

Law of copy rights : Fundamental of copy right law, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, copy right registration, notice of copy right, international copy right law.

Law of patents : Foundation of patent law, patent searching process, ownership rights and transfer

**UNIT – IV**

Trade Secrets : Trade secrete law, determination of trade secrete status, liability for misappropriations of trade secrets, protection for submission, trade secrete litigation.

Unfair competition : Misappropriation right of publicity, False advertising.

**UNIT – V**

New development of intellectual property: new developments in trade mark law ; copy right law, patent law, intellectual property audits.

International overview on intellectual property, international – trade mark law, copy right law, international patent law, international development in trade secrets law.

**TEXT BOOKS & REFERENCES:**

1. Intellectual property right, Deborah. E. Bouchoux, cengage learning.
2. Intellectual property right – Unleashing the knowledge economy, prabuddha ganguli, Tate Mc Graw Hill Publishing company ltd.,

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**(A60117) DISASTER MANAGEMENT****(Open Elective)****Unit-I**

Environmental Hazards & Disasters: Meaning of Environmental hazards, Environmental Disasters and Environmental stress. Concept of Environmental Hazards, Environmental stress & Environmental Disasters. Different approaches & relation with human Ecology - Landscape Approach - Ecosystem Approach - Perception approach - Human ecology & its application in geographical researches.

**Unit –II**

Types of Environmental hazards & Disasters: Natural hazards and Disasters - Man induced hazards & Disasters - Natural Hazards- Planetary Hazards/ Disasters - Extra Planetary Hazards/ disasters - Planetary Hazards- Endogenous Hazards - Exogenous Hazards -

**Unit –III**

Endogenous Hazards - Volcanic Eruption – Earthquakes – Landslides - Volcanic Hazards/ Disasters - Causes and distribution of Volcanoes - Hazardous effects of volcanic eruptions - Environmental impacts of volcanic eruptions - Earthquake Hazards/ disasters - Causes of Earthquakes - Distribution of earthquakes - Hazardous effects of - earthquakes - Earthquake Hazards in India - Human adjustment, perception & mitigation of earthquake.

**Unit –IV**

Exogenous hazards/ disasters - Infrequent events- Cumulative atmospheric hazards/ disasters

Infrequent events: Cyclones – Lightning – Hailstorms

Cyclones: Tropical cyclones & Local storms - Destruction by tropical cyclones & local storms (causes, distribution human adjustment, perception & mitigation) Cumulative atmospheric hazards/ disasters : - Floods- Droughts- Cold waves- Heat waves Floods:- Causes of floods- Flood hazards India- Flood control measures (Human adjustment, perception & mitigation) Droughts:- Impacts of droughts- Drought hazards in India- Drought control measures- Extra Planetary Hazards/ Disasters- Man induced Hazards / Disasters- Physical hazards/ Disasters- Soil Erosion

Soil Erosion:— Mechanics & forms of Soil Erosion- Factors & causes of Soil Erosion- Conservation measures of Soil Erosion



Chemical hazards/ disasters:— Release of toxic chemicals, nuclear explosion- Sedimentation processes Sedimentation processes:- Global Sedimentation problems- Regional Sedimentation problems- Sedimentation & Environmental problems- Corrective measures of Erosion & Sedimentation Biological hazards/ disasters:- Population Explosion.

### Unit –V

Emerging approaches in Disaster Management- Three Stages

1. Pre- disaster stage (preparedness)
2. Emergency Stage
3. Post Disaster stage-Rehabilitation

### TEXT BOOKS:

1. Disaster Mitigation: Experiences And Reflections by Pardeep Sahni.
2. Natural Hazards & Disasters by Donald Hyndman & David Hyndman – Cengage Learning.

### REFERENCES

1. R.B.Singh (Ed) Environmental Geography, Heritage Publishers New Delhi, 1990.
2. Savinder Singh Environmental Geography, Prayag Pustak Bhawan, 1997.
3. Kates, B.I & White, G.F The Environment as Hazards, oxford, New York, 1978.
4. R.B. Singh (Ed) Disaster Management, Rawat Publication, New Delhi, 2000.
5. H.K. Gupta (Ed) Disaster Management, Universiters Press, India, 2003.
6. R.B. Singh, Space Technology for Disaster Mitigation in India (INCED), University of Tokyo, 1994.
7. Dr. Satender , Disaster Management t in Hills, Concept Publishing Co., New Delhi, 2003.
8. A.S. Arya Action Plan For Earthquake, Disaster, Mitigation in V.K. Sharma (Ed) Disaster Management IIPA Publication New Delhi, 1994.
9. R.K. Bhandani An overview on Natural & Man made Disaster & their Reduction, CSIR, New Delhi.
10. M.C. Gupta Manuals on Natural Disaster management in India, National Centre for Disaster Management, IIPA, New Delhi, 2001.

## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

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### (A60524) OBJECT ORIENTED ANALYSIS AND DESIGN

#### Objectives:

- Concisely define the following key terms: class, object, state, behavior, object class, class diagram, object diagram, operation, encapsulation, constructor operation, query operation, update operation, scope operation, association, association role, multiplicity, association class, abstract class, concrete class, class-scope attribute, abstract operation, method, polymorphism, overriding, multiple classification, aggregation, and composition.
- Describe the activities in the different phases of the object-oriented development life cycle.
- State the advantages of object-oriented modeling vis-à-vis structured approaches.
- Compare and contrast the object-oriented model with the E-R and EER models.
- Model a real-world application by using a UML class diagram.
- Provide a snapshot of the detailed state of a system at a point in time using a UML (Unified Modeling Language) object diagram.
- Recognize when to use generalization, aggregation, and composition relationships.
- Specify different types of business rules in a class diagram.

#### UNIT- I

Introduction to UML: Importance of modeling, principles of modeling, object oriented modeling, conceptual model of the UML, Architecture, 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.

Class & Object Diagrams: Terms, concepts, modeling techniques for Class & Object Diagrams.

#### UNIT- III

Basic Behavioral Modeling-I: Interactions, Interaction diagrams.

Basic Behavioral Modeling-II: Use cases, Use case Diagrams, Activity Diagrams.

#### UNIT- IV

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.

#### UNIT- V

Patterns and Frameworks, Artifact Diagrams. Case Study: The Unified Library application

#### TEXT BOOKS:

1. Grady Booch, James Rumbaugh, Ivar Jacobson : The Unified Modeling Language User Guide, Pearson Education 2nd Edition.
2. Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado: UML 2 Toolkit, WILEY-Dreamtech India Pvt. Ltd.

#### REFERENCE BOOKS:

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-Hill Companies.
4. Mark Priestley: Practical Object-Oriented Design with UML, TMH.
5. Applying UML and Patterns: An introduction to Object – Oriented Analysis and Design and Unified Process, Craig Larman, Pearson Education.
6. Object-Oriented Analysis and Design with the Unified Process By John W. Satzinger, Robert B Jackson and Stephen D Burd, Cengage Learning.
7. UML and C++, R.C.Lee, and W.M.Tepfenhart, PHI.
8. Object Oriented Analysis, Design and Implementation, B.Dathan, S.Ramnath, Universities Press.
9. OODesign with UML and Java, K.Barclay, J.Savage, Elsevier.
10. Learning UML 2.0, Russ Miles and Kim Hamilton, O'Reilly, SPD.

**Outcomes:** Graduate can able to take up the case studies and model it in different views with respect user requirement such as use case, logical, component and deployment and etc, and preparation of document of the project for the unified Library application.

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#### (A60520) DATA WAREHOUSING AND DATA MINING

##### Objectives:

Study data warehouse principles and its working learn data mining concepts understand association rules mining. Discuss classification algorithms learn how data is grouped using clustering techniques.

##### UNIT-I

**Data warehouse:** Introduction to Data warehouse, Difference between operational database systems and data warehouses, Data warehouse Characteristics, Data warehouse Architecture and its Components, Extraction-Transformation-Loading, Logical(Multi-Dimensional), Data Modeling, Schema Design, Star and Snow-Flake Schema, Fact Consultation, Fact Table, Fully Addictive, Semi-Addictive, Non Addictive Measures; Fact-Less-Facts, Dimension Table Characteristics; OLAP Cube, OLAP Operations, OLAP Server Architecture-ROLAP, MOLAP and HOLAP.

##### UNIT-II

**Introduction to Data Mining:** Introduction, What is Data Mining, Definition, KDD, Challenges, Data Mining Tasks, Data Preprocessing, Data Cleaning, Missing data, Dimensionality Reduction, Feature Subset Selection, Discretization and Binaryzation, Data Transformation; Measures of Similarity and Dissimilarity- Basics.

##### UNIT-III

**Association Rules:** Problem Definition, Frequent Item Set Generation, The APRIORI Principle, Support and Confidence Measures, Association Rule Generation; APRIORI Algorithm, The Partition Algorithms, FP-Growth Algorithms, Compact Representation of Frequent Item Set- Maximal Frequent Item Set, Closed Frequent Item Set.

##### UNIT-IV

**Classification:** Problem Definition, General Approaches to solving a classification problem, Evaluation of Classifiers, Classification techniques, Decision Trees-Decision tree Construction, Methods for Expressing attribute test conditions, Measures for Selecting the Best Split, Algorithm for Decision tree Induction; Naive-Bayes Classifier, Bayesian Belief Networks; K- Nearest neighbor classification-Algorithm and Characteristics.

##### UNIT-V

**Clustering:** Problem Definition, Clustering Overview, Evaluation of Clustering Algorithms, Partitioning Clustering-K-Means Algorithm, K-Means Additional



Issues, PAM Algorithm; Hierarchical Clustering-Agglomerative Methods and divisive methods, Basic Agglomerative Hierarchical Clustering Algorithm, Specific techniques, Key Issues in Hierarchical Clustering, Strengths and Weakness; Outlier Detection.

#### TEXT BOOKS:

- 1) Data Mining- Concepts and Techniques- Jiawei Han, Micheline Kamber, Morgan Kaufmann Publishers Elsevier 2 Edition, 2006.
- 2) Introduction to Data Mining, Pang-Ning Tan, Vipin Kumar, Michael Steinbach, Pearson Education

#### REFERENCE BOOKS:

- 1) Data Mining Techniques, Arun K Pujari, 3<sup>rd</sup> Edition, Universities Press.
- 2) Data Warehousing Fundamentals, Pualraj Ponnaiah, Wiley Student Edition.
- 3) The Data Warehouse Life Cycle Toolkit – Ralph Kimball, Wiley Student Edition.
- 4) Data Mining, Vikaram Pudi, P Radha Krishna, Oxford University Press.

#### Outcomes:

- Student should be able to understand why the data warehouse in addition to database systems.
- Ability to perform the preprocessing of data and apply mining techniques on it.
- Ability to identify the association rules, classification and clusters in large data sets.
- Ability to solve real world problems in business and scientific information using data mining.

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### (A60525) SOFTWARE TESTING METHODOLOGIES

#### Objectives:

To understand the software testing methodologies such as flow graphs and path testing, transaction flows testing, data flow testing, domain testing and logic base testing.

#### UNIT - I

Introduction:- Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy of bugs.

Flow graphs and Path testing:- Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

#### UNIT - II

Transaction Flow Testing:- transaction flows, transaction flow testing techniques.

Dataflow testing:- Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing.

#### UNIT - III

Domain Testing:- domains and paths, Nice & ugly domains, domain testing, domains and interfaces testing, domain and interface testing, domains and testability.

#### UNIT-IV

Paths, Path products and Regular expressions:- path products & path expression, reduction procedure, applications, regular expressions & 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 & bad state graphs, state testing, Testability tips.

Graph Matrices and Application:- Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm, building tools. (Student should be given an exposure to a tool like JMeter or Win-runner).

#### TEXT BOOKS:

1. Software Testing techniques – Boris Beizer, Dreamtech, second edition.

2. Software Testing Tools – Dr.K.V.K.K.Prasad, Dreamtech.

### REFERENCE BOOKS:

1. The craft of software testing - Brian Marick, Pearson Education.
2. Software Testing, 3<sup>rd</sup> edition, P.C. Jorgensen, Aurbach Publications (Dist.by SPD).
3. Software Testing, N.Chauhan, Oxford University Press.
4. Introduction to Software Testing, P.Ammann&J.Offutt, Cambridge Univ.Press.
5. Effective methods of Software Testing, Perry, John Wiley, 2<sup>nd</sup> Edition, 1999.
6. Software Testing Concepts and Tools, P.Nageswara Rao, dreamtech Press.
7. Software Testing, M.G.Limaye, TMH.
8. Software Testing, S.Desikan, G.Ramesh, Pearson.
9. Foundations of Software Testing, D.Graham & Others, Cengage Learning.
10. Foundations of Software Testing, A.P.Mathur, Pearson.

### Outcomes:

Ability to apply the process of testing and various methodologies in testing for developed software.

Ability to write test cases for given software to test it before delivery to the customer.

## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

III Year B.Tech. IT/CST-II Sem

L	T/P/D	C
4	-/-	4

### (A60519) CLOUD COMPUTING

#### Objectives:

- To explain the evolving computer model called cloud computing.
- To introduce the various levels of services that can be achieved by cloud.
- To describe the security aspects in cloud.

#### UNIT- I

**Systems Modeling, Clustering and Virtualization:** Distributed System Models and Enabling Technologies, Computer Clusters for Scalable Parallel Computing, Virtual Machines and Virtualization of Clusters and Data centers.

#### UNIT- II

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

#### UNIT- III

**Infrastructure as a Service (IAAS) & Platform and Software as a Service (PAAS / SAAS):** 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, Secure Distributed Data Storage in Cloud Computing.

Aneka, Comet Cloud, T-Systems', Workflow Engine for Clouds, Understanding Scientific Applications for Cloud Environments.

#### UNIT- IV

**Monitoring, Management and Applications:** An Architecture for Federated Cloud Computing, SLA Management in Cloud Computing, Performance Prediction for HPC on Clouds, Best Practices in Architecting Cloud Applications in the AWS cloud, Building Content Delivery networks using Clouds, Resource Cloud Mashups.

#### UNIT- V

**Governance and Case Studies:** Organizational Readiness and Change management in the Cloud age, Data Security in the Cloud, Legal Issues in Cloud computing, Achieving Production Readiness for Cloud Services.

#### TEXT BOOKS:

1. Cloud Computing: Principles and Paradigms by Rajkumar Buyya, James Broberg and Andrzej M. Goscinski, Wiley, 2011.



2. Distributed and Cloud Computing, Kai Hwang, Geoffrey C.Fox, Jack J.Dongarra, Elsevier, 2012.

#### REFERENCE BOOKS:

1. Cloud Computing : A Practical Approach, Anthony T.Velte, Toby J.Velte, Robert Elsenpeter, Tata McGraw Hill, 2011.
2. Enterprise Cloud Computing, Gautam Shroff, Cambridge University Press, 2010.
3. Cloud Computing: Implementation, Management and Security, John W. Rittinghouse, James F.Ransome, CRC Press, rp2012.
4. Cloud Application Architectures: Building Applications and Infrastructure in the Cloud, George Reese, O'Reilly, SPD, rp2011.
5. Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance, Tim Mather, Subra Kumaraswamy, Shahed Latif, O'Reilly, SPD, rp2011.

#### Outcomes:

- Ability to understand the virtualization and cloud computing concepts.

## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

III Year B.Tech. IT/CST-II Sem

L	T/P/D	C
-	-/3/-	2

### (A60592) DATA MINING AND WEB TECHNOLOGIES LAB

#### DATA MINING LAB

##### Objectives:

Learn to perform data mining tasks using a data mining toolkit (such as open source WEKA). Understand the data sets and data preprocessing. Demonstrate the working of algorithms for data mining tasks such association rule mining, classification, clustering and regression. Exercise the data mining techniques with varied input values for different parameters.

##### Credit Risk Assessment

**Description:** The business of banks is making loans. Assessing the credit worthiness of an applicant is of crucial importance. You have to develop a system to help a loan officer decide whether the credit of a customer is good, or bad. A bank's business rules regarding loans must consider two opposing factors. On the one hand, a bank wants to make as many loans as possible. Interest on these loans is the banks profit source. On the other hand, a bank cannot afford to make too many bad loans. Too many bad loans could lead to the collapse of the bank. The bank's loan policy must involve a compromise: not too strict, and not too lenient.

