



Course Structure and Syllabus
For
B. Tech. Information Technology
Programme
(FIRST YEAR)
(With effect from the Academic Year 2010-2011)



Dr. Babasaheb Ambedkar Technological University, Lonere

Semester I				
Code	Course of Study	L	P	C
BH101	Basic Course in Communicative English	3	0	6
BH102	Engineering Mathematics – I	4	0	8
BH103	Engineering Physics – I	3	0	6
BH103L	Engineering Physics – I (Laboratory)	0	2	2
BH104	Engineering Chemistry – I	3	0	6
BH104L	Engineering Chemistry – I (Laboratory)	0	2	2
EM105	Engineering Mechanics	3	0	6
ID106	Energy and Environmental Engineering	2	0	4
WS107	Workshop Practice	0	4	4
IT108	Branch Specific Course*	3	0	6
XC109	NCC/NSS/Sports	0	0	0
Total		21	8	50
Semester II				
Code	Course of Study	L	P	C
BH201	Basic Course in Human Rights	2	0	4
BH202	Engineering Mathematics – II	4	0	8
BH203	Engineering Physics – II	3	0	6
BH203L	Engineering Physics – II (Laboratory)	0	2	2
BH204	Engineering Chemistry - II	3	0	6
BH204L	Engineering Chemistry – II (Laboratory)	0	2	2
CL205	Basic Civil Engineering	2	0	4
ME206	Basic Mechanical Engineering	2	0	4
ME207	Engineering Graphics***	2	0	4
ME207L	Engineering Graphics Term-work	0	4	2
IT208	Branch Specific Programming and Softwares**	3	0	6
XC209	NCC/NSS/Sports	0	0	0
Total		21	8	48

*IT108: Introduction to Information Technology

** IT208: Information Technology: Programming and Softwares

*** ME207: Four Hours End Semester Examination

BH101

Basic Course in communicative English

6 Credits

UNIT - 1

Communication:

An introduction - Its role and importance in the corporate world - Tools of communication - Barriers - Levels of communication

UNIT - 2

Listening:

Importance to listening in the corporate world - Listening process and practice - Exposure to recorded and structured talks, class room lectures - Problems in comprehension and retention - Note-taking practice - Listening tests

UNIT - 3

Reading-1:

Introduction of different kinds of materials: technical and non-technical - Different reading strategies: skimming, scanning, inferring, predicting and responding to content

UNIT - 4

Reading-2:

Guessing from context - Note making - Vocabulary extension

UNIT - 5

Speaking:

Barriers to speaking - Building confidence and fluency - dialogue practice - Extempore speech practice – Speech assessment

UNIT - 6

Writing:

Effective writing practice - Effective sentences: role of acceptability, appropriateness, brevity and clarity in writing - Cohesive writing practice - Paragraph writing - Discourse writing

TEXT/REFERENCE BOOKS

Text Books:

1. Meenakshi Raman and Sangeetha Sharma, *Technical Communication*, Oxford University Press, New Delhi, 2008

Reference Books:

1. M. Ashraf Rizvi, *Effective Technical Communication*, Tata McGraw-Hill, New Delhi, 2005
2. Golding S.R, *Common Errors in English Language*, Macmillan, 1978
3. Christopher Turk, *Effective Speaking*, E and FN Spon, London, 1985

BH102

Engineering Mathematics - I

8 Credits

UNIT - 1

Linear Algebra – Matrices:

Matrix operations, cofactors, normal form of a matrix, rank, Consistency, Eigen and Eigen values, Cayley – Hamilton theorem

UNIT - 2

Differential Calculus:

Successive differentiation, Leibnitz's theorem, Taylor's theorem, Maclaurin's Theorem

UNIT - 3

Vector Calculus:

Differentiation of vectors, Curves in space, Velocity and acceleration, Tangential and normal acceleration

UNIT - 4

Applications of Vector and Scalar Point Functions:

Vector operator Del, Del applied to the Scalar point function – Gradient, Del applied to the Vector point functions, Divergence and Curl, Del applied twice to point function, Line Integral, Surface integral, Volume integral, Divergence theorem, Green's theorem, Stoke's theorem.

UNIT - 5

Integral Calculus:

Double integral, Triple integral, Application to the area, volume, surface area, Moment of Inertia, Center of gravity

UNIT - 6

Infinite Series:

Positive term series – Integral test, Comparison test, D'Alembert ratio test, Cauchy's root test, Raabe's test, Log Test, Alternating Series – Leibnitz rule, absolute and conditional convergence, power series

TEXT BOOKS

Text Books:

1. Grewal B. S., *Higher Engineering Mathematics*, Khanna Publication, New Delhi
2. Kreyszig E., *Advanced Engineering Mathematics*, Wiley Eastern Publication

BH103

Engineering Physics - I

6 Credits

UNIT - 1

Wave and Oscillations:

Free oscillation, Damped oscillation and forced oscillation and resonance. Examples, Longitudinal and transverse wave, Wave equation

UNIT - 2

Acoustics:

Ultrasonic waves piezoelectric effect, Magnetostriction effect and production of ultrasonic waves, Applications of Ultrasonic waves

UNIT - 3

Optics:

Interference in thin films, Wedge shaped film and Newton's ring application of interference of light, Polarization of light, Methods for production of polarized light, Hygen's theory of double refraction, Laurent's half shade Polari meter, faraday effect, Kerr effect

UNIT - 4

Laser and Fiber Optics:

Principle of Laser, Spontaneous and stimulated emission – Einstein's co-efficient, Types of Laser and its applications , Total internal reflection, materials and types of optical fibers, numerical aperture, fiber optics communication principle and application

UNIT - 5

Electron Optics:

Motion of charged particles in electric field and magnetic field, Measurement of e/m by Thomson's Method, Millikan's Oil Drop method, Positive Rays, Bainbridge mass spectrograph

UNIT - 6

Nuclear Physics and Quantum Mechanics:

Nuclear reaction, q -value of Nuclear reaction, G.M.Counter. Duality of Matter, de-Broglie's wave, Electron Diffraction, Davisson and Germer's \bar{e} diffraction experiment, Heisenberg's Uncertainty Principle, Schrodinger's time dependent and time independent wave equation, Physical Significance of wave function

TEXT/REFERENCE BOOKS

Text Books:

1. M.N. Avadhanulu and P.G. Kshirsagar, *A Text of Engineering Physics*
2. R.K. Gaur and S.L. Gupta, *Engineering Physics*

Reference Books:

1. D. Halliday, R. Resnick and J. Walker, *Fundamental of Physics*, Sixth Edition
2. F.S. Crawford Jr., *Waves – Berkeley Physics Courses*, Volume 3
3. A. Ghatak, *Optics*, Third Edition

BH103L

Engineering Physics – I (LAB)

2 Credits

List of Experiments:

1. To find variation of thermo emf with temp difference between hot and cold junction of chromal alumel thermo couple and calculate electric power.
2. To determine radius of curvature of plano convex lens by forming a system of network's ring in air film between the lens surface and plane glass.
3. To determine specific rotation of optically active compound.
4. Determination of wavelength of He-Ne Laser light.
5. To determine value of emf of the electron by magnetron tube method.
6. Determination of the operating voltage of G. M. tube.

BH104

Engineering Chemistry - I

6 Credits

UNIT - 1

Fuels and Lubricants:

Fuels : Introduction, Classification of fuel, essential properties of fuel, characteristics of good fuel, solid fuels- wood and coal, various types of coal, analysis of coal – Proximate and Ultimate analysis, liquid fuel- refining of petroleum

Lubricants: Introduction, types of lubrication, classification of lubricants, properties of lubricants

UNIT - 2

Physical Properties in Liquid State:

Additive and Constitutive properties, Surface tension and its determination, Viscosity and its determination, Refractive index and their determination, Optical activity, Specific rotation, Polari meter

UNIT - 3

Chemical Bonding:

Types of chemical bonds, Ionic bonding and its characteristics, Factors affecting the formation of ionic bond, Born-Haber cycle for determination of lattice energy, the concept of Molecular Orbital theory, Characteristics of bonding and ant bonding molecular orbitals, formation of MO, Bond order and stability of molecule, Energy level sequence, MO diagram of H₂, O₂, etc. Hydrogen bonding