To do the assignment, you first and foremost need some knowledge about the world of credit. You can acquire such knowledge in a number of ways.

1. Knowledge Engineering. Find a loan officer who is willing to talk. Interview her and try to represent her knowledge in the form of production rules.
2. Books. Find some training manuals for loan officers or perhaps a suitable textbook on finance. Translate this knowledge from text form to production rule form.
3. Common sense. Imagine yourself as a loan officer and make up reasonable rules which can be used to judge the credit worthiness of a loan applicant.
4. Case histories. Find records of actual cases where competent loan officers correctly judged when, and when not to, approve a loan application.

**The German Credit Data:** Actual historical credit data is not always easy to come by because of confidentiality rules. Here is one such dataset, consisting of 1000 actual cases collected in Germany. credit dataset (original) Excel spreadsheet version of the German credit data (Down load from web). In

spite of the fact that the data is German, you should probably make use of it for this assignment. (Unless you really can consult a real loan officer !)

A few notes on the German dataset

- DM stands for Deutsche Mark, the unit of currency, worth about 90 cents Canadian (but looks and acts like a quarter).
- owns\_telephone. German phone rates are much higher than in Canada so fewer people own telephones.
- foreign\_worker. There are millions of these in Germany (many from Turkey). It is very hard to get German citizenship if you were not born of German parents.
- There are 20 attributes used in judging a loan applicant. The goal is to classify the applicant into one of two categories, good or bad.

**Subtasks : (Turn in your answers to the following tasks)**

1. List all the categorical (or nominal) attributes and the real-valued attributes separately.
2. What attributes do you think might be crucial in making the credit assessment ? Come up with some simple rules in plain English using your selected attributes.
3. One type of model that you can create is a Decision Tree - train a Decision Tree using the complete dataset as the training data. Report the model obtained after training.
4. Suppose you use your above model trained on the complete dataset, and classify credit good/bad for each of the examples in the dataset. What % of examples can you classify correctly? (This is also called testing on the training set) Why do you think you cannot get 100 % training accuracy ?
5. Is testing on the training set as you did above a good idea ? Why or Why not ?
6. One approach for solving the problem encountered in the previous question is using cross-validation? Describe what is cross-validation briefly. Train a Decision Tree again using cross-validation and report your results. Does your accuracy increase/decrease? Why? (10 marks)
7. Check to see if the data shows a bias against „foreign workers“ (attribute 20), or „personal-status“ (attribute 9). One way to do this (perhaps rather simple minded) is to remove these attributes from the dataset and see if the decision tree created in those cases is significantly different from the full dataset case which you have already done. To remove an attribute you can use the preprocess tab in Weka's GUI Explorer. Did removing these attributes have a

significant effect? Discuss.

8. Another question might be, do you really need to input so many attributes to get good results? Maybe only a few would do. For example, you could try just having attributes 2, 3, 5, 7, 10, 17 (and 21, the class attribute (naturally)). Try out some combinations. (You had removed two attributes in problem 7. Remember to reload the arff data file to get all the attributes initially before you start selecting the ones you want.)
9. Sometimes, the cost of rejecting an applicant who actually has a good credit (case 1) might be higher than accepting an applicant who has bad credit (case 2). Instead of counting the misclassifications equally in both cases, give a higher cost to the first case (say cost 5) and lower cost to the second case. You can do this by using a cost matrix in Weka. Train your Decision Tree again and report the Decision Tree and cross-validation results. Are they significantly different from results obtained in problem 6 (using equal cost)?
10. Do you think it is a good idea to prefer simple decision trees instead of having long complex decision trees ? How does the complexity of a Decision Tree relate to the bias of the model?
11. You can make your Decision Trees simpler by pruning the nodes. One approach is to use Reduced Error Pruning - Explain this idea briefly. Try reduced error pruning for training your Decision Trees using cross-validation (you can do this in Weka) and report the Decision Tree you obtain? Also, report your accuracy using the pruned model. Does your accuracy increase?
12. (Extra Credit): How can you convert a Decision Trees into „if-then-else rules“. Make up your own small Decision Tree consisting of 2-3 levels and convert it into a set of rules. There also exist different classifiers that output the model in the form of rules - one such classifier in Weka is rules.PART, train this model and report the set of rules obtained. Sometimes just one attribute can be good enough in making the decision, yes, just one ! Can you predict what attribute that might be in this dataset ? OneR classifier uses a single attribute to make decisions (it chooses the attribute based on minimum error). Report the rule obtained by training a one R classifier. Rank the performance of j48, PART and oneR.

#### Task Resources:

Andrew Moore's Data Mining Tutorials (See tutorials on Decision Trees and Cross Validation)

- Decision Trees (Source: Tan, MSU)
- Tom Mitchell's book slides (See slides on Concept Learning and



## Decision Trees)

## • Weka resources:

- Introduction to Weka (html version) (download ppt version)
- Download Weka
- Weka Tutorial
- ARFF format
- Using Weka from command line

**Outcomes:**

- Ability to understand the various kinds of tools.
- Demonstrate the classification, clusters and etc. in large data sets

**WEB TECHNOLOGIES LAB****Objectives:**

- To enable the student to program web applications using the following technologies
- HTML
- Javascript
- AJAX
- PHP
- Tomcat Server
- Servlets
- JSP

**Note:**

3. ***Use LAMP Stack (Linux, Apache, MySQL and PHP) for the Lab Experiments. Though not mandatory, encourage the use of Eclipse platform wherever applicable***
4. ***The list suggests the minimum program set. Hence, the concerned staff is requested to add more problems to the list as needed***
1. Install the following on the local machine
  - Apache Web Server (if not installed)
  - Tomcat Application Server locally
  - Install MySQL (if not installed)
  - Install PHP and configure it to work with Apache web server and MySQL (if not already configured)
2. Write an HTML page including any required Javascript that takes a number from one text field in the range of 0 to 999 and shows it

another text field in words. If the number is out of range, it should show "out of range" and if it is not a number, it should show "not a number" message in the result box.

3. Write an HTML page that has one input, which can take multi-line text and a submit button. Once the user clicks the submit button, it should show the number of characters, words and lines in the text entered using an alert message. Words are separated with white space and lines are separated with new line character.
4. Write an HTML page that contains a selection box with a list of 5 countries. When the user selects a country, its capital should be printed next to the list. Add CSS to customize the properties of the font of the capital (color, bold and font size).
5. Create an XML document that contains 10 users information. Write a Java program, which takes User id as input and returns the user details by taking the user information from the XML document using (a) DOM Parser and (b) SAX parser
6. Implement the following web applications using (a) PHP, (b) Servlets and (c) JSP:
  - i. A user validation web application, where the user submits the login name and password to the server. The name and password are checked against the data already available in Database and if the data matches, a successful login page is returned. Otherwise a failure message is shown to the user.
  - ii. Modify the above program to use an xml file instead of database.
  - iii. Modify the above program to use AJAX to show the result on the same page below the submit button.
  - iv. A simple calculator web application that takes two numbers and an operator (+, -, /, \* and %) from an HTML page and returns the result page with the operation performed on the operands.
  - v. Modify the above program such that it stores each query in a database and checks the database first for the result. If the query is already available in the DB, it returns the value that was previously computed (from DB) or it computes the result and returns it after storing the new query and result in DB.
  - vi. A web application takes a name as input and on submit it shows a hello <name> page where <name> is taken from the request. It shows the start time at the right top corner of the page and provides a logout button. On clicking this button, it should show a logout page with Thank You <name> message with the duration of usage (hint: Use session to store name and time).

- vii. A web application that takes name and age from an HTML page. If the age is less than 18, it should send a page with "Hello <name>, you are not authorized to visit this site" message, where <name> should be replaced with the entered name. Otherwise it should send "Welcome <name> to this site" message.
- viii. A web application for implementation:  
The user is first served a login page which takes user's name and password. After submitting the details the server checks these values against the data from a database and takes the following decisions.  
If name and password matches, serves a welcome page with user's full name.  
If name matches and password doesn't match, then serves "password mismatch" page  
If name is not found in the database, serves a registration page, where user's full name is asked and on submitting the full name, it stores, the login name, password and full name in the database (hint: use session for storing the submitted login name and password)
- ix. A web application that lists all cookies stored in the browser on clicking "List Cookies" button. Add cookies if necessary.

#### TEXT BOOKS:

1. Web Technologies, Uttam K Roy, Oxford University Press
2. The Complete Reference PHP – Steven Holzner, Tata McGraw-Hill

#### REFERENCE BOOKS:

1. Web Programming, building internet applications, Chris Bates 2<sup>nd</sup> edition, Wiley Dreamtech
2. Java Server Pages –Hans Bergsten, SPD O'Reilly
3. Java Script, D.Flanagan, O'Reilly,SPD.
4. Beginning Web Programming-Jon Duckett WROX.
5. Programming world wide web, R.W.Sebesta, Fourth Edition, Pearson.
6. Internet and World Wide Web – How to program, Dietel and Nieto, Pearson.

#### Outcomes:

- The student should be able to:
- Use LAMP Stack for web applications
- Use Tomcat Server for Servlets and JSPs
- Write simple applications with Technologies like HTML, Javascript, AJAX, PHP, Servlets and JSPs
- Connect to Database and get results
- Parse XML files using Java (DOM and SAX parsers)

## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

### III Year B.Tech. IT/CST-II Sem

L	T/P/D	C
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### (A60086) ADVANCED COMMUNICATION SKILLS (ACS) LAB

#### Introduction

The introduction of the Advanced Communication Skills Lab is considered essential at 3<sup>rd</sup> year level. At this stage, the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalised context.

The proposed course should be a laboratory course to enable students to use 'good' English and perform the following:

- Gathering ideas and information to organise ideas relevantly and coherently.
- Engaging in debates.
- Participating in group discussions.
- Facing interviews.
- Writing project/research reports/technical reports.
- Making oral presentations.
- Writing formal letters.
- Transferring information from non-verbal to verbal texts and vice-versa.
- Taking part in social and professional communication.

#### Objectives:

This Lab focuses on using multi-media instruction for language development to meet the following targets:

- To improve the students' fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.
- Further, they would be required to communicate their ideas relevantly and coherently in writing.
- To prepare all the students for their placements.

#### Syllabus:

The following course content to conduct the activities is prescribed for the Advanced Communication Skills (ACS) Lab:

1. Activities on Fundamentals of Inter-personal Communication and



**Building Vocabulary** - Starting a conversation – responding appropriately and relevantly – using the right body language – Role Play in different situations & Discourse Skills- using visuals - Synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, study of word origin, business vocabulary, analogy, idioms and phrases, collocations & usage of vocabulary.

2. **Activities on Reading Comprehension** –General Vs Local comprehension, reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, critical reading & effective googling.
3. **Activities on Writing Skills** – Structure and presentation of different types of writing – *letter writing/Resume writing/ e-correspondence/ Technical report writing/ Portfolio writing* – planning for writing – improving one's writing.
4. **Activities on Presentation Skills** – Oral presentations (individual and group) through JAM sessions/seminars/**PPTs** and written presentations through posters/projects/reports/ e-mails/assignments etc.
5. **Activities on Group Discussion and Interview Skills** – Dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and organization of ideas and rubrics for evaluation- Concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele-conference & video-conference and Mock Interviews.

#### Minimum Requirement:

The Advanced Communication Skills (ACS) Laboratory shall have the following infra-structural facilities to accommodate at least 35 students in the lab:

- **Spacious room with appropriate acoustics.**
- **Round Tables with movable chairs**
- **Audio-visual aids**
- **LCD Projector**
- **Public Address system**
- **P – IV Processor, Hard Disk – 80 GB, RAM–512 MB Minimum, Speed – 2.8 GHZ**
- **T. V, a digital stereo & Camcorder**
- **Headphones of High quality**

**Prescribed Lab Manual:** A book titled **A Course Book of Advanced Communication Skills (ACS) Lab** published by Universities Press, Hyderabad.

#### Suggested Software:

The software consisting of the prescribed topics elaborated above should be procured and used.

- **Oxford Advanced Learner's Compass, 7<sup>th</sup> Edition**
- **DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.**
- **Lingua TOEFL CBT Insider**, by Dreamtech
- **TOEFL & GRE( KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)**
- **The following software from 'train2success.com'**
  - **Preparing for being interviewed**
  - **Positive Thinking**
  - **Interviewing Skills**
  - **Telephone Skills**
  - **Time Management**

#### Books Recommended:

1. Technical Communication by Meenakshi Raman & Sangeeta Sharma, Oxford University Press 2009.
2. Advanced Communication Skills Laboratory Manual by Sudha Rani, D, Pearson Education 2011.
3. Technical Communication by Paul V. Anderson. 2007. Cengage Learning pvt. Ltd. New Delhi.
4. Business and Professional Communication: Keys for Workplace Excellence. Kelly M. Quintanilla & Shawn T. Wahl. Sage South Asia Edition. Sage Publications. 2011.
5. The Basics of Communication: A Relational Perspective. Steve Duck & David T. McMahan. Sage South Asia Edition. Sage Publications. 2012.
6. English Vocabulary in Use series, Cambridge University Press 2008.
7. Management Shapers Series by Universities Press(India)Pvt Ltd., Himayatnagar, Hyderabad 2008.
8. Handbook for Technical Communication by David A. McMurrey & Joanne Buckley. 2012. Cengage Learning.
9. Communication Skills by Leena Sen, PHI Learning Pvt Ltd., New Delhi, 2009.
10. Handbook for Technical Writing by David A McMurrey & Joanne Buckley CENGAGE Learning 2008.

11. Job Hunting by Colm Downes, Cambridge University Press 2008.
12. Master Public Speaking by Anne Nicholls, JAICO Publishing House, 2006.
13. English for Technical Communication for Engineering Students, Aysha Vishwamohan, Tata Mc Graw-Hill 2009.
14. Books on TOEFL/GRE/GMAT/CAT/ IELTS by Barron's/DELTA/ Cambridge University Press.
15. International English for Call Centres by Barry Tomalin and Suhashini Thomas, Macmillan Publishers, 2009.

## **DISTRIBUTION AND WEIGHTAGE OF MARKS:**

### ***Advanced Communication Skills Lab Practicals:***

1. The practical examinations for the ACS Laboratory practice shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the English Language lab sessions, there shall be continuous evaluation during the year for 25 sessional marks and 50 End Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The End Examination shall be conducted by the teacher concerned, by inviting the External Examiner from outside. In case of the non-availability of the External Examiner, other teacher of the same department can act as the External Examiner.

### **Mini Project: As a part of Internal Evaluation**

1. Seminar/ Professional Presentation
  2. A Report on the same has to be prepared and presented.
- \* *Teachers may use their discretion to choose topics relevant and suitable to the needs of students.*
  - \* *Not more than two students to work on each mini project.*
  - \* *Students may be assessed by their performance both in oral presentation and written report.*

### **Outcomes**

- Accomplishment of sound vocabulary and its proper use contextually.
- Flair in Writing and felicity in written expression.
- Enhanced job prospects.
- Effective Speaking Ability.