UNIT - 4

Corrosion:

Introduction, Fundamental reason, Electrochemical corrosion, Direct chemical corrosion, Factors affecting the rate of corrosion, Types of corrosion- pitting corrosion, Microbiological corrosion, stress corrosion, Methods to minimize the corrosion – proper design, cathodic and anodic protection, metallic coating, organic coating

UNIT - 5

Fundamentals of Organic Chemistry-1:

Introduction, E₁ and E₂ reactions, Birch reduction, Oppenauer oxidation, Study of Aromatic compounds: Naphthalene, Anthracene

UNIT - 6

Fundamentals of Organic Chemistry-2:

Study of Heterocyclic compound: Pyridine and Quinolene, Manufacture of alcohol by fermentation process

TEXT/REFERENCE BOOKS

Text Books:

1. Bhal and Bhal, *Advanced Organic Chemistry*, S. Chand and Company, New Delhi, 1995.
2. Jain P. C. and Jain Monica, *Engineering Chemistry*, Dhanpat Rai and Sons, Delhi, 1992.

Reference Books:

1. Finar I. L., *Organic Chemistry* (Vol. I and II), Longman Gr. Ltd. and English Language Book Society, London.
2. Barrow G.M., *Physical Chemistry*, McGraw-Hill Publication, New Delhi.

BH104L

Engineering Chemistry – I (LAB)

2 Credits

List of Experiments:

1. Surface Tension
2. Viscosity
3. Titration - 1
4. Titration – 2
5. Titration – 3
6. Volumetric Analysis
7. Determination of Acid Value of an Oil Sample
8. Saponification Value of an Oil Sample
9. Study of Rate of Corrosion of Metals

Reference Books:

1. Systematic experiments in Chemistry, A. Sethi, New Age International Publication, New Delhi
2. Practical Inorganic Chemistry, A. I. Vogel, ELBS Publication
3. Practical in Engineering Chemistry, S. S. Dara

EM105

Engineering Mechanics

6 Credits

UNIT - 1

Concurrent forces in a plane:

Principles of Statics-Composition of forces-Equilibrium of concurrent forces in a plane- Method of projections- Equilibrium of three forces in a plane Method of Moments – Friction

UNIT - 2

Forces in plane:

Parallel forces in a plane: Two parallel forces- General case of parallel forces in a plane-Center of parallel forces and center of gravity-Centroids of composite plane figures and curves – Distributed forces in a plane

General case of forces in a plane: Composition of forces in a plane-Equilibrium of forces in a plane

UNIT - 3

Forces in space:

Force systems in space: Concurrent forces in space- method of projections, methods of moments-couples in space-parallel forces in space-center of parallel forces and center of gravity- general case of forces in space

UNIT - 4

Rectilinear Translation:

Kinematics of rectilinear motion-Principles of dynamics Differential equation of rectilinear motion-Motion of particle acted upon by a constant force D'Alembert's principle-Momentum and impulse-Work and energy- Ideal systems: conservation of energy-Impact

UNIT - 5

Curvilinear Translation:

Kinematics of curvilinear motion- Differential equations of curvilinear motion- Motion of a projectile- D'Alembert's principle in curvilinear motion

UNIT - 6

Rigid Body Motion:

Rotation of a rigid body about a fixed axis and plane motion of a rigid body

TEXT/REFERENCE BOOKS

Text Books:

1. Rajasekaran.S. and Sankara Subramanian.G., *Engineering Mechanics – Statics and Dynamics*, Vikas Publishing Comp, 2005
2. S. Timoshenko and D.H. Young, *Engineering Mechanics*, McGraw Hill, 1995

Reference Books:

1. Irving H.Shames, *Engineering Mechanics – Statics and Dynamics*, Pearson Educations, Forth edition, 2003
2. Beer and Johnston, *Vector Mechanics for Engineers, Vol.1 “Statics” and Vol.2 “Dynamics*, McGraw Hill International Edition, 1995
3. Suhas Nitsure, *Engineering Mechanics*, Technical Publications, Pune, 2007

ID106

Energy and Environmental Engineering

4 Credits

UNIT - 1

Power Generation-1:

Conventional Vs Non convectional power generation, Renewable and alternative energy trends in power generation in future

UNIT - 2

Power Generation-2:

Solar, Wind, Bioenergy, Ocean Thermal energy conversion (OTEC), Tidal, Fuel cell, Magneto Hydro Dynamics (MHD)

UNIT - 3

Power Generation-3:

Thermo electric and thermionic generators – Principle and Application - Energy conservation and management- Industry, domestic, case studies

UNIT - 4

Pollution-Air:

Air pollution- sources- effects- control- air quality standards, air pollution act- measurement

UNIT - 5

Pollution-Water:

Water pollution- effects- selection of process- Disposal of solid wastes

UNIT - 6

Pollution-General:

Greenhouse effect- Acid rain- Noise pollution – Thermal pollution- Pollution aspects of various power plants

TEXT/REFERENCE BOOKS

Text Books:

1. Rai. G. D., Non-Conventional Energy Sources, Khanna Publishers, Delhi, 2006
2. Gilbert M. Masters, *Introduction to Environmental Engineering and Science*, 2nd edition, Prentice Hall, 2003

Reference Books:

1. Rao S., Parulekar B.B., *Energy Technology Non conventional, Renewable and Conventional*, Khanna Publishers, Delhi, 2005.
2. Glynn Henry J., Gary W. Heinke, *Environmental Science and Engineering*, Pearson Education, Inc, 2004.

WS107

Workshop Practice

4 Credits

UNIT - 1

Carpentry/Pattern Making:

- A. Wood sizing exercises in planning, marking, sawing, chiseling and grooving to make half lap joint and cross lap joint
- B. Demonstration of power operated tools related to Carpentry skills

UNIT - 2

Fitting/Plumbing:

- A. A job involving cutting, filing to saw cut, filing all sides and faces, corner rounding, drilling and
Tapping on M. S. plates
- B. Demonstration on use of plumbing tools and preparation of plumbing line involving fixing of water tap and use of elbow, tee, union and coupling, etc.
- C. Demonstration of power operated tools related to Fitting skills

UNIT - 3

Sheet Metal Working:

- A. Making a small parts using GI sheet involving development, marking, cutting, bending, brazing and soldering operations- i)Tray ii) Funnel
- B. Demonstration of power operated tools related to sheet metal works

UNIT - 4

Welding:

- A. Exercise in MMA welding to make a square butt joint
- B. Exercise in resistance (spot) welding to make a lap joint
- C. Demonstration of power operated tools related to Welding skills

UNIT - 5

Machine Shop:

Demonstration of step turning of a Mild Steel cylindrical job using center lathe

Instructions to the Students

Each student is required to maintain a 'workshop diary' consisting of drawing / sketches of the jobs and a brief description of tools, equipment, and procedure used for doing the job

UNIT - 1

Introduction to the world of Computers:

Overview, Introduction to computers: Generation of computers, Software and hardware, Types of computers, Computer networks and Internet.

UNIT - 2

The System Unit: Processing and Memory

Overview, Data and program representation, Inside the system unit, Working of CPU, Making computers faster and better now and in the Future. Storage systems characteristics, Magnetic disk systems, Optical disk systems, Flash memory systems, Other types of storage systems.

UNIT - 3

Input and Output:

Overview, Keyboards, Pointing devices, Scanners, Readers and Digital cameras, Audio input, Display devices, Printers, Audio output.

UNIT - 4

System Software: Operating Systems and Utility Programs:

Overview, System software and Application software, The operating system, Operating systems for Desktop PCs and servers, Operating systems for handheld PCs and other devices, Operating systems for larger computers, Utility programs.

UNIT - 5

Introduction to Application Software:

Overview, Basics of application software, Word processing concepts, Spreadsheet concepts, Database concepts, Presentation graphics concepts, Graphics and multimedia concepts, Other types of application software.

UNIT - 6

Computer Networks and the Internet:

Introduction to networks, Networking and communications applications, Types of networks, Data transmission over network, networking standards and communication protocols, Networking hardware.

TEXT/REFERENCE BOOKS

Concerned teacher will prepare lecture notes to distribute among the students.