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD  
(Established by Andhra Pradesh Act No.30 of 2008)  
Kukatpally, Hyderabad – 500 085, TELANGANA (India)

**ADD-ON COURSE STRUCTURE FOR III AND IV YEARS EFFECTIVE AFTER OCTOBER 2015**  
**B. TECH. INFORMATION TECHNOLOGY /COMPUTER SCIENCE AND TECHNOLOGY**

**Note :**

**1) Qualification pack for ASSOCIATE ANALYTICS includes the following three subjects**

1. Introduction to Analytics
2. Big Data Analytics
3. Predictive Analytics

**2) Qualification pack for SECURITY ANALYST includes the following three subjects**

1. Information Security Management
2. Information Security Assessments & Audits
3. Information Security Incident Response & Management

\*For registering for **Big Data Analytics** the prerequisite is **Introduction to Analytics**

\*For registering for **Information Security Assessments & Audits** the prerequisite is **Information Security Management**

**IV YEAR I SEMESTER**

Code	Subject	L	T/P/D	C
	Information Security	4	-	4
	Design Patterns	4	-	4
	Mobile Application Development	4	-	4
	Information Retrieval Systems	4	-	4
	<b>ELECTIVE – I</b>	4	-	4
	Wireless Networks and Mobile Computing			
	Image Processing and Pattern Recognition			
	Soft Computing			
	Semantic Web and Social Networks			
	Operations Research			
	<i>Big Data Analytics (Associate Analytics-2) *</i>			
	<i>Information Security Assessments &amp; Audits (Security Analyst-2) *</i>			
	<b>ELECTIVE – II</b>	4	-	4
	Software Project Management			
	Computer Graphics			
	Human Computer Interaction			
	Scripting Languages			
	Computer Forensics			
	Case Tools and Software Testing Lab	-	3	2
	Mobile Applications Development Lab	-	3	2
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>28</b>



(A70522) INFORMATION SECURITY

Objectives:

- Explain the objectives of information security
- Explain the importance and application of each of confidentiality, integrity, authentication and availability
- Understand various cryptographic algorithms.
- Understand the basic categories of threats to computers and networks
- Describe public-key cryptosystem.
- Describe the enhancements made to IPv4 by IPSec
- Understand Intrusions and intrusion detection
- Discuss the fundamental ideas of public-key cryptography.
- Generate and distribute a PGP key pair and use the PGP package to send an encrypted e-mail message.
- Discuss Web security and Firewalls

UNIT – I

**Attacks on Computers and Computer Security:** Introduction, The need for security, Security approaches, Principles of security, Types of Security attacks, Security services, Security Mechanisms, A model for Network Security

**Cryptography: Concepts and Techniques:** Introduction, plain text and cipher text, substitution techniques, transposition techniques, encryption and decryption, symmetric and asymmetric key cryptography, steganography, key range and key size, possible types of attacks.

UNIT – II

**Symmetric key Ciphers:** Block Cipher principles & Algorithms(DES, AES, Blowfish), Differential and Linear Cryptanalysis, Block cipher modes of operation, Stream ciphers, RC4, Location and placement of encryption function, Key distribution **Asymmetric key Ciphers:** Principles of public key cryptosystems, Algorithms(RSA, Diffie-Hellman, ECC), Key Distribution

UNIT – III

**Message Authentication Algorithms and Hash Functions:** Authentication requirements, Functions, Message authentication codes, Hash Functions, Secure hash algorithm, Whirlpool, HMAC, CMAC, Digital signatures, knapsack algorithm **Authentication Applications:** Kerberos, X.509



#### UNIT – IV

**E-Mail Security:** Pretty Good Privacy, S/MIME **IP Security:** IP Security overview, IP Security architecture, Authentication Header, Encapsulating security payload, Combining security associations, key management

#### UNIT – V

**Web Security:** Web security considerations, Secure Socket Layer and Transport Layer Security, Secure electronic transaction **Intruders, Virus and Firewalls:** Intruders, Intrusion detection, password management, Virus and related threats, Countermeasures, Firewall design principles, Types of firewalls **Case Studies on Cryptography and security:** Secure Inter-branch Payment Transactions, Cross site Scripting Vulnerability, Virtual Elections

#### TEXT BOOKS:

1. Cryptography and Network Security : William Stallings, Pearson Education, 4<sup>th</sup> Edition.
2. Cryptography and Network Security : Atul Kahate, Mc Graw Hill, 2<sup>nd</sup> Edition.

#### REFERENCE BOOKS:

1. Cryptography and Network Security: C K Shyamala, N Harini, Dr T R Padmanabhan, Wiley India, 1<sup>st</sup> Edition.
2. Cryptography and Network Security : Forouzan Mukhopadhyay, Mc Graw Hill, 2<sup>nd</sup> Edition.
3. Information Security, Principles and Practice: Mark Stamp, Wiley India.
4. Principles of Computer Security: WM Arthur Conklin, Greg White, TMH.
5. Introduction to Network Security: Neal Krawetz, CENGAGE Learning.
6. Network Security and Cryptography: Bernard Menezes, CENGAGE Learning.

#### Outcomes:

- Student will be able to understand basic cryptographic algorithms, message and web authentication and security issues.
- Ability to identify information system requirements for both of them such as client and server.
- Ability to understand the current legal issues towards information security.

#### (A70530) DESIGN PATTERNS

#### Objectives:

- Understand the design patterns that are common in software applications.
- Understand how these patterns are related to Object Oriented design.

#### UNIT-I

Introduction : What is a 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 .  
Creational Patterns : Abstract Factory, Builder, Factory Method, Prototype, Singleton, Discussion of Creational Patterns.

#### UNIT-III

Structural Pattern Part-I : Adapter, Bridge, Composite.  
Structural Pattern Part-II : Decorator, façade, Flyweight, Proxy.

#### UNIT-IV

Behavioral Patterns Part-I : Chain of Responsibility, Command, Interpreter, Iterator.

Behavioral Patterns Part-II : Mediator, Memento, Observer.

#### UNIT-V

Behavioral Patterns Part-II (cont'd): State, Strategy, Template Method, Visitor, Discussion of Behavioral Patterns.

What to Expect from Design Patterns, A Brief History, The Pattern Community An Invitation, A Parting Thought.

#### TEXT BOOK :

1. Design Patterns By Erich Gamma, Pearson Education.

#### REFERENCE BOOKS :

1. Pattern's in JAVA Vol-I By Mark Grand, Wiley DreamTech.

2. Pattern's in JAVA Vol-II By Mark Grand, Wiley DreamTech.
3. JAVA Enterprise Design Patterns Vol-III By Mark Grand, Wiley DreamTech.
4. Head First Design Patterns By Eric Freeman-Oreilly-spd.
5. Peeling Design Patterns, Prof. Meda Srinivasa Rao, Narsimha Karumanchi, CareerMonk Publications.
6. Design Patterns Explained By Alan Shalloway, Pearson Education.
7. Pattern Oriented Software Architecture, F.Buschmann&others, John Wiley & Sons.

#### Outcomes:

- o Ability to understand and apply common design patterns to incremental / iterative development.
- o Ability to identify appropriate patterns for design of given problem.

## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. IT/CST-I Sem

L	T/P/D	C
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### (A70535) MOBILE APPLICATION DEVELOPMENT

Mobile application development is the process by which application software is developed for low-power handheld devices, such as personal digital assistants, enterprise digital assistants or mobile phones. These applications can be pre-installed on phones during manufacture, downloaded by customers from various mobile software distribution platforms, or delivered as web applications using server-side or client-side processing (e.g. JavaScript) to provide an "application-like" experience within a Web browser. Application software developers also have to consider a lengthy array of screen sizes, hardware specifications and configurations because of intense competition in mobile software and changes within each of the platforms.

#### Objectives:

On completion of this course the students should be able to:

1. Design, implement and evaluate a User Interface for a mobile application using J2ME.
2. Create a small but realistic working mobile application for small computing devices.
3. Categorise the challenges posed by developing mobile applications and be able to propose and evaluate and select appropriate solutions.

#### UNIT- I

**J2ME Overview :** Java 2 Micro Edition and the World of Java, Inside J2ME, J2ME and Wireless Devices

Small Computing Technology: Wireless Technology, Radio Data Networks, Microwave Technology, Mobile Radio Networks, Messaging, Personal Digital Assistants

#### UNIT- II

**J2ME Architecture and Development Environment:** J2ME Architecture, Small Computing Device Requirements, Run-Time Environment, MIDlet Programming, Java Language for J2ME, J2ME Software Development Kits, Hello World J2ME Style, Multiple MIDlets in a MIDlet Suite, J2ME Wireless Toolkit

J2ME Best Practices and Patterns: The Reality of Working in a J2ME World, Best Practices

#### UNIT- III

**Commands, Items, and Event Processing:** J2ME User Interfaces, Display

Class, The Palm OS Emulator, Command Class, Item Class, Exception Handling

High-Level Display: Screens: Screen Class, Alert Class, Form Class, Item Class, List Class, Text Box Class, Ticker Class

Low-Level Display: Canvas: The Canvas, User Interactions, Graphics, Clipping Regions, Animation

#### UNIT- IV

**Record Management System:** Record Storage, Writing and Reading Records, Record Enumeration, Sorting Records, Searching Records, Record Listener

**JDBC Objects:** The Concept of JDBC, JDBC Driver Types, JDBC Packages, Overview of the JDBC Process, Database Connection, statement Objects, Result set, Transaction Processing, Metadata, Data Types, Exceptions.

**JDBC and Embedded SQL:** Model Programs, Tables, Indexing, Inserting Data into Tables, Selecting Data from a Table, Metadata, Updating Tables, Deleting Data from a Table, Joining Tables, Calculating Data, Grouping and Ordering Data, Subqueries, VIEWS

#### UNIT- V

**Generic Connection Framework:** The Connection, Hypertext Transfer Protocol, Communication Management Using HTTP Commands, Session Management, Transmit as a Background Process

#### TEXT BOOKS:

1. J2ME: The Complete Reference, James Keogh, Tata McGrawHill.
2. Programming for Mobile and Remote Computers, G.T.Thampi, dreamtech press.

#### REFERENCE BOOKS:

1. Enterprise J2ME: Developing Mobile Java Applications – Michael Juntao Yuan, Pearson Education, 2004
2. Beginning Java ME Platform, Ray Rischpater, Apress, 2009
3. Beginning J2ME: From Novice to Professional, Third Edition, Sing Li, Jonathan B. Knudsen, Apress, 2005
4. Kicking Butt with MIDP and MSA: Creating Great Mobile Applications, 1<sup>st</sup> edition, J.Knudsen, Pearson.

#### Outcomes:

- Ability to evaluate and select appropriate solutions to the mobile computing platform.
- Ability to develop the user interface.
- Ability design a simple mobile phone game.

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### (A70533) INFORMATION RETRIEVAL SYSTEMS

#### Objectives:

- To learn the different models for information storage and retrieval
- To learn about the various retrieval utilities
- To understand indexing and querying in information retrieval systems
- To expose the students to the notions of structured and semi structured data
- To learn about web search

#### UNIT-I

Introduction, Retrieval Strategies: Vector space model, Probabilistic retrieval strategies: Simple term weights, Non binary independence model, Language Models.

#### UNIT-II

Retrieval Utilities: Relevance feedback, Clustering, N-grams, Regression analysis, Thesauri.

#### UNIT-III

Retrieval Utilities: Semantic networks, Parsing

Cross-Language Information Retrieval: Introduction, Crossing the language barrier.

#### UNIT-IV

Efficiency: Inverted index, Query processing, Signature files, Duplicate document detection.

#### UNIT-V

Integrating Structured Data and Text: A Historical progression, Information retrieval as a relational application, Semi-structured search using a relational schema

Distributed Information Retrieval: A Theoretical model of distributed retrieval, Web search.

#### TEXT BOOK:

1. David A. Grossman, Ophir Frieder, Information Retrieval – Algorithms and Heuristics, Springer, 2<sup>nd</sup> Edition (Distributed by Universities Press), 2004.

## REFERENCE BOOKS:

1. Gerald J Kowalski, Mark T Maybury. Information Storage and Retrieval Systems, Springer, 2000
2. Soumen Chakrabarti, Mining the Web : Discovering Knowledge from Hypertext Data, Morgan-Kaufmann Publishers, 2002
3. Christopher D. Manning, Prabhakar Raghavan, Hinrich Schütze, An Introduction to Information Retrieval, Cambridge University Press, Cambridge, England, 2009

## Outcomes:

- Possess the ability to store and retrieve textual documents using appropriate models
- Possess the ability to use the various retrieval utilities for improving search
- Possess an understanding of indexing and compressing documents to improve space and time efficiency
- Possess the skill to formulate SQL like queries for unstructured data
- Understand issues in web search

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## (A70541) WIRELESS NETWORKS AND MOBILE COMPUTING

### (ELECTIVE - I)

## Objectives:

- To understand GSM and UMTS architectures
- To have an in-depth knowledge of mobile computing
- To understand Mobile network layer and transport layer
- To understand Bluetooth technology

## UNIT – I

Introduction to Network Technologies and Cellular Communications

HIPERLAN: Protocol Architecture, Physical Layer, Channel Access Control Sub-layer, MAC Sub-layer, Information Bases and Networking

WLAN: Infrared vs. Radio Transmission, Infrastructure and Ad Hoc Networks, IEEE 802.11. Bluetooth.: User Scenarios, Physical Layer, MAC layer, Networking, Security, Link Management

GSM: Mobile Services, System Architecture, Radio Interface, Protocols, Localization and calling, Handover, Security, and New Data Services.

Mobile Computing (MC): Introduction to MC, Novel Applications, Limitations, and Architecture

## UNIT –II

(Wireless) Medium Access Control (MAC): Motivation for a Specialized MAC (Hidden and Exposed Terminals, Near and Far Terminals), SDMA, FDMA, TDMA, CDMA. MAC Protocols for GSM, Wireless LAN (IEEE802.11), Collision Avoidance (MACA, MACAW) Protocols.

## UNIT –III

Mobile IP Network Layer: IP and Mobile IP Network Layers, Packet Delivery and Handover Management, Location Management, Registration, Tunnelling and Encapsulation, Route Optimization, DHCP.

Mobile Transport Layer: Conventional TCP/IP Protocols, Indirect TCP, Snooping TCP, Mobile TCP, Other Transport Layer Protocols for Mobile Networks.

## UNIT- IV

Database Issues: Database Hoarding & Caching Techniques, Client–Server Computing & Adaptation, Transactional Models, Query processing, Data Recovery Process & QoS Issues.



Data Dissemination and Synchronization: Communications Asymmetry, Classification of Data Delivery Mechanisms, Data Dissemination Broadcast Models, Selective Tuning and Indexing Methods, Digital Audio and Video Broadcasting (DAB & DVB). Data Synchronization – Introduction, Software, and Protocols

#### UNIT- V

Mobile Ad hoc Networks (MANETs): Introduction, Applications & Challenges of a MANET, Routing, Classification of Routing Algorithms, Algorithms such as DSR, AODV, DSDV, etc., Mobile Agents, Service Discovery.

Protocols and Platforms for Mobile Computing WAP, Bluetooth, XML, J2ME, JavaCard, PalmOS, Windows CE, SymbianOS, Linux for Mobile Devices.

#### TEXT BOOKS

1. Raj Kamal, "Mobile Computing", Oxford University Press, 2007, ISBN: 0195686772
2. Jochen Schiller, "Mobile Communications", Addison-Wesley, Second Edition, 2004

#### REFERENCE BOOKS

1. Stojmenovic and Cacute, "Handbook of Wireless Networks and Mobile Computing", Wiley, 2002, ISBN 0471419028.
2. Reza Behravanfar, "Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML", ISBN: 0521817331, Cambridge University Press, Oct 2004.

#### Outcomes:

Ability to understand the strengths and limitations of mobile/wireless networks

Ability to design and analyze the performance of location update algorithms for cellular networks;

### (A70532) IMAGE PROCESSING AND PATTERN RECOGNITION

#### (ELECTIVE - I)

#### Objectives:

- Adequate background knowledge about image processing and pattern recognition
- Practical knowledge and skills about image processing and pattern recognition tools
- Necessary knowledge to design and implement a prototype of an image processing and pattern recognition application.

#### UNIT – I

Fundamental steps of image processing, components of an image processing of system. The image model and image acquisition, sampling and quantization, relationship between pixels, distance functions, scanner.

Statistical and spatial operations, Intensity functions transformations, histogram processing, smoothing & sharpening – spatial filters Frequency domain filters, homomorphic filtering, image filtering & restoration. Inverse and weiner filtering, FIR weiner filter, Filtering using image transforms, smoothing splines and interpolation.

#### UNIT – II

Morphological and other area operations, basic morphological operations, opening and closing operations, dilation erosion, Hit or Miss transform, morphological algorithms, extension to grey scale images.