Laboratory Work:

Assignments based on above units.

Text Books:

1. Deborah Morley and Charles S. Parker, *Fundamentals of Computers*, Cengage Learning, India edition, 2009.
2. Peter Norton, *Introduction to Computers*, 6th edition, Tata McGraw Hill publication, 2008.
3. Alexis Leon and Mathews Leon, *Fundamentals of Information Technology*, Leon Vikas Publication, Chennai.

Reference Books:

1. Francis Scheid, *Theory and Problems of Introduction to Computer Science*, Schaum's Outline Series, Tata McGraw Hill publication.
2. *Information Technology: Tools and Application*, Ed. UPTEC Computer Consultancy Limited, Elsevier publication, 2004.

BH201

Basic Course in Human Rights

4 Credits

UNIT - 1

The Basic Concepts:

Individual, group, civil society, state, equality, justice, Human Values: - Humanity, virtues, compassion

UNIT - 2

Human rights and Human Duties:

Origin, civil and political rights, Contribution of American bill of rights, French revolution, Declaration of independence, Rights of citizen, Rights of working and exploited people, Fundamental rights and economic programme, India's charter of freedom.

UNIT - 3

Society, religion, culture, and their inter-relationship:

Impact of social structure on human behavior, Roll of socialization in human values, Science and Technology, modernization, globalization, and dehumanization

UNIT - 4

Social Structure and Social Problems:

Social and communal conflicts and social harmony, rural poverty, unemployment, bonded labour,
Migrant workers and human rights violations, human rights of mentally and physically challenged

UNIT - 5

State, Individual liberty, Freedom and Democracy:

The changing of state with special reference to developing countries, Concept of development under development and social action, need for collective action in developing societies and methods of social action, NGOs and human rights in India: - Land, Water, Forest issues.

UNIT - 6

Human Rights in Indian Constitution and Law:

The constitution of India:

- (i) Preamble
- (ii) Fundamental rights.
- (iii) Directive principles of state policy.
- (iv) Fundamental duties.
- (v) Some other provisions.

Universal declaration of human rights and provisions of India, Constitution and law,
National human rights commission and state human rights commission

TEXT/REFERENCE BOOKS

Reference Books:

1. Shastry, T. S. N., *India and Human rights: Reflections*, Concept Publishing Company India (P Ltd.), 2005.
2. Nirmal, C.J., *Human Rights in India: Historical, Social and Political Perspectives (Law in India)*, Oxford India.

BH202

Engineering Mathematics- II

8 Credits

UNIT - 1

Linear Algebra – Matrices:

Matrix operations, cofactors, normal form of a matrix, rank, Consistency, Eigen and eigen values, Cayley – Hamilton theorem

UNIT - 2

Differential Calculus:

Successive differentiation, Leibnitz's theorem, Taylor's theorem, Maclaurin's Theorem

UNIT - 3

Vector Calculus:

Differentiation of vectors, Curves in space, Velocity and acceleration, Tangential and normal acceleration

UNIT - 4

Applications of Vector and Scalar Point Functions:

Vector operator del, Del applied to the Scalar point function – Gradient, Del applied to the Vector point functions – Divergence and Curl, Del applied twice to point function, Line Integral, Surface integral, Volume integral, Divergence theorem, Green's theorem, Stoke's theorem

UNIT - 5

Integral Calculus:

Double integral, Triple integral, Application to the area, volume, surface area, Moment of Inertia, Center of gravity.

UNIT - 6

Infinite Series:

Positive term series – Integral test, Comparison test, D'Alembert ratio test, Cauchy's root test, Raabe's test, Log Test, Alternating Series – Leibnitz rule, absolute and conditional convergence, power series

TEXT/REFERENCE BOOKS

Text Books:

1. Grewal B. S., Higher Engineering Mathematics, Khanna Publication, New Delhi.
2. Kreyszig E., Advanced Engineering Mathematics, Wiley Eastern Publication.

BH203

Engineering Physics - II

6 Credits

UNIT - 1

Crystallography and X -rays

Crystalline and amorphous solids, crystal structure , Lattice point, space lattice, unit cells, lattice parameter and crystal systems, cubic system, number of atoms per unit cell, Co-ordination number, atomic radius, packing density, Lattice constant. Lattice plane and Miller Indices, Interplaner spacing for cubic system, Production and types of x-rays spectrum, x-ray diffraction, Bragg's law, Moseley's law

UNIT - 2

Conducting Materials:

Electrical conduction, free electron theory, Fermi Dirac statistics, band theory of solids, Resistivity of metals, Superconductivity and types- Meissner effect, High temperature superconductor, Applications

UNIT - 3

Semiconductor:

Intrinsic and extrinsic semiconductor, conductivity of semiconductor and its temperature dependence, Fermi level, Hall Effect, semiconductor devices (P-N junction diode, Transistor)

UNIT - 4

Dielectric Materials:

Dielectric constant, polarization, types of polarization Internal field and claussius-Mosotti equation, types of dielectric materials, temperature and frequency effect, application.

UNIT - 5

Magnetic Materials and Advanced Materials:

Magnetic dipole moment, magnetic flux density, magnetic field strength magnetization, magnetic permeability , types of magnetic materials, domain theory, hysteresis loop, hard and soft materials, Nano materials, physical properties, a ferrites and garnets and application

UNIT - 6

Electrodynamics:

Coulomb's law for distribution of charges, polarization and Gauss's law, Maxwell's equation, electromagnetic wave equation, propagation of electromagnetic waves in free – space

TEXT/REFERENCE BOOKS

Text Books:

1. A text of Engineering Physics – M. N. Avadhanulu and P. G. Kshirsagar
2. Materials Science and Engineering – V. Raghavan

Reference Books:

1. E. M. Purcell, Electricity and Magnetism-Berkeley Physics Course Volume 2.
2. J. R. Reitz, F. J. Milford and R. W. Christy, Foundation of electromagnetic theory , third edition.

BH203L

Engineering Physics – II (LAB)

2 Credits

List of experiments:

1. Study of crystal planes.
2. Study of diode characteristics.
3. Study of transistor characteristics.
4. To determine energy band gap of a semiconductor by using P – N junction diode.
5. To determine resistivity of semiconductor by four probe method at different temperature.
6. To determine Hall effect and determine Hall coefficient, Charge carrier density.

BH204

Engineering Chemistry - II

6 Credits

UNIT - 1

Water:

Introduction, Hard and soft water, softening of water-zeolite process, ion-exchange process, hot lime-soda process, purification of water- methods to remove suspended impurities, methods to remove germs and bacteria.

UNIT - 2

Metallurgy:

Introduction, occurrence of metals, Types of ores, conc. of ores- crushing and sizing, froth flotation, magnetic separation, tabling process etc. calcination, roasting, reduction by pyrolysis. Chemical reductions, Refining of metals

UNIT - 3

Phase Rule:

Phase Rule, statement & derivation, explanation of the terms- Phase, components, degrees of freedom, one component system-water & sulphur, two components alloy system.

UNIT - 4

High Polymers:

Introductions, Types of polymerization-addition, condensation & co-polymerization, molecular weight determination by viscosity method & osmotic pressure method, plastic and its classification

UNIT - 5

Electrochemistry – I:

Introduction, conductivity-specific conductance, equivalent conductance, measurement of conductance, cell constant, factors affecting the conductance of electrolytic solution, conductometric titrations, Debye- Huckel theory of strong electrolyte, Transport number & determination of transport number by moving boundary method

UNIT - 6

Electrochemistry – II:

Introduction, Theory of acid-base indicator, glass electrode, Quinhydrone electrode, measurement of pH, potentiometric titration

TEXT/REFERENCE BOOKS

Text Books:

1. Bhal and Bhal *Advanced Organic Chemistry*, S. Chand and Company, New Delhi, 1995.
2. Jain P. C. and Jain Monica, *Engineering Chemistry*, Dhanpat Rai and Sons, Delhi, 1992.