Segmentation and Edge detection region operations, basic edge detection, second order detection, crack edge detection, gradient operators, compass and Laplace operators, edge linking and boundary detection, thresholding, region based segmentation, segmentation by morphological watersheds.

#### UNIT –III

Image compression: Types and requirements, statistical compression, spatial compression, contour coding, quantizing compression, image data compression-predictive technique, pixel coding, transfer coding theory, lossy and lossless predictive type coding, Digital Image Water marking.

#### UNIT –IV

Representation and Description: Chain codes, Polygonal approximation, Signature Boundary Segments, Skelltons, Boundary Descriptors, Regional Descriptors, Relational Descriptors, Principal components for Description,

**UNIT- V**

**Pattern Recognition Fundamentals:** Basic Concepts of pattern recognition, Fundamental problems in pattern recognition system, design concepts and methodologies, example of automatic pattern recognition systems, a simple automatic pattern recognition model

**Pattern classification:** Pattern classification by distance function: Measures of similarity, Clustering criteria, K-means algorithm, Pattern classification by likelihood function: Pattern classification as a Statistical decision problem, Bayes classifier for normal patterns,

**TEXT BOOKS**

1. Digital Image Processing Third edition, Pearson Education, Rafael C. Gonzalez, Richard E. Woods.
2. Pattern recognition Principles: Julius T. Tou, and Rafael C. Gonzalez, Addison-Wesley Publishing Company.
3. Digital Image Processing, M.Anji Reddy, Y.Hari Shankar, BS Publications.

**REFERENCE BOOKS:**

1. Image Processing, Analysis and Machine Vision, Second Edition, Milan Sonka, Vaclav Hlavac and Roger Boyle. Thomson learning
2. Digital Image Processing – William k. Pratt –John Wiley edition.
3. Fundamentals of digital image processing – by A.K. Jain, PHI.
4. Pattern classification, Richard Duda, Hart and David strok John Wiley publishers.
5. Digital Image Processing, S.Jayaraman,S. Esakkirajan, T.Veerakumar, TMH.
6. Pattern Recognition, R.Shinghal, Oxford University Press.

**Outcomes:**

- Ability to apply computer algorithms to practical problems.
- Ability to image segmentation, reconstruction and restoration.
- Ability to perform the classification of patterns

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**(A70539) SOFT COMPUTING****(ELECTIVE - I)****Objectives:**

To give students knowledge of soft computing theories fundamentals, ie. Fundamentals of artificial and neural networks, fuzzy sets and fuzzy logic and genetic algorithms.

**UNIT-I**

AI Problems and Search: AI problems, Techniques, Problem Spaces and Search, Heuristic Search Techniques- Generate and Test, Hill Climbing, Best First Search Problem reduction, Constraint Satisfaction and Means End Analysis. Approaches to Knowledge Representation- Using Predicate Logic and Rules.

**UNIT-II**

Artificial Neural Networks: Introduction, Basic models of ANN, important terminologies, Supervised Learning Networks, Perceptron Networks, Adaptive Linear Neuron, Back propagation Network. Associative Memory Networks. Training Algorithms for pattern association, BAM and Hopfield Networks.

**UNIT-III**

Unsupervised Learning Network- Introduction, Fixed Weight Competitive Nets, Maxnet, Hamming Network, Kohonen Self-Organizing Feature Maps, Learning Vector Quantization, Counter Propagation Networks, Adaptive Resonance Theory Networks. Special Networks-Introduction to various networks.

**UNIT-IV**

Introduction to Classical Sets ( crisp Sets)and Fuzzy Sets- operations and Fuzzy sets. Classical Relations -and Fuzzy Relations- Cardinality, Operations, Properties and composition. Tolerance and equivalence relations.

Membership functions- Features, Fuzzification, membership value assignments, Defuzzification.

**UNIT-V**

Fuzzy Arithmetic and Fuzzy Measures, Fuzzy Rule Base and Approximate Reasoning Fuzzy Decision making

Fuzzy Logic Control Systems. Genetic Algorithm- Introduction and basic operators and terminology. Applications: Optimization of TSP, Internet Search Technique

### TEXT BOOKS:

1. Principles of Soft Computing- S N Sivanandam, S N Deepa, Wiley India, 2007.
2. Soft Computing and Intelligent System Design -Fakhreddine O Karray, Clarence D Silva, Pearson Edition, 2004.

### REFERECE BOOKS :

1. Artificial Intelligence and SoftComputing- Behavioural and Cognitive Modelling of the Human Brain- Amit Konar, CRC press, Taylor and Francis Group.
2. Artificial Intelligence – Elaine Rich and Kevin Knight, TMH, 1991, rp2008.
3. Artificial Intelligence – Patric Henry Winston – Third Edition, Pearson Education.
4. A first course in Fuzzy Logic-Hung T Nguyen and Elbert A Walker, CRC. Press Taylor and Francis Group.
5. Artificial Intelligence and Intelligent Systems,N.P.Padhy, Oxford Univ. Press.

### Outcomes:

- Ability to build intelligent machines using soft computing techniques
- Ability to apply fuzzy logic to handle uncertainty problems.
- Ability to apply neural networks for classifications.

### (A70538) SEMANTIC WEB AND SOCIAL NETWORKS (ELECTIVE – I)

#### Objectives:

- To learn Web Intelligence
- To learn Knowledge Representation for the Semantic Web
- To learn Ontology Engineering
- To learn Semantic Web Applications, Services and Technology
- To learn Social Network Analysis and semantic web

#### UNIT- I

Thinking and Intelligent Web Applications, The Information Age ,The World Wide Web, Limitations of Today's Web, The Next Generation Web.

Machine Intelligence, Artificial Intelligence, Ontology, Inference engines, Software Agents, Berners-Lee www, Semantic Road Map, Logic on the semantic Web.

#### UNIT- II

Ontologies and their role in the semantic web, Ontologies Languages for the Semantic Web –Resource Description Framework(RDF) / RDF Schema, Ontology Web Language(OWL),UML/XML/XML Schema.

Ontology Engineering, Constructing Ontology, Ontology Development Tools, Ontology Methods, Ontology Sharing and Merging, Ontology Libraries and Ontology Mapping.

#### UNIT- III

Logic, Rule and Inference Engines. Semantic Web applications and services, Semantic Search, e-learning, Semantic Bioinformatics, Knowledge Base.

#### UNIT- IV

XML Based Web Services, Creating an OWL-S Ontology for Web Services, Semantic Search Technology, Web Search Agents and Semantic Methods, What is social Networks analysis, development of the social networks analysis, Electronic Sources for Network Analysis – Electronic Discussion networks.

#### UNIT- V

Blogs and Online Communities, Web Based Networks. Building Semantic Web Applications with social network features.

## TEXT BOOKS:

1. Thinking on the Web - Berners Lee, Godel and Turing, Wiley interscience, 2008.
2. Social Networks and the Semantic Web, Peter Mika, Springer, 2007.

## REFERENCE BOOKS:

1. Semantic Web Technologies, Trends and Research in Ontology Based Systems, J. Davies, Rudi Studer, Paul Warren, John Wiley & Sons.
2. Semantic Web and Semantic Web Services - Liyang Lu Chapman and Hall/CRC Publishers, (Taylor & Francis Group)
3. Information Sharing on the semantic Web - Heiner Stuckenschmidt; Frank Van Harmelen, Springer Publications.
4. Programming the Semantic Web, T. Segaran, C. Evans, J. Taylor, O'Reilly, SPD.

## Outcomes:

- Ability to understand and knowledge representation for the semantic web.
- Ability to create ontology.
- Ability to build a blogs and social networks

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### (A70352) OPERATIONS RESEARCH

#### (ELECTIVE-I)

#### UNIT - I

Development - Definition- Characteristics and Phases - Types of models - Operations Research models - applications.

**Allocation:** Linear Programming Problem Formulation - Graphical solution - Simplex method - Artificial variables techniques: Two-phase method, Big-M method.

#### UNIT - II

**Transportation Problem** - Formulation - Optimal solution, unbalanced transportation problem - Degeneracy.

**Assignment problem** - Formulation - Optimal solution - Variants of Assignment Problem- Traveling Salesman problem.

#### UNIT - III

**Sequencing** - Introduction - Flow - Shop sequencing -  $n$  jobs through two machines -  $n$  jobs through three machines - Job shop sequencing - two jobs through 'm' machines

**Replacement:** Introduction - Replacement of items that deteriorate with time - when money value is not counted and counted - Replacement of items that fail completely- Group Replacement.

#### UNIT - IV

**Theory of Games:** Introduction - Terminology- Solution of games with saddle points and without saddle points-  $2 \times 2$  games - dominance principle -  $m \times 2$  &  $2 \times n$  games - graphical method.

**Inventory:** Introduction - Single item, Deterministic models - Purchase inventory models with one price break and multiple price breaks - Stochastic models - demand may be discrete variable or continuous variable - Single Period model and no setup cost.

#### UNIT - V

**Waiting Lines:** Introduction - Terminology- Single Channel - Poisson arrivals and Exponential Service times - with infinite population and finite population models- Multichannel - Poisson arrivals and exponential service times with infinite population.

**DYNAMIC Programming:** Introduction - Terminology- Bellman's Principle of Optimality - Applications of dynamic programming- shortest path problem



– linear programming problem.

**Simulation:** Introduction, Definition, types of simulation models, Steps involved in the simulation process- Advantages and disadvantages- applications of simulation to queuing and inventory.

**TEXT BOOK :**

1. Operations Research /J.K.Sharma 4e. /MacMilan
2. Introduction to O.R/Hillier & Libermann/TMH

**REFERENCE BOOKS :**

1. Introduction to O.R /Taha/PHI
2. Operations Research/ NVS Raju/ SMS Education/3<sup>rd</sup> Revised Edition
3. Operations Research /A.M.Natarajan, P.Balasubramaniam, A. Tamilarasi/Pearson Education.
4. Operations Research / Wagner/ PHI Publications.
5. Operations Research/M.V. Durga Prasad, K, Vijaya Kumar Reddy, J. Suresh Kumar/ Cengage Learning.

**(A70540) SOFTWARE PROJECT MANAGEMENT**

**(Elective-II)**

**Objectives:**

The main goal of software development projects is to create a software system with a predetermined functionality and quality in a given time frame and with given costs. For achieving this goal, models are required for determining target values and for continuously controlling these values. This course focuses on principles, techniques, methods & tools for model-based management of software projects, assurance of product quality and process adherence (quality assurance), as well as experience-based creation & improvement of models (process management). The goals of the course can be characterized as follows:

1. Understanding the specific roles within a software organization as related to project and process management
2. Understanding the basic infrastructure competences (e.g., process modeling and measurement)
3. Understanding the basic steps of project planning, project management, quality assurance, and process management and their relationships

**UNIT-I**

Conventional Software Management: The waterfall model, conventional software Management performance. Evolution of Software Economics: Software Economics, pragmatic software cost estimation.

**UNIT-II**

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- III**

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- IV

Work Flows of the process : Software process workflows, Inter trans 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, Interaction planning process, Pragmatic planning.

Project Organizations and Responsibilities : Line-of-Business Organizations. Project Organizations, evolution of Organizations.

Process Automation : Automation Building Blocks, The Project Environment.

#### UNIT- V

Project Control and Process instrumentation : The server care Metrics, Management indicators, quality indicators, life cycle expectations pragmatic Software Metrics, Metrics automation. Tailoring the Process: Process discriminants, Example.

Future Software Project Management : Modern Project Profiles Next generation .

Software economics, modern Process transitions.

Case Study : The Command Centre Processing and Display System- Replacement(CCPDS-R).

#### TEXT BOOKS:

1. Software Project Management, Walker Royce, Pearson Education.
2. Software Project Management, Bob Hughes & Mike Cotterell, fourth edition, Tata Mc-Graw Hill.

#### REFERENCE BOOKS:

1. Applied Software Project Management, Andrew Stellman & Jennifer Greene, O'Reilly, 2006
2. Head First PMP, Jennifer Greene & Andrew Stellman, O'Reilly, 2007
3. Software Engineering Project Management, Richard H. Thayer & Edward Yourdon, second edition, Wiley India, 2004.
4. Agile Project Management, Jim Highsmith, Pearson education, 2004
5. The art of Project management, Scott Berkun, O'Reilly, 2005.
6. Software Project Management in Practice, Pankaj Jalote, Pearson Education, 2002.

#### Outcomes:

At the end of the course, the student shall be able to:

- Describe and determine the purpose and importance of project management from the perspectives of planning, tracking and completion of project.
- Compare and differentiate organisation structures and project structures.
- Implement a project to manage project schedule, expenses and resources with the application of suitable project management tools.

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**BIG DATA ANALYTICS (ASSOCIATE ANALYTICS – II)**  
(Elective-I)

**Unit I:**

**Data Management (NOS 2101):**

Design Data Architecture and manage the data for analysis, understand various sources of Data like Sensors/signal/GPS etc. Data Management, Data Quality (noise, outliers, missing values, duplicate data) and Data Preprocessing.

Export all the data onto Cloud ex. AWS/Rackspace etc.

**Maintain Healthy, Safe & Secure Working Environment (NOS 9003):**

Introduction, workplace safety, Report Accidents & Emergencies, Protect health & safety as your work, course conclusion, assessment

**Unit II**

**Big Data Tools (NOS 2101):**

Introduction to Big Data tools like Hadoop, Spark, Impala etc., Data ETL process, Identify gaps in the data and follow-up for decision making.

**Provide Data/Information in Standard Formats (NOS 9004):**

Introduction, Knowledge Management, Standardized reporting & compliances, Decision Models, course conclusion, Assessment.

**Unit III**

**Big Data Analytics:**

Run descriptives to understand the nature of the available data, collate all the data sources to suffice business requirement, Run descriptive statistics for all the variables and observe the data ranges, Outlier detection and elimination.

**Unit IV**

**Machine Learning Algorithms (NOS 9003):**

Hypothesis testing and determining the multiple analytical methodologies, Train Model on 2/3 sample data using various Statistical/Machine learning algorithms, Test model on 1/3 sample for prediction etc.

**Unit V**

**(NOS 9004)**

**Data Visualization (NOS 2101):**

Prepare the data for Visualization, Use tools like Tableau, QlickView and D3, Draw insights out of Visualization tool.

Product Implementation

**TEXT BOOK:**

1. Student's Handbook for Associate Analytics.

**REFERENCE BOOKS:**

5. Introduction to Data Mining, Tan, Steinbach and Kumar, Addison Wesley, 2006
6. Data Mining Analysis and Concepts, M. Zaki and W. Meira (the authors have kindly made an online version available): <http://www.dataminingbook.info/uploads/book.pdf>
7. Mining of Massive Datasets Jure Leskovec Stanford Univ. Anand RajaramanMilliway Labs Jeffrey D. Ullman Stanford Univ.
8. ([http://www.vistrails.org/index.php/Course:\\_Big\\_Data\\_Analysis](http://www.vistrails.org/index.php/Course:_Big_Data_Analysis))

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**INFORMATION SECURITY ASSESSMENTS & AUDITS ( SECURITY ANALYST – II)**  
(Elective-I)

**Unit I**

**Information Security Performance Metrics and Audit:**

Security Metrics and Reporting, Common Issues and Variances of Performance Metrics, Introduction to Security Audit, Servers and Storage devices, Infrastructure and Networks, Communication Routes, Information Security Methodologies (Black-box, White-box, Grey-box), Phases of Information Security Audit and Strategies, Ethics of an Information Security Auditor etc.

Maintain Healthy, Safe & Secure Working environment (NOS 9003).

**Unit II**

**Information Security Audit Tasks, Reports and Post Auditing Actions:**

Pre-audit checklist, Information Gathering, Vulnerability Analysis, External Security Audit, Internal Network Security Audit, Firewall Security Audit, IDS Security Auditing, Social Engineering Security Auditing, Web Application Security Auditing, Information Security Audit Deliverables & Writing Report, Result Analysis, Post Auditing Actions, Report Retention etc.

Provide Data/Information in Standard formats (NOS 9004).

**Unit III**

**Vulnerability Management:**

Information Security Vulnerabilities – Threats and Vulnerabilities, Human-based Social Engineering, Computer-based Social Engineering, Social Media Countermeasures, Vulnerability Management – Vulnerability Scanning, Testing, Threat management, Remediation etc.

**Unit IV**

**Information Security Assessments:**

Vulnerability Assessment, Classification, Types of Vulnerability Assessment, Vulnerability Assessment Phases, Vulnerability Analysis Stages, Characteristics of a Good Vulnerability Assessment Solutions & Considerations, Vulnerability Assessment Reports – Tools and choosing a right Tool, Information Security Risk Assessment, Risk Treatment, Residual Risk, Risk Acceptance, Risk Management Feedback Loops etc.

**Unit V**

**Configuration Reviews:**

Introduction to Configuration Management, Configuration Management Requirements-Plan-Control, Development of configuration Control Policies, Testing Configuration Management etc.

**TEXT BOOKS:**

Prescribed books:-

1. Assessing Information Security (strategies, tactics, logic and framework) by A Vladimirov, K.Gavrilenko, and A.Michajlowski
2. "The Art of Computer Virus Research and Defense by Peter Szor."

**REFERENCES:**

1. <https://www.sans.org/reading-room/whitepapers/threats/implementing-vulnerability-management-process-34180>
2. <http://csrc.nist.gov/publications/nistpubs/800-40-Ver2/SP800-40v2.pdf>



**(A70529) COMPUTER GRAPHICS****(Elective- II)****Objectives:**

- To make students understand about fundamentals of Graphics to enable them to design animated scenes for virtual object creations.
- To make the student present the content graphically.

**UNIT- I**

**Introduction:** Application areas of Computer Graphics, overview of graphics systems, video-display devices, raster-scan systems, random scan systems, graphics monitors and work stations and input devices

**Output primitives:** Points and lines, line drawing algorithms, mid-point circle and ellipse algorithms. Filled area primitives: Scan line polygon fill algorithm, boundary-fill and flood-fill algorithms.

**UNIT- II**

**2-D Geometrical transforms:** Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems.

**2-D Viewing:** The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland-Hodgeman polygon clipping algorithm.

**UNIT- III**

**3-D Object representation:** Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-spline curves, Bezier and B-spline surfaces, sweep representations, octrees BSP Trees.

**3-D Geometric transformations:** Translation, rotation, scaling, reflection and shear transformations, composite transformations, 3-D viewing: Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping.

**UNIT- IV**

**Visible surface detection methods:** Classification, back-face detection, depth-buffer, scan-line, depth sorting, BSP-tree methods, area sub-division and octree methods

**Illumination Models and Surface rendering Methods:** Basic illumination models, polygon rendering methods

**UNIT- V**

**Computer animation:** Design of animation sequence, general computer animation functions, raster animation, computer animation languages, key frame systems, motion specifications

**TEXT BOOKS:**

- "Computer Graphics C version", Donald Hearn and M. Pauline Baker, Pearson education.
- "Computer Graphics Second edition", Zhigang xiang, Roy Plasterock, Schaum's outlines, Tata Mc Graw hill edition.

**REFERENCE BOOKS:**

- "Computer Graphics Principles & practice", second edition in C, Foley, VanDam, Feiner and Hughes, Pearson Education.
- "Procedural elements for Computer Graphics", David F Rogers, Tata Mc Graw hill, 2nd edition.
- "Principles of Interactive Computer Graphics", Neuman and Sproul, TMH.
- "Principles of Computer Graphics", Shalini, Govil-Pai, Springer.
- "Computer Graphics", Steven Harrington, TMH
- Computer Graphics, F.S.Hill, S.M.Kelley, PHI.
- Computer Graphics, P.Shirley, Steve Marschner & Others, Cengage Learning.
- Computer Graphics & Animation, M.C.Trivedi, Jaico Publishing House.
- An Integrated Introduction to Computer Graphics and Geometric Modelling, R.Goldman, CRC Press, Taylor&Francis Group.
- Computer Graphics, Rajesh K.Maurya, Wiley India.

**Outcomes:**

- Students can animate scenes entertainment.
- Will be able work in computer aided design for content presentation.
- Better analogy data with pictorial representation.

**(A70531) HUMAN COMPUTER INTERACTION**

**(Elective - II)**

**Objectives:**

You will gain an overview of Human-Computer Interaction (HCI), with an understanding of user interface design in general, and alternatives to traditional "keyboard and mouse" computing; become familiar with the vocabulary associated with sensory and cognitive systems as relevant to task performance by humans; be able to apply models from cognitive psychology to predicting user performance in various human-computer interaction tasks and recognize the limits of human performance as they apply to computer operation; appreciate the importance of a design and evaluation methodology that begins with and maintains a focus on the user; be familiar with a variety of both conventional and non-traditional user interface paradigms, the latter including virtual and augmented reality, mobile and wearable computing, and ubiquitous computing; and understand the social implications of technology and their ethical responsibilities as engineers in the design of technological systems. Finally, working in small groups on a product design from start to finish will provide you with invaluable team-work experience.

**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.

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- III**

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

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

**UNIT- IV**

Software tools – Specification methods, Interface – Building Tools.

**UNIT- V**

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

**TEXT BOOKS:**

1. The essential guide to user interface design, Wilbert O Galitz, Wiley DreamTech.
2. Designing the user interface. 3rd Edition Ben Shneidermann, Pearson Education Asia.

**REFERENCE BOOKS:**

1. Human – Computer Interaction. Alan Dix, Janet Fincay, Gre Goryd, Abowd, Russell Bealg, Pearson Education
2. Interaction Design Prece, Rogers, Sharps. Wiley Dreamtech.
3. User Interface Design, Soren Lauesen , Pearson Education.
4. Human –Computer Interaction,D.R.Olsen, Cengage Learning.
5. Human –Computer Interaction, Smith - Atakan, Cengage Learning.

**Outcomes:**

Ability to apply HCI and principles to interaction design.

Ability to design certain tools for blind or PH people.

### (A70537) SCRIPTING LANGUAGES (Elective – II)

#### Objectives:

The course demonstrates an in depth understanding of the tools and the scripting languages necessary for design and development of applications dealing with Bio-information/ Bio-data. The instructor is advised to discuss examples in the context of Bio-data/ Bio-information application development.

#### UNIT – I

**Introduction to PERL and Scripting:** Scripts and Programs, Origin of Scripting , Scripting Today, Characteristics of Scripting Languages, Uses for Scripting Languages, Web Scripting, and the universe of Scripting Languages. PERL- Names and Values, Variables, Scalar Expressions, Control Structures, arrays, list, hashes, strings, pattern and regular expressions, subroutines.

#### UNIT – II

**Advanced perl:** Finer points of looping, pack and unpack, filesystem, eval, data structures, packages, modules, objects, interfacing to the operating system, Creating Internet ware applications, Dirty Hands Internet Programming, security Issues.

#### PHP Basics

PHP Basics- Features, Embedding PHP Code in your Web pages, Outputting the data to the browser, Datatypes, Variables, Constants, expressions, string interpolation, control structures . Function, Creating a Function, Function Libraries, Arrays, strings and Regular Expressions.

#### UNIT – III

**Advanced PHP Programming:** PHP and Web Forms, Files, PHP Authentication and Methodologies -Hard Coded, File Based, Database Based, IP Based, Login Administration, Uploading Files with PHP, Sending Email using PHP, PHP Encryption Functions, the Mcrypt package, Building Web sites for the World.

#### UNIT – IV

**TCL :** TCL Structure, syntax, Variables and Data in TCL, Control Flow, Data Structures, input/output, procedures , strings , patterns, files, Advance TCL- eval, source, exec and uplevel commands, Name spaces, trapping errors, event driven programs, making applications internet aware, Nuts and Bolts Internet Programming, Security Issues, C Interface.

Tk-Visual Tool Kits, Fundamental Concepts of Tk, Tk by example, Events and Binding, Perl-Tk.

#### UNIT – V

**Python:** Introduction to Python language, python-syntax, statements, functions, Built-in-functions and Methods, Modules in python, Exception Handling.

Integrated Web Applications in Python – Building Small, Efficient Python Web Systems ,Web Application Framework.

#### TEXT BOOKS:

1. The World of Scripting Languages, David Barron, Wiley Publications.
2. Python Web Programming , Steve Holden and David Beazley, New Riders Publications.
3. Beginning PHP and MySQL , 3<sup>rd</sup> Edition , Jason Gilmore, Apress Publications (Dream tech.).

#### REFERENCE BOOKS:

1. Open Source Web Development with LAMP using Linux, Apache, MySQL, Perl and PHP, J.Lee and B.Ware (Addison Wesley) Pearson Education.
2. Programming Python, M.Lutz, SPD.
3. PHP 6 Fast and Easy Web Development, Julie Meloni and Matt Telles, Cengage Learning Publications.
4. PHP 5.1, I.Bayross and S.Shah, The X Team, SPD.
5. Core Python Programming, Chun, Pearson Education.

#### Outcomes:

- Ability to understand the differences between scripting languages.
- Ability to apply your knowledge of the weaknesses of scripting languages to select implementation.
- Master an understanding of python especially the object oriented concepts.

**(A70528) COMPUTER FORENSICS**  
**(Elective-II)**

**Objectives:**

- A brief explanation of the objective is to provide digital evidences which are obtained from digital media.
- In order to understand the objectives of computer forensics, first of all, people have to recognize the different roles computer plays in a certain crime.
- According to a snippet from the United States Security Service, the functions computer has in different kinds of crimes.

**UNIT – I**

**Computer Forensics Fundamentals:** What is Computer Forensics?, Use of Computer Forensics in Law Enforcement, Computer Forensics Assistance to Human Resources/Employment Proceedings, Computer Forensics Services, Benefits of Professional Forensics Methodology, Steps taken by Computer Forensics Specialists

**Types of Computer Forensics Technology:** Types of Military Computer Forensic Technology, Types of Law Enforcement – Computer Forensic Technology – Types of Business Computer Forensic Technology

**Computer Forensics Evidence and Capture:** Data Recovery Defined – Data Back-up and Recovery – The Role of Back-up in Data Recovery – The Data-Recovery Solution

**UNIT – II**

**Evidence Collection and Data Seizure:** Why Collect Evidence? Collection Options – Obstacles – Types of Evidence – The Rules of Evidence – Volatile Evidence – General Procedure – Collection and Archiving – Methods of Collection – Artifacts – Collection Steps – Controlling Contamination: The Chain of Custody

**Duplication and Preservation of Digital Evidence:** Preserving the Digital Crime Scene – Computer Evidence Processing Steps – Legal Aspects of Collecting and Preserving Computer Forensic Evidence

**Computer Image Verification and Authentication:** Special Needs of Evidential Authentication – Practical Consideration – Practical Implementation

**UNIT – III**

**Computer Forensics analysis and validation:** Determining what data to

collect and analyze, validating forensic data, addressing data-hiding techniques, performing remote acquisitions

**Network Forensics:** Network forensics overview, performing live acquisitions, developing standard procedures for network forensics, using network tools, examining the honeynet project.

**Processing Crime and Incident Scenes:** Identifying digital evidence, collecting evidence in private-sector incident scenes, processing law enforcement crime scenes, preparing for a search, securing a computer incident or crime scene, seizing digital evidence at the scene, storing digital evidence, obtaining a digital hash, reviewing a case

**UNIT – IV**

**Current Computer Forensic tools:** evaluating computer forensic tool needs, computer forensics software tools, computer forensics hardware tools, validating and testing forensics software

**E-Mail Investigations:** Exploring the role of e-mail in investigation, exploring the roles of the client and server in e-mail, investigating e-mail crimes and violations, understanding e-mail servers, using specialized e-mail forensic tools

**Cell phone and mobile device forensics:** Understanding mobile device forensics, understanding acquisition procedures for cell phones and mobile devices.

**UNIT – V**

**Working with Windows and DOS Systems:** understanding file systems, exploring Microsoft File Structures, Examining NTFS disks, Understanding whole disk encryption, windows registry, Microsoft startup tasks, MS-DOS start up tasks, virtual machines.

**TEXT BOOKS:**

1. Computer Forensics, Computer Crime Investigation by John R. Vacca, Firewall Media, New Delhi.
2. Computer Forensics and Investigations by Nelson, Phillips Enfinger, Steuart, CENGAGE Learning

**REFERENCE BOOKS:**

1. Real Digital Forensics by Keith J. Jones, Richard Bejtlich, Curtis W. Rose, Addison- Wesley Pearson Education
2. Forensic Compiling, A Tractitioneris Guide by Tony Sammes and Brian Jenkinson, Springer International edition.
3. Computer Evidence Collection & Presentation by Christopher L.T. Brown, Firewall Media.
4. Homeland Security, Techniques & Technologies by Jesus Mena, Firewall Media.



5. Software Forensics Collecting Evidence from the Scene of a Digital Crime by Robert M. Slade, TMH 2005
6. Windows Forensics by Chad Steel, Wiley India Edition.

#### Outcomes:

- Students will be understanding the usage of computers in forensic, and how to use various forensic tools for a wide variety of investigations.
- It gives an opportunity to students to continue their zeal in research in computer forensics.

#### (A70593) CASE TOOLS AND SOFTWARE TESTING LAB

#### Objectives:

- Understand how UML supports the entire OOAD process.
- Become familiar with all phases of OOAD.
- Understand different software testing techniques and strategies.
- Understand the procedure to write test plan and execution.
- Understand different software testing tools and their features

#### CASE TOOLS LAB

Students are divided into batches of 5 each and each batch has to draw the following diagrams using UML for an ATM system whose description is given below.

UML diagrams to be developed are:

1. Use Case Diagram.
2. Class Diagram.
3. Sequence Diagram.
4. Collaboration Diagram.
5. State Diagram
6. Activity Diagram.
7. Component Diagram
8. Deployment Diagram.
9. Test Design.

#### Description for an ATM System

The software to be designed will control a simulated automated teller machine (ATM) having a magnetic stripe reader for reading an ATM card, a customer console (keyboard and display) for interaction with the customer, a slot for depositing envelopes, a dispenser for cash (in multiples of Rs. 100, Rs. 500 and Rs. 1000), a printer for printing customer receipts, and a key-operated switch to allow an operator to start or stop the machine. The ATM will communicate with the bank's computer over an appropriate communication link. (The software on the latter is not part of the requirements for this problem.)

The ATM will service one customer at a time. A customer will be required to insert an ATM card and enter a personal identification number (PIN) - both of which will be sent to the bank for validation as part of each transaction.

The customer will then be able to perform one or more transactions. The card will be retained in the machine until the customer indicates that he/she desires no further transactions, at which point it will be returned - except as noted below.

The ATM must be able to provide the following services to the customer:

1. A customer must be able to make a cash withdrawal from any suitable account linked to the card, in multiples of Rs. 100 or Rs. 500 or Rs. 1000. Approval must be obtained from the bank before cash is dispensed.
2. A customer must be able to make a deposit to any account linked to the card, consisting of cash and/or checks in an envelope. The customer will enter the amount of the deposit into the ATM, subject to manual verification when the envelope is removed from the machine by an operator. Approval must be obtained from the bank before physically accepting the envelope.
3. A customer must be able to make a transfer of money between any two accounts linked to the card.
4. A customer must be able to make a balance inquiry of any account linked to the card.
5. A customer must be able to abort a transaction in progress by pressing the Cancel key instead of responding to a request from the machine.

The ATM will communicate each transaction to the bank and obtain verification that it was allowed by the bank. Ordinarily, a transaction will be considered complete by the bank once it has been approved. In the case of a deposit, a second message will be sent to the bank indicating that the customer has deposited the envelope. (If the customer fails to deposit the envelope within the timeout period, or presses cancel instead, no second message will be sent to the bank and the deposit will not be credited to the customer.)

If the bank determines that the customer's PIN is invalid, the customer will be required to re-enter the PIN before a transaction can proceed. If the customer is unable to successfully enter the PIN after three tries, the card will be permanently retained by the machine, and the customer will have to contact the bank to get it back.

If a transaction fails for any reason other than an invalid PIN, the ATM will display an explanation of the problem, and will then ask the customer whether he/she wants to do another transaction.