Reference Books:

1. I. L., *Organic Chemistry* (Vol. I and II), Longman Gr. Ltd. and English Language Book Society, London
2. Barrow G.M., *Physical Chemistry*, McGraw-Hill Publication, New Delhi
3. S. S. Dara, *Engineering chemistry*, S. Chand & company, New Delhi

BH204L

Engineering Chemistry – II (LAB)

2 Credits

List of Experiments:

1. Determination of hardness of water sample
2. Determination of chloride content in water
3. Determination of acidity of water sample
4. Determination of dissolve oxygen
5. Determination of alkalinity of water
6. Determination of percent purity of bleaching powder
7. Determination of purity of washing soda
8. PH- metric titration - 02
9. Conducto-metric titration - 02

Reference Books:

1. Systematic experiments in Chemistry, A. Sethi, New Age International Publication, New Delhi
2. Practical Inorganic Chemistry, A. I. Vogel, ELBS Publication
3. Practical in Engineering Chemistry, S. S. Dara

CL205

Basic Civil Engineering

4 Credits

UNIT - 1

Properties and uses of Construction Materials:

Stones, bricks, cement, concrete and steel, Site selection for buildings

UNIT - 2

Component of Building:

Foundation- Shallow and deep foundations

UNIT - 3

Brick and Stone Masonry:

Plastering- Lintels, beams and columns- Roofs

UNIT - 4

Roads:

Classification of Rural and urban Roads- Pavement Materials-Traffic signs and road marking-Traffic Signals

UNIT - 5

Surveying:

Classification-Chain Survey-Ranging-Compass Survey-exhibition of different survey equipment

UNIT - 6

Water Supply:

Quality of Water-Wastewater Treatment units-Their functional utility- Need for conservation of water

REFERENCE BOOKS

Reference Books:

1. Sushil Kumar (2001), *Building Construction*, Standard Publishers Distributors
2. S.C Rangwala (1996), *Building Materials*, Charotar Publishing House
3. Lecture notes prepared by Department of Civil Engineering

ME206

Basic Mechanical Engineering

4 Credits

UNIT - 1

Introduction to Mechanical Engineering:

Thermal Engineering, Design Engineering, Manufacturing Engineering

UNIT - 2

Introduction to Laws of Thermodynamics:

Simple examples pertaining to respective branches, IC Engines: Classification, Applications, 2 Stroke and 4 Stroke systems in IC Engines

UNIT - 3

Automobiles:

Transmission systems, Suspension system, Power Plant: Types of Power plant; Gas power plant, Thermal power plant, nuclear power plant

UNIT - 4

Design Basics:

Mechanisms, Factor of safety, materials and metallurgical considerations

UNIT - 5

Engineering Materials, Machine Elements, Transmission, Fasteners, Support Systems

UNIT - 6

Manufacturing:

Classification, introduction to Lathe machine, Drilling machine, Milling machine, metal joining, Metal forming, casting (A visit to Workshop for demonstration)

TEXT/REFERENCE BOOKS

1. Lecture notes prepared by Department of Mechanical Engineering

ME207

Engineering Graphics

4 Credits

UNIT - 1

Drawing standard:

Drawing standard SP46: Dimensioning, Lettering, type of lines, scaling conventions

UNIT - 2

Geometrical Constructions:

Dividing a given straight line into any number of equal parts, bisecting a given angle, drawing a regular polygon given one side, special methods of constructing a pentagon and a hexagon

UNIT - 3

Orthographic /Isometric Projection:

Introduction to orthographic projection, drawing orthographic views of objects from their isometric views - Orthographic projections of Points lying in four quarters, Orthographic projection of lines parallel and inclined to one or both planes. Orthographic projection of planes inclined to one or both planes. Isometric Projection and view of planes and simple solids

UNIT - 4

Solids and Sectioning:

Types of solids, Projections of solids with axis perpendicular to HP, solids with axis perpendicular to VP, solids with axis inclined to one plane. Projection of spheres touching each other sectioning of solids: section planes perpendicular to one plane and parallel or inclined to other plane

UNIT - 5

Studies of Surfaces:

Intersection of surfaces: intersection of cylinder and cylinder, intersection of cylinder and cone, intersection of prisms. Development of surfaces: Development of cylindrical and conical surfaces Development of prisms.