The ATM will provide the customer with a printed receipt for each successful transaction

The ATM will have a key-operated switch that will allow an operator to start and stop the servicing of customers. After turning the switch to the „on”

position, the operator will be required to verify and enter the total cash on hand. The machine can only be turned off when it is not servicing a customer. When the switch is moved to the „off” position, the machine will shut down, so that the operator may remove deposit envelopes and reload the machine with cash, blank receipts, etc.

#### Outcomes:

- Ability to understand the history, cost of using and building CASE tools.
- Ability to construct and evaluate hybrid CASE tools by integrating existing tools.
- Ability to deliver the product with qualitative.

#### SOFTWARE TESTING LAB

##### List of Experiments

1. Write programs in 'C' Language to demonstrate the working of the following constructs:  
i) do...while ii) while....do iii) if...else iv) switch v) for
2. "A program written in 'C' language for Matrix Multiplication fails" Introspect the causes for its failure and write down the possible reasons for its failure.
3. Take any system (e.g. ATM system) and study its system specifications and report the various bugs.
4. Write the test cases for any known application (e.g. Banking application)
5. Create a test plan document for any application (e.g. Library Management System)
6. Study of any testing tool (e.g. Win runner)
7. Study of any web testing tool (e.g. Selenium)
8. Study of any bug tracking tool (e.g. Bugzilla, bugbit)
9. Study of any test management tool (e.g. Test Director)
10. Study of any open source-testing tool (e.g. Test Link)
11. Take a mini project (e.g. University admission, Placement Portal) and execute it. During the Life cycle of the mini project create the various testing documents\* and final test report document.

\*Note: To create the various testing related documents refer to the text "Effective Software Testing Methodologies by William E. Perry"

(A70597) MOBILE APPLICATIONS DEVELOPMENT LAB

Contents

Mobile Application Development (Through J2ME) LABORATORY

Objectives:

- Week - 1: Installation of Java Wireless Toolkit (J2ME)
- Week - 2 Working with J2ME Features
- Week - 3 Threads & High Level UI
- Week - 4 Working on Drawing and Images
- Week - 5 Developing Networked Applications using the Wireless Toolkit
- Week - 6 Authentication with a Web Server
- Week - 7 & 8 Web Application using J2ME

Outcomes:

- 1. Ability to install J2ME toolkit.
- 2. Ability to develop the user interface and authenticate with a Web Server..
- 3. Ability to design Web application using J2ME.

Mobile Application Development (Through J2ME) LABORATORY

Objective:

In this lab, a student is expected to design, implement, document and present a mobile client/server system using standard Java and Java 2 Micro Edition (J2ME) platform. Specifically it is required to design and implement a system that consists mainly of a mobile client (MC) and a Proxy Server (PS). MC will be written in J2ME, MIDP 2.0, while PS will be written in standard Java. It is necessary to use a mobile phone emulator to develop and demonstrate the experiments.

It may be necessary to use other components or existing resources (servers) as needed. For instance a database local to PS or a web service available on the Internet that can be invoked by the PS.

Week - 1: Installation of Java Wireless Toolkit (J2ME)

- 1) If the Java Development Kit (JDK) is not there or only having the Java Runtime Environment (JRE) installed, install the latest JDK from <http://java.sun.com/javase/downloads/index.jsp>. Current stable release of Java is JDK 6 Update 7 but check the web page in case there are newer non-beta releases available.

- 2) Next, download the **Java Wireless Toolkit** (formerly called J2ME Wireless Toolkit) from: <http://java.sun.com/products/sjwtoolkit/download.html>.
- 3) Run the installer (for example, for Windows it is: `sun_java_wireless_toolkit-2_5_2-windows.exe`). The installer checks whether a compatible Java environment has been pre-installed. If not, it is necessary to uninstall old versions of Java and perform Step 1 again.

Once after successful installation of Java and the tool kit compile this program and run the following program in the toolkit.

Steps to run this program in toolkit:

- 1. Start -> All Programs -> Sun Java Tool Kit -> Wireless Tool Kit
- 2. Click New Project - Enter Project Name -> Enter Class Name -> Click on Create Project.
- 3. Choose appropriate API Selection and Configurations:
- 4. Place Java Source file in WTK2.1 / WTK2.2\ apps\ projectname\ src
- 5. Build the Project.
- 6. Run the Project.

```
import javax.microedition.lcdui.*;
import javax.microedition.midlet.*;
public class HelloWorld extends MIDlet{
    private Form form;
    private Display display;
    public HelloWorld(){
        super();
    }
    public void startApp(){
        form = new Form("Hello World");
        String msg = "Hello World!!!!!!";
        form.append(msg);
        display = Display.getDisplay(this);
        display.setCurrent(form);
    }
    public void pauseApp(){}
    public void destroyApp(boolean unconditional){
        notifyDestroyed();
    }
}
```

## Week - 2 Working with J2ME Features:

Working with J2ME Features: Say, creating a *Hello World* program Experiment with the most basic features and mobile application interaction concepts (lists, text boxes, buttons, radio boxes, soft buttons, graphics, etc)

### 2.1 Create a program which creates to following kind of menu.

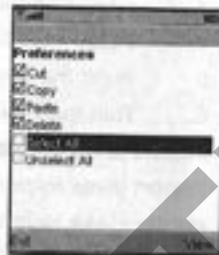
- \* cut
- \* copy
- \* past
- \* delete
- \* select all
- \* unselect all



### 2.2 Event Handling.

Create a menu which has the following options:

- \* cut - can be on/off
- \* copy - can be on/off
- \* paste - can be on/off
- \* delete - can be on/off
- \* select all - put all 4 options on
- \* unselect all - put all 4 options off



### 2.3. Input checking

Create an MIDP application which examine, that a phone number, which a user has entered is in the given format.

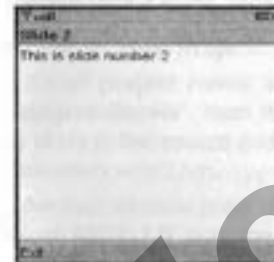
- \* Area code should be one of the following: 040, 041, 050, 0400, 044
- \* There should 6-8 numbers in telephone number (+ area code)



## Week - 3 Threads & High Level UI:

3.1. Create a slide show which has three slides, which includes only text. Program should change to the new slide after 5 seconds. After the third

slide program returns to the first slide.

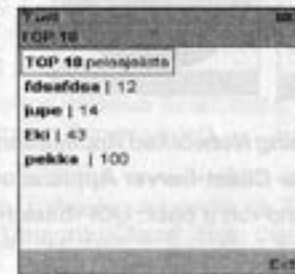
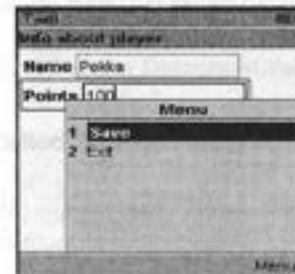


### 3.2 High-level UI

Create a MIDP application, which show to the user 5-10 quiz questions. All questions have 4 possible options and one right option exactly. Application counts and shows to the user how many right answers were right and shows them to user.



3.3 Create a MIDP application, where the user can enter player name and points. The program saves the information to the record using RMS at MIDP device. Program should also print out the top 10 player list to the end user. You can use this class in your game if you made own class for saving and reading record sets.





## Week - 4 Working on Drawing and Images

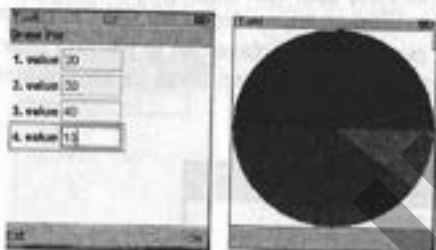
4.1 Create a slide show which has three slides, which includes pictures at PNG format. Program should change to the new slide after 5 seconds.



4.2 Create a MIDP application, which draws a bar graph to the display. Data values can be given at int[] array.



4.3 Create a MIDP application, which draws a bar graph to the display. Data values can be given at int[] array. You can enter four data (integer) values to the input text field.



## Week - 5 Developing Networked Applications using the Wireless Toolkit

### Creating a Simple Client-Server Application

Create, compile and run a basic UDP-based client-server application.

### Creating the Datagram Server project

- 1) Click on Wireless Toolkit 2.5.2 under the group: **All Programs?Sun Java (TM) Wireless Toolkit 2.5.2**.
- 2) Click on 'New Project...' button.
- 3) Enter project name as '**DatagramServer**'. Enter MIDlet name as '**DatagramServer**'. Note that the Midlet name is the same as the name of the class in the source code, which extends the MIDlet class, otherwise the application won't run.
- 4) Another window pops up where it is required to select a target platform. Select '**MIDP 1.0**' from the drop down list.
- 5) After clicking OK, the project is created, and the Wireless Toolkit tells that the name of the folder where source code files are created. The path of the source code folder is displayed in the debug output window.

### Creating and Compiling the DatagramServer source files

The Wireless Toolkit does not come with an IDE by default so Use any IDE or a text editor like Notepad.

- 1) Create a new text file called **DatagramServer.java** in the source folder of the project. The exact path of this folder is displayed in the Wireless Toolkit window.
- 2) Paste contents **DatagramServer.java** from into the source file.

### Running your Server application on the Phone simulator

- 1) After compiling the project successfully, click on the Run button in the Wireless Toolkit window.
- 2) A graphical window depicting a phone handset will appear with the name of your application highlighted on its screen as shown below.
- 3) To start the application, click on the right soft-key (marked with a dot) below the '**Launch**' command.
- 4) The phone simulator might ask if it is OK to run the network application. Select '**Yes**' by clicking on the appropriate soft-key. The server is now up and running.
- 5) Keep the server running during the creation, compilation and running of the Datagram Client application.

### Creating the DatagramClient project

- 1) Use the same instance of the Wireless Toolkit that is used for creating and compiling the Datagram Server project.
- 2) Click on 'New Project...' button.
- 3) A new window pops up. Enter project name as '**DatagramClient**'. Enter MIDlet name as '**DatagramClient**'. Note that the Midlet name

is the same as the name of the class in the source code, which extends the MIDlet class.

- 4) Another window pops up where one has to select a target platform. Select 'MIDP 1.0' from the drop down list.
- 5) After clicking OK, the project is created and the Wireless Toolkit tells where to place the source code files. The path of the source code folder is displayed in the debug output window as explained before.

#### Creating and Compiling the DatagramClient source files

- 1) Create a new text file called **DatagramClient.java** in the source folder of the project.
- 2) Paste contents **DatagramClient.java** into the source file.
- 3) Then click on the Build button in the Wireless Toolkit window. If the compilation is OK, it will say Build Complete in the window's debug output window, otherwise it will show the errors. **Note:** In the source code, use the `System.out.println()` statement to output debug information to this window.

#### Running your Client application on the Phone simulator

- 1) After compiling the project successfully, click on the Run button in the Wireless Toolkit window.
- 2) A graphical window depicting a phone handset will appear with the name of the application highlighted on its screen.
- 3) To start the application, click on the right soft-key (marked with a dot) below the 'Launch' command.
- 4) The phone simulator might ask if it is OK to run the network application. Select 'Yes' by clicking on the appropriate soft-key. The client is now up and running.
- 5) When the client executes on the phone simulator, one should see a text box with the caption 'Message'. Enter any message and press the right soft-key (corresponding to Send). If the client-server application is working properly, the screen of the server phone will display the message sent by the client and the client screen will now display a message sent by the server in response. The response message from the server is the original client message in reverse.
- 6) Try various features of the phone simulator including the different look-and feel options.

#### Week - 6 Authentication with a Web Server

##### 6.1 Write a sample program to show how to make a SOCKET Connection from J2ME phone.

This J2ME sample program shows how to how to make a SOCKET

Connection from a J2ME Phone. Many a times there is a need to connect backend HTTP server from the J2ME application. shows how to make a SOCKET connection from the phone to port 80.

##### 6.2 Login to HTTP Server from a J2ME Program

This J2ME sample program shows how to display a simple LOGIN SCREEN on the J2ME phone and how to authenticate to a HTTP server.

Many J2ME applications for security reasons require the authentication of the user. This free J2ME sample program, shows how a J2ME application can do authentication to the backend server.

**Note:** Use Apache Tomcat Server as Web Server and Mysql as Database Server.

#### Week - 7 & 8 Web Application using J2ME

The following should be carried out with respect to the given set of application domains: (Assume that the Server is connected to the well-maintained database of the given domain. Mobile Client is to be connected to the Server and fetch the required data value/information)

- Students Marks Enquiry
- Town/City Movie Enquiry
- Railway/Road/Air (For example PNR) Enquiry/Status
- Sports (say, Cricket) Update
- Town/City Weather Update
- Public Exams (say Intermediate or SSC)/ Entrance (Say EAMCET) Results Enquiry

Divide Students into Batches and suggest them to design database according to their domains and render information according to their requests.

#### IV YEAR II SEMESTER

Code	Subject	L	T/P/D	C
	Management Science	4	-	4
	<b>ELECTIVE III</b>	4	-	4
	Web Services			
	E – Commerce			
	Middleware Technologies			
	Ad hoc and Sensor Networks			
	<i>Predictive Analytics (Associate Analytics-3) **</i>			
	<i>Information Security Incident Response &amp; Management (Security Analyst-3) **</i>			
	<b>ELECTIVE IV</b>	4	-	4
	Multimedia & Rich Internet Applications			
	Artificial Intelligence			
	Storage Area Networks			
	Machine Learning			
	Industry Oriented Mini Project	-	-	2
	Seminar	-	6	2
	Project Work	-	15	10
	Comprehensive Viva	-	-	2
	<b>Total</b>	<b>12</b>	<b>21</b>	<b>28</b>

Note: All End Examinations (Theory and Practical) are of three hours duration.

T Tutorial L – Theory P – Practical/Drawing C Credits

**\*\* For registering for Predictive Analytics the prerequisite is Big Data Analytics.**

**\*\* For registering for Information Security Incident Response & Management the prerequisite is Information Security Assessments & Audits.**

**Note:**

1) Qualification pack for **ASSOCIATE ANALYTICS** includes the following three subjects.

1. Introduction to Analytics
2. Big Data Analytics
3. Predictive Analytics

2) Qualification pack for **SECURITY ANALYST** includes the following three subjects.

1. Information Security Management,
2. Information Security Assessments & Audits.
3. Information Security Incident Response & Management

# JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. IT/CST-II Sem

L	T/P/D	C
4	-/-	4

## (A80014) MANAGEMENT SCIENCE

### Objectives:

This course is intended to familiarise the students with the framework for the managers and leaders available for understanding and making decisions relating to issues related organisational structure, production operations, marketing, Human resource Management, product management and strategy.

### UNIT -I:

**Introduction to Management and Organisation:** Concepts of Management and organization- nature, importance and Functions of Management, Systems Approach to Management - Taylor's Scientific Management Theory – Fayal's Principles of Management – Maslow's theory of Hierarchy of Human Needs – Douglas McGregor's Theory X and Theory Y – Herzberg Two Factor Theory of Motivation - Leadership Styles, Social responsibilities of Management. Designing Organisational Structures: Basic concepts related to Organisation - Departmentation and Decentralisation, Types and Evaluation of mechanistic and organic structures of organisation and suitability.

### UNIT -II:

**Operations and Marketing Management:** Principles and Types of Plant Layout-Methods of production (Job, batch and Mass Production), Work Study -Basic procedure involved in Method Study and Work Measurement – Business Process Reengineering (BPR) - Statistical Quality Control: control charts for Variables and Attributes (simple Problems) and Acceptance Sampling, TQM, Six Sigma, Deming's contribution to quality. Objectives of Inventory control, EOQ, ABC Analysis, Purchase Procedure, Stores Management and Stores Records – JIT System, Supply Chain Management, Functions of Marketing, Marketing Mix, and Marketing Strategies based on Product Life Cycle, Channels of distribution.

### UNIT -III:

**Human Resources Management (HRM):** Concepts of HRM, HRD and Personnel Management and Industrial Relations (PMIR), HRM vs PMIR, Basic functions of HR Manager, Manpower planning, Recruitment, Selection, Training and Development, Placement, Wage and Salary Administration,

Promotion, Transfer, Separation, Performance Appraisal, Grievance Handling and Welfare Administration, Job Evaluation and Merit Rating – Capability Maturity Model (CMM) Levels – Performance Management System.

### UNIT -IV:

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

### UNIT -V:

**Strategic Management and Contemporary Strategic Issues:** Mission, Goals, Objectives, Policy, Strategy, Programmes, Elements of Corporate Planning Process, Environmental Scanning, Value Chain Analysis, SWOT Analysis, Steps in Strategy Formulation and Implementation, Generic Strategy alternatives. Bench Marking and Balanced Score Card as Contemporary Business Strategies.

### TEXT BOOKS:

1. Stoner, Freeman, Gilbert, *Management*, 6th Ed, Pearson Education, New Delhi, 2004
2. P. Vijaya Kumar, N. Appa Rao and Ashima B. Chhalil, Cengage Learning India Pvt Ltd, 2012.

### REFERENCE BOOKS:

1. Kotler Philip and Keller Kevin Lane: *Marketing Management*, Pearson, 2012.
2. Koontz and Weihrich: *Essentials of Management*, McGraw Hill, 2012.
3. Thomas N.Duening and John M.Ivancevich *Management—Principles and Guidelines*, Biztantra, 2012.
4. Kanishka Bedi, *Production and Operations Management*, Oxford University Press, 2012.
5. Samuel C.Certo: *Modern Management*, 2012.
6. Schermerhorn, Capling, Poole and Wiesner: *Management*, Wiley, 2012.
7. Parnell: *Strategic Management*, Cengage, 2012.
8. Lawrence R Jauch, R.Gupta and William F.Glueck: *Business Policy and Strategic Management*, Frank Bros, 2012.
9. Aryasri: *Management Science*, McGraw Hill, 2012.



## Outcomes:

By the end of the course, the student will be in a position to

- Plan an organisational structure for a given context in the organisation
- carry out production operations through Work study
- understand the markets, customers and competition better and price the given products appropriately.
- ensure quality for a given product or service
- plan and control the HR function better
- plan, schedule and control projects through PERT and CPM
- evolve a strategy for a business or service organisation

## (A80551) WEB SERVICES

(Elective – III)

### Objectives:

- To understand the details of Web services technologies: SOAP, WSDL, UDDI
- To learn how to implement and deploy web service clients and servers.
- To explore interoperability between different frameworks.
- To learn basic concepts of SOA.

### UNIT- I

**Evolution and Emergence of Web Services** - Evolution of distributed computing, Core distributed computing technologies – client/server, CORBA, JAVA RMI, Microsoft DCOM, MOM, Challenges in Distributed Computing, role of J2EE and XML in distributed computing, emergence of Web Services and Service Oriented Architecture (SOA).

**Introduction to Web Services** – The definition of web services, basic operational model of web services, tools and technologies enabling web services, benefits and challenges of using web services.

**Web Services Architecture** – Web services Architecture and its characteristics, core building blocks of web services, standards and technologies available for implementing web services, web services communication models, basic steps of implementing web services.

### UNIT- II

**Core fundamentals of SOAP** – SOAP Message Structure, SOAP encoding, SOAP message exchange models, SOAP communication and messaging, SOAP security.

**Developing Web Services using SOAP** – Building SOAP Web Services, developing SOAP Web Services using Java and Axis, limitations of SOAP.

### UNIT- III

**Describing Web Services** – WSDL – WSDL in the world of Web Services, Web Services life cycle, anatomy of WSDL definition document, WSDL bindings, WSDL Tools, limitations of WSDL.

**Discovering Web Services** – Service discovery, role of service discovery in a SOA, service discovery mechanisms, UDDI – UDDI Registries, uses of UDDI Registry, Programming with UDDI, UDDI data structures, Publishing API, Publishing, searching and deleting information in a UDDI Registry,

limitations of UDDI.

#### UNIT- IV

**Web Services Interoperability** – Means of ensuring Interoperability, Overview of .NET, Creating a .NET client for an Axis Web Service, Creating java client for a web service, Challenges in Web Services Interoperability.

**Web Services Security** – XML security framework, Goals of Cryptography, Hash Cipher, Symmetric Cipher, Asymmetric Cipher, XML encryption, Digital signature, Digital Certificate, XML Encryption, SAML, structure.

#### UNIT- V

**Overview of Service Oriented Architecture** – SOA concepts, Key Service Characteristics, Technical Benefits of a SOA.

**SOA and Web Services** – Web Services Platform, Service-Level Data Models, Discovery, Security and Interaction Patterns, Atomic and Composite services, Service-level communication and alternative transports.

#### TEXT BOOKS:

1. Developing Java Web Services, R. Nagappan, R. Skoczylas, R.P. Sriganesh, Wiley India, 1<sup>st</sup> ed – 2008.
2. Understanding SOA with Web Services, Eric Newcomer and Greg Lomow, Pearson Education – 2009
3. Java Web Service Architecture, James McGovern, Sameer Tyagi et al., Elsevier - 2009

#### REFERENCE BOOKS:

1. Building Web Services with Java, 2<sup>nd</sup> Edition, S. Graham and others, Pearson Edn., 2008.
2. Java Web Services, D.A. Chappell & T. Jewell, O'Reilly, SP.
3. McGovern, et al., "Java Web Services Architecture", Morgan Kaufmann Publishers, 2005.
4. J2EE Web Services, Richard Monson-Haefel, Pearson Education.
5. Web Services, G. Alonso, F. Casati and others, Springer, 2005.
6. Developing Enterprise Web Services, S. Chatterjee, J. Webber, Pearson Education, 2008.
7. XML, Web Services, and the Data Revolution, F.P.Coyle, Pearson Education.

#### Outcomes:

- Basic details of WSDL, UDDI, SOAP
- Implement WS client and server with interoperable systems

#### (A80544) E - COMMERCE

#### (Elective – III)

#### Objectives:

- Identify the major categories and trends of e-commerce applications.
- Identify the essential processes of an e-commerce system.
- Identify several factors and web store requirements needed to succeed in e-commerce.
- Discuss the benefits and trade-offs of various e-commerce clicks and bricks alternatives.
- Understand the main technologies behind e-commerce systems and how these technologies interact.
- Discuss the various marketing strategies for an online business.
- Define various electronic payment types and associated security risks and the ways to protect against them.

#### UNIT - I

Electronic Commerce-Framework, anatomy of E-Commerce applications, E-Commerce Consumer applications, E-Commerce organization applications.

Consumer Oriented Electronic commerce - Mercantile Process models.

#### UNIT - II

Electronic payment systems - Digital Token-Based, Smart Cards, Credit Cards, Risks in Electronic Payment systems.

Inter Organizational Commerce - EDI, EDI Implementation, Value added networks.

#### UNIT - III

Intra Organizational Commerce - work Flow, Automation Customization and internal Commerce, Supply chain Management.

#### UNIT - IV

Corporate Digital Library - Document Library, digital Document types, corporate Data Warehouses. Advertising and Marketing - Information based marketing, Advertising on Internet, on-line marketing process, market research.

#### UNIT - V

Consumer Search and Resource Discovery - Information search and

Retrieval, Commerce Catalogues, Information Filtering.

Multimedia - key multimedia concepts, Digital Video and electronic Commerce, Desktop video processing's, Desktop video conferencing.

#### TEXT BOOK :

1. Frontiers of electronic commerce – Kalakata, Whinston, Pearson.

#### REFERENCES :

1. E-Commerce fundamentals and applications Hendry Chan, Raymond Lee, Tharam Dillon, Elizabeth Chang, John Wiley.
2. E-Commerce, S.Jaiswal – Galgotia.
3. E-Commerce, Efrain Turbon, Jae Lee, David King, H.Michael Chang.
4. Electronic Commerce – Gary P.Schneider – Thomson.
5. E-Commerce – Business, Technology, Society, Kenneth C.Taudon, Carol Guyerico Traver.

#### Outcomes:

- Ability to identify the business relationships between the organizations and their customers
- Ability to perform various transactions like payment, data transfer and etc.

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### (A80546) MIDDLEWARE TECHNOLOGIES

(Elective – III)

#### Objectives:

- IT systems are more and more integrated with other software systems.
- The knowledge of integrating these systems by using middleware technologies can be a key competence for IT engineers. Middleware is commonly understood as an intermediary software layer between the application and the operating system, which encapsulates the heterogeneity of the underlying communication network, operating system or hardware platform.
- This course provides details about the modern component platforms. Based on practical examples, details about modern middleware technologies are studied.
- Students get the chance to gain in-depth knowledge popular middleware platforms.

#### UNIT-I

**Introduction to client server computing:** Evolution of corporate computing models from centralized to distributed computing, client server models. Benefits of client server computing, pitfalls of client server programming.

#### UNIT-II

**CORBA with Java:** Review of Java concept like RMI, RMI API, JDBC. Client/ Server CORBA-style, The object web: CORBA with Java.

**Introducing C# and the .NET Platform;** Understanding .NET Assemblies; Object –Oriented Programming with C#; Callback Interfaces, Delegates, and Events.

#### UNIT III

**Building c# applications:** Type Reflection, Late Binding, and Attribute-Based Programming; Object Serialization and the .NET Remoting Layer; Data Access with ADO.NET; XML Web Services.

**Core CORBA / Java:** Two types of Client/ Server invocations-static, dynamic. The static CORBA, first CORBA program, ORBlets with Applets, Dynamic CORBA-The portable count, the dynamic count multicount.

#### UNIT-IV

**Existential CORBA :** CORBA initialization protocol, CORBA activation services, CORBAIDL mapping CORBA java- to- IDL mapping. The

Introspective CORBA/Java object.

**Java Bean Component Model :** Events, properties, persistency, Introspection of beans, CORBA Beans.

#### UNIT-V

**EJBs and CORBA:** Object transaction monitors CORBA OTM's, EJB and CORBA OTM's, EJB container frame work, Session and Entity Beans, The EJB client/server development Process The EJB container protocol, support for transaction EJB packaging EJB design Guidelines.

#### TEXT BOOKS :

1. Client/Server programming with Java and CORBA Robert Orfali and Dan Harkey, John Wiley & Sons ,SPD 2nd Edition
2. Java programming with CORBA 3rd Edition, G.Brose, A Vogel and K.Duddy, Wiley-dreamtech, India John wiley and sons

#### REFERENCE BOOKS:

1. Distributed Computing, Principles and applications, M.L.Liu, Pearson Education
2. Client/Server Survival Guide 3rd edition Robert Orfali Dan Harkey & Jeri Edwards, John Wiley & Sons
3. Client/Server Computing D T Dewire, TMH.
4. IBM Webspere Starter Kit Ron Ben Natan Ori Sasson, TMh, New Delhi
5. Programming C#, Jesse Liberty, SPD-O'Reilly.
6. C# Preciesely Peter Sestoft and Henrik I. Hansen, Prentice Hall of India
7. Intoduction to C# Using .NET Pearson Education
8. C# How to program, Pearson Education
9. C# and the .NET Platform Andrew Troelsen, Apress Wiley-dreamtech, India Pvt Ltd

#### Outcomes:

- Ability to design the integrated system with different software's.
- Ability to create simple interface between the software and hardware.

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### (A80542) AD HOC AND SENSOR NETWORKS

(Elective – II)

#### Objectives:

- To understand the concepts of sensor networks
- To understand the MAC and transport protocols for adhoc networks
- To understand the security of sensor networks
- To understand the applications of adhoc and sensor networks

#### UNIT- I

**Introduction to Ad Hoc Wireless Networks:** Characteristics of MANETs, Applications of MANETs, Challenges.

**Routing in MANETs:** Topology-based versus Position-based approaches, Topology based routing protocols, Position based routing, Other Routing Protocols.

#### UNIT- II

**Data Transmission in MANETs:** The Broadcast Storm, Multicasting, Geocasting

**TCP over Ad Hoc Networks:** TCP Protocol overview, TCP and MANETs, Solutions for TCP over Ad Hoc

#### UNIT- III

**Basics of Wireless Sensors and Applications:** The Mica Mote, Sensing and Communication Range, Design Issues, Energy consumption, Clustering of Sensors, Applications

**Data Retrieval In Sensor Networks:** Classification of WSNs, MAC layer, Routing layer, High-level application layer support, Adapting to the inherent dynamic nature of WSNs.

#### UNIT- IV

**Security :** Security in Ad hoc Wireless Networks, Key Management, Secure Routing, Cooperation in MANETs, Intrusion Detection Systems.

**Sensor Network Platforms and Tools:** Sensor Network Hardware, Sensor Network Programming Challenges, Node-Level Software Platforms

#### UNIT- V

**Operating System – TinyOS**

**Imperative Language:** nesC, Dataflow style language: TinyGALS, Node-Level Simulators, ns-2 and its sensor network extension, TOSSIM



## TEXT BOOKS:

1. Ad Hoc and Sensor Networks – Theory and Applications, Carlos Corderio Dharma P. Aggarwal, World Scientific Publications / Cambridge University Press, March 2006
2. Wireless Sensor Networks: An Information Processing Approach, Feng Zhao, Leonidas Guibas, Elsevier Science imprint, Morgan Kauffman Publishers, 2005, rp2009.

## REFERENCE BOOKS:

1. Adhoc Wireless Networks – Architectures and Protocols, C.Siva Ram Murthy, B.S.Murthy, Pearson Education, 2004
2. Wireless Sensor Networks – Principles and Practice, Fei Hu, Xiaojun Cao, An Auerbach book, CRC Press, Taylor & Francis Group, 2010
3. Wireless Ad hoc Mobile Wireless Networks – Principles, Protocols and Applications, Subir Kumar Sarkar, et al., Auerbach Publications, Taylor & Francis Group, 2008.
4. Ad hoc Networking, Charles E.Perkins, Pearson Education, 2001.
5. Wireless Ad hoc Networking, Shih-Lin Wu, Yu-Chue Tseng, Auerbach Publications, Taylor & Francis Group, 2007
6. Wireless Ad hoc and Sensor Networks – Protocols, Performance and Control, Jagannathan Sarangapani, CRC Press, Taylor & Francis Group, 2007, rp 2010.
7. Security in Ad hoc and Sensor Networks, Raheem Beyah, et al., World Scientific Publications / Cambridge University Press, 2010
8. Ad hoc Wireless Networks – A communication-theoretic perspective, Ozan K.Tonguz, Gialuigi Ferrari, Wiley India.2006, rp2009.
9. Wireless Sensor Networks – Signal processing and communications perspectives, Ananthram Swami, et al., Wiley India, 2007, rp2009.

## Outcomes:

- Ability to understand the concept of ad-hoc and sensor networks, their applications and typical node and network architectures.
- Ability to design a protocol for wireless sensor networks
- Ability to evaluate measurements of protocol performance in wireless sensor networks

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### (A80547) MULTIMEDIA & RICH INTERNET APPLICATIONS

#### (Elective-IV)

#### Objectives:

This course aims to further develop students' competency in producing dynamic and creative graphic solutions for multimedia productions. It provides students with the basic concepts and techniques of interactive authoring. It also introduces students with the advanced scripting skills necessary for implementing highly interactive, rich internet applications using multimedia technologies and authoring tools. Students will develop aesthetic value and competencies in multimedia authoring. Artistic visual style and layout design are stressed, as well as the editing and integration of graphic images, animation, video and audio files. The course allows students to master industry-wide software and technologies to create highly interactive, rich internet applications.

#### UNIT - I

Fundamental concepts in Text and Image: Multimedia and hypermedia, World Wide Web, overview of multimedia software tools, Graphics and image data representation graphics/image data types, file formats, Color in image and video: color science, color models in images, color models in video.

#### UNIT- II

Fundamental concepts in video and digital audio: Types of video signals, analog video, digital video, digitization of sound, MIDI, quantization and transmission of audio.

Multimedia Data Compression: Lossless compression algorithms, Lossy compression algorithms, Image compression standards.

#### UNIT- III

Basic Video compression techniques, Case study: MPEG Video Coding I, Basic Audio compression techniques, Case study: MPEG Audio compression.

#### Web 2.0

What is web 2.0, Search, Content Networks, User Generated Content, Blogging, Social Networking, Social Media, Tagging, Social Marking, Rich Internet Applications, Web Services, Mashups, Location Based Services, XML, RSS, Atom, JSON, and VoIP, Web 2.0 Monetization and Business Models, Future of the Web.

#### UNIT - IV

Rich Internet Applications(RIAs) with Adobe Flash : Adobe Flash-

Introduction, Flash Movie Development, Learning Flash with Hands-on Examples, Publish your flash movie, Creating special effects with Flash, Creating a website splash screen, action script, web sources.

**Rich Internet Applications(RIAs) with Flex 3** - Introduction, Developing with Flex 3, Working with Components, Advanced Component Development, Visual Effects and Multimedia.

#### UNIT - V

**Ajax- Enabled Rich Internet Application** : Introduction, Traditional Web Applications vs Ajax Applications, Rich Internet Application with Ajax, History of Ajax, Raw Ajax example using xmlhttprequest object, Using XML, Creating a full scale Ajax Enabled application, Dojo ToolKit.

#### TEXT BOOKS:

1. Fundamentals of Multimedia by Ze-Nian Li and Mark S. Drew PHI Learning, 2004
2. Professional Adobe Flex 3, Joseph Balderson, Peter Ent, et al, Wrox Publications, Wiley India, 2009.
3. AJAX, Rich Internet Applications, and Web Development for Programmers, Paul J Deitel and Harvey M Deitel, Deitel Developer Series, Pearson Education.

#### REFERENCE BOOKS:

1. Multimedia Communications: Applications, Networks, Protocols and Standards, Fred Halsall, Pearson Education, 2001, rp 2005.
2. Multimedia Making it work, Tay Vaughan, 7<sup>th</sup> edition, TMH, 2008.
3. Introduction to multimedia communications and Applications, Middleware, Networks, K.R.Rao, Zoran, Dragored, Wiley India, 2006, rp. 2009.
4. Multimedia Computing, Communications & Applications, Ralf Steinmetz and Klara Nahrstedt, Pearson Education, 2004
5. Principles of Multimedia, Ranjan Parekh, TMH, 2006.
6. Multimedia in Action, James E.Shuman, Cengage Learning, 198, rp 2008.
7. Multimedia Systems design, Prabhat K. Andleigh, Kiran Thakrar, PHI, 1986.
8. Multimedia and Communications Technology, Steve Heath, Elsevier, 1999, rp 2003.
9. Adobe Flash CS3 Professional, Adobe press, Pearson Education, 2007.
10. Flash CS3 Professional Advanced, Russel Chun, Pearson Education, 2007.

11. Flash CS5, Chris Grover, O'Reilly, SPD, 2010.
12. SAMS Teach yourself Adobe flash CS3, Pearson Education, 2007.
13. Flex 4 Cookbook, Joshua Noble, et.al, O'Reilly,SPD 2010.
14. Flex3 – A beginner's guide, Michele E.Davis, Jon A.Phillips, TMH, 2008.
15. Mastering Dojo,R.Gill,C.Riecke and A.Russell,SPD.

#### Outcomes:

- Ability to design a short films and teaching material for better understanding.
- Ability to apply different multimedia development tools to produce web based and stand-alone user interfaces.

**PREDICTIVE ANALYTICS (ASSOCIATE ANALYTICS – III)**  
(Elective-II)

**Unit I**

**Introduction to Predictive Analytics & Linear Regression (NOS 2101):**

What and Why Analytics, Introduction to Tools and Environment, Application of Modelling in Business, Databases & Types of data and variables, Data Modelling Techniques, Missing imputations etc.

Need for Business Modelling, Regression – Concepts, Blue property-assumptions-Least Square Estimation, Variable Rationalization, and Model Building etc.

**Unit II**

**Logistic Regression (NOS 2101):**

Model Theory, Model fit Statistics, Model Conclusion, Analytics applications to various Business Domains etc.

Regression Vs Segmentation – Supervised and Unsupervised Learning, Tree Building – Regression, Classification, Overfitting, Pruning and complexity, Multiple Decision Trees etc.

**Unit III**

**Objective Segmentation(NOS 2101):**

Regression Vs Segmentation – Supervised and Unsupervised Learning, Tree Building – Regression, Classification, Overfitting, Pruning and complexity, Multiple Decision Trees etc.

**Develop Knowledge, Skill and Competences (NOS 9005)**

Introduction to Knowledge skills & competences, Training & Development, Learning & Development, Policies and Record keeping, etc.

**Unit IV**

**Time Series Methods /Forecasting, Feature Extraction (NOS 2101):**

Arima, Measures of Forecast Accuracy, STL approach, Extract features from generated model as Height, Average, Energy etc and Analyze for prediction.

**Project**

**Unit V**

**Working with Documents (NOS 0703):**

Standard Operating Procedures for documentation and knowledge sharing, Defining purpose and scope documents, Understanding structure of documents – case studies, articles, white papers, technical reports, minutes of meeting etc., Style and format, Intellectual Property and Copyright, Document preparation tools – Visio, PowerPoint, Word, Excel etc., Version Control, Accessing and updating corporate knowledge base, Peer review and feedback.

**TEXT BOOK:**

1. Student's Handbook for Associate Analytics-III.

**REFERENCE BOOK:**

1. Gareth James • Daniela Witten • Trevor Hastie Robert Tibshirani, An Introduction to Statistical Learning with Applications in R



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**INFORMATION SECURITY INCIDENT RESPONSE & MANAGEMENT (SECURITY ANALYST – III)**  
(Elective-II)

**Unit I**

**Managing Information Security Services:**

Configuring Network Devices, Identifying Unauthorized Devices, Testing the Traffic Filtering Devices, Configuring Router, Configuring Modes – Router/Global/Interface/Line/Privilege EXEC/ROM/User EXEC, Configuring a banner/Firewall/Bastion Host/VPN server etc.

**Unit II**

**Troubleshooting Network Devices and Services:**

Introduction & Methodology of Troubleshooting, Troubleshooting of Network Communication-Connectivity-Network Devices-Network Slowdowns-Systems-Modems etc.

**Unit III**

**Information Security Incident Management & Data Backup:**

Information Security Incident Management overview-Handling-Response, Incident Response Roles and Responsibilities, Incident Response Process etc.

Data Back introduction, Types of Data Backup and its techniques, Developing an Effective Data Backup Strategy and Plan, Security Policy for Back Procedures.

**Unit IV**

**Log Correlation:**

Computer Security Logs, Configuring & Analyzing Windows Logs, Log Management-Functions & Challenges, Centralized Logging and Architecture, Time Synchronization – NTP/NIST etc.

Develop Knowledge Skill and competences (NOS 9005)

**Unit V**

**Handling Network Security Incidents:**

Network Reconnaissance Incidents, Network Scanning Security Incidents, Network Attacks and Security Incidents, Detecting DoS Attack, DoS Response Strategies, Preventing/stopping a DoS Incident etc.

**Handling Malicious Code Incidents:**

Incident Handling Preparation, Incident Prevention, Detection of Malicious Code, Containment Strategy, Evidence Gathering and Handling, Eradication and Recovery, Recommendations etc.  
**Project.**

**TEXT BOOKS:**

1. Managing Information Security Risks, The Octave Approach by Christopher Alberts, and Audrey Dorofee
2. "Cryptography and Network Security (4th Edition) by (Author) William Stallings."

**REFERENCES:**

1. <https://www.sans.org/reading-room/whitepapers/incident/security-incident-handling-small-organizations-32979>



**(A80526) ARTIFICIAL INTELLIGENCE**

**(Elective- IV)**

**Objectives:**

- To learn the difference between optimal reasoning vs human like reasoning.
- To understand the notions of state space representation, exhaustive search, heuristic search along with the time and space complexities.
- To learn different knowledge representation techniques.
- To understand the applications of AI: namely Game Playing, Theorem Proving, Expert Systems, Machine Learning and Natural Language Processing.

**UNIT-I**

Introduction, History, Intelligent Systems, Foundations of AI, Sub areas of AI, Applications Problem Solving - State-Space Search and Control Strategies: Introduction, General Problem Solving, Characteristics of Problem, Exhaustive Searches, Heuristic Search Techniques, Iterative-Deepening A\*, Constraint Satisfaction Game Playing, Bounded Look-ahead Strategy and use of Evaluation Functions, Alpha-Beta Pruning.

**UNIT-II**

Logic Concepts and Logic Programming: Introduction, Propositional Calculus, Propositional Logic, Natural Deduction System, Axiomatic System, Semantic Tableau System in Propositional Logic, Resolution Refutation in Propositional Logic, Predicate Logic, Logic Programming.

Knowledge Representation: Introduction, Approaches to Knowledge Representation, Knowledge Representation using Semantic Network, Extended Semantic Networks for KR, Knowledge Representation using Frames.

**UNIT-III**

Expert System and Applications: Introduction, Phases in Building Expert Systems, Expert System Architecture, Expert Systems vs Traditional Systems, Truth Maintenance Systems, Application of Expert Systems, List of Shells and Tools.

Uncertainty Measure - Probability Theory: Introduction, Probability Theory, Bayesian Belief Networks, Certainty Factor Theory, Dempster-Shafer Theory.

**UNIT-IV**

Machine-Learning Paradigms: Introduction, Machine Learning Systems.

Supervised and Unsupervised Learning, Inductive Learning, Learning Decision Trees (Text Book 2), Deductive Learning, Clustering, Support Vector Machines.

Artificial Neural Networks: Introduction, Artificial Neural Networks, Single-Layer Feed-Forward Networks, Multi-Layer Feed-Forward Networks, Radial-Basis Function Networks, Design Issues of Artificial Neural Networks, Recurrent Networks.

**UNIT-V**

Advanced Knowledge Representation Techniques: Case Grammars, Semantic Web.

Natural Language Processing: Introduction, Sentence Analysis Phases, Grammars and Parsers, Types of Parsers, Semantic Analysis, Universal Networking Knowledge.

**TEXT BOOKS:**

1. Saroj Kaushik, Artificial Intelligence, Cengage Learning, 2011.
2. Russell, Norvig: Artificial intelligence, A Modern Approach, Pearson Education, Second Edition, 2004.

**REFERENCE BOOK:**

1. Rich, Knight, Nair: Artificial intelligence, Tata McGraw Hill, Third Edition 2009.

**Outcomes:**

- Possess the ability to formulate an efficient problem space for a problem expressed in English.
- Possess the ability to select a search algorithm for a problem and characterize its time and space complexities.
- Possess the skill for representing knowledge using the appropriate technique.
- Possess the ability to apply AI techniques to solve problems of Game Playing, Expert Systems, Machine Learning and Natural Language Processing.

**(A80550) STORAGE AREA NETWORKS**

(Elective – IV)

**Objectives:**

- To understand Storage Area Networks characteristics and components.
- To become familiar with the SAN vendors and their products
- To learn Fibre Channel protocols and how SAN components use them to communicate with each other
- To become familiar with Cisco MDS 9000 Multilayer Directors and Fabric Switches. Thoroughly learn Cisco SAN-OS features.
- To understand the use of all SAN-OS commands. Practice variations of SANOS features

**UNIT- I**

Review data creation and the amount of data being created and understand the value of data to a business, challenges in data storage and data management, Solutions available for data storage, Core elements of a data centre infrastructure, role of each element in supporting business activities

Hardware and software components of the host environment, Key protocols and concepts used by each component, Physical and logical components of a connectivity environment, Major physical components of a disk drive and their function, logical constructs of a physical disk, access characteristics, and performance Implications.

**UNIT-II:**

Concept of RAID and its components, Different RAID levels and their suitability for different application environments: RAID 0, RAID 1, RAID 3, RAID 4, RAID 5, RAID 0+1, RAID 1+0, RAID 6, Compare and contrast integrated and modular storage systems, High-level architecture and working of an intelligent storage system

Evolution of networked storage, Architecture, components, and topologies of FC-SAN, NAS, and IP-SAN, Benefits of the different networked storage options, understand the need for long-term archiving solutions and describe how CAS fulfills the need, understand the appropriateness of the different networked storage options for different application environments

**UNIT- III**

List reasons for planned/unplanned outages and the impact of downtime,

Impact of downtime, Differentiate between business continuity (BC) and disaster recovery (DR), RTO and RPO, Identify single points of failure in a storage infrastructure and list solutions to mitigate these failures.

**UNIT- IV**

Architecture of backup/recovery and the different backup/recovery topologies, replication technologies and their role in ensuring information availability and business continuity, Remote replication technologies and their role in providing disaster recovery and business continuity capabilities

**UNIT- V**

Identify key areas to monitor in a data centre, Industry standards for data centre monitoring and management, Key metrics to monitor for different components in a storage infrastructure, Key management tasks in a data centre, Information security, Critical security attributes for information systems, Storage security domains, List and analyzes the common threats in each domain Virtualization technologies, block-level and file-level virtualization technologies and processes.

**Case Studies:**

The technologies described in the course are reinforced with EMC examples of actual solutions.

Realistic case studies enable the participant to design the most appropriate solution for given sets of criteria.

**TEXT BOOK:**

1. EMC Corporation, Information Storage and Management, Wiley.

**REFERENCE BOOKS:**

1. Robert Spalding, "Storage Networks: The Complete Reference", Tata McGraw Hill, Osborne, 2003.
2. Marc Farley, "Building Storage Networks", Tata McGraw Hill, Osborne, 2001.
3. Meeta Gupta, Storage Area Network Fundamentals, Pearson Education Limited, 2002.

**Outcomes:**

- Ability to demonstrate the storage area networks and their products
- Ability to provide the mechanisms for the backup/recovery

**(A80534) MACHINE LEARNING**

**(Elective – IV)**

**Objectives:**

- To be able to formulate machine learning problems corresponding to different applications.
- To understand a range of machine learning algorithms along with their strengths and weaknesses.
- To understand the basic theory underlying machine learning.

**UNIT – I**

**Introduction:** An illustrative learning task, and a few approaches to it. What is known from algorithms? Theory, Experiment. Biology. Psychology.

**Concept Learning:** Version spaces. Inductive Bias. Active queries. Mistake bound/ PAC model. basic results. Overview of issues regarding data sources, success criteria.

**UNIT –II**

**Decision Tree Learning:** - Minimum Description Length Principle. Occam's razor. Learning with active queries

**Neural Network Learning:** Perceptions and gradient descent back propagation.

**UNIT –III**

**Sample Complexity and Over fitting:** Errors in estimating means. Cross Validation and jackknifing VC dimension. Irrelevant features: Multiplicative rules for weight tuning.

**Bayesian Approaches:** The basics Expectation Maximization. Hidden Markov Models

**UNIT–IV**

**Instance-based Techniques:** Lazy vs. eager generalization. K nearest neighbor, case- based reasoning.

**UNIT–V**

**Genetic Algorithms:** Different search methods for induction - Explanation-based Learning: using prior knowledge to reduce sample complexity.

**TEXT BOOKS:**

1. Tom Michel, Machine Learning, McGraw Hill, 1997
2. Trevor Hastie, Robert Tibshirani & Jerome Friedman. The Elements

of Statically Learning, Springer Verlag, 2001.

**REFERENCE BOOKS:**

1. Machine Learning Methods in the Environmental Sciences, Neural Networks, William W Hsieh, Cambridge Univ Press.
2. Richard o. Duda, Peter E. Hart and David G. Stork, pattern classification, John Wiley & Sons Inc., 2001.
3. Chris Bishop, Neural Networks for Pattern Recognition, Oxford University Press, 1995.

**Outcomes:**

- Student should be able to understand the basic concepts such as decision trees and neural networks.
- Ability to formulate machine learning techniques to respective problems.
- Apply machine learning algorithms to solve problems of moderate complexity.

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**L T/P/D C**

**- -/- 2**

**(A80087) INDUSTRY ORIENTED MINI PROJECT**

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**(A80089) SEMINAR**

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**(A80088) PROJECT WORK**

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**L T/P/D C**

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**(A80090) COMPREHENSIVE VIVA**