UNIT - 6

Computer Aids:

Introduction to computer aided drafting: introduction to computer aided drafting package to make drawings

TEXT/REFERENCE BOOKS

Text Books:

1. N.D. Bhatt, *Engineering Drawing*, Charotar publishing House, 46th Edition, 2003
2. K.V. Natarajan, *A text book of Engineering Graphic*, Dhanalakshmi Publishers, Chennai, 2006

Reference Books:

1. K. Venugopal and V. Prabhu Raja, *Engineering Graphics*, New Age International (P) Ltd, 2008.

ME207L

Engineering Graphics (LAB)

2 Credits

List of Experiments:

1. Line, Lettering and Dimensioning (Fig. 3.1, 2, 3, 4, 6, 12, 13)
2. Geometric Construction (Fig. 5.11, 12, 31, 33, 35 to 40, 77, 81, Ex. (5) – 23)
3. Orthographic Projection (Fig. 20.32, 38, 45, 48)
4. Projection of Lines (Fig. 10.34, 35, Ex. (10b) – 5, 9)
5. Projection of Planes (Fig. 12.14, 15, 20, Ex. (12) - 7)
6. Projection of Solids (Fig. 13.21, 28, 39(ii), 54)
7. Isometric Projection (Fig. 17.47, 57, Ex. (17) – 115, 127(9))
8. Section of Solids (Fig. 14.10, 20(ii), 43, Ex. (14) - 12)
9. Development of Surfaces (Fig. 15.9, 14, 22, 33)

NOTE: Refer “Engineering Graphics”, N. D. Bhatt, 51st Edition

UNIT - 1

Introduction to Unix Operating System:

Functions and Types of Operating System, Overview of the unix system, Architecture of unix operating system, Introduction to system concepts , Single and compound unix commands, Shell scripts.

C Fundamentals: Identifiers and keywords, data types, constants, variables, declarations, expressions, statements.

UNIT - 2

Operators & Expressions: Arithmetic operators, Unary operators, Relational Operators, Assignment operators, Conditional operator, library functions.

Data input and output: getchar function, putchar function, scanf function, printf function, gets and puts function.

Control Statement: While statement, Do-While statement, for statement, Nested loops , if-else statements, switch statements, break statement, continue statement

Functions:- Definition, accessing a function , passing argument to the function, specifying argument data types .

UNIT - 3

Arrays & Pointers:- Definition ,processing of array, passing array to a function, multidimensional array, arrays and strings, fundamentals, pointer declaration, Passing pointer to a function

Structure& Unions: - Definition of structure& Union, processing of structure & Union, passing structure to a function

UNIT - 4

Introduction to Object Oriented programming:

Procedure versus object orientated programming, Basic concepts of object oriented programming, Examples with C++ & Java.

UNIT - 5

Introduction to Visual Basic: what is VB & using controls, file Handling.

UNIT - 6

Introduction to Web Programming: Overview of HTML, Introduction to scripting languages.

Hand on Experience

1. Working with Unix commands.
2. Writing 05 programs in C language
3. Writing simple programs in C++, Java (02 Programs).
4. Creation of small projects in Visual Basic.
5. Creation of Web page using HTML, Scripting language.

TEXT/REFERENCE BOOKS

Text Books:

1. Byron S. Gottfried, *Schaum's Outlines: Programming with C*, 2nd Edition, Tata McGraw Hill publication, 2006.
2. E. Balagurusamy, *Object Oriented Programming with C++*, 4th Edition, Tata McGraw Hill publication, 2008.
3. E. Balagurusamy, *Programming with Java*, 4th Edition, Tata McGraw Hill publication, 2009.
4. Steven Holzner, *Visual Basic 6 Programming*, Dreamtech publication.
5. E. Balagurusamy, *Computer Programming – I: Unix and C*, Tata McGraw Hill publication.
6. Sumitabha Das, *Unix: Concepts and Applications*, 4th edition, 2006.
7. Gosselin, *Java Script*, Cengage Learning, India.

Reference Books:

1. Marty Matthews, John Cronan, *Dynamic Web Programming: A Beginner's Guide*, Tata McGraw Hill publication, 2010.
2. John Hubbard, *Schaum's Outlines: Programming with C++*, Tata McGraw Hill publication, 2010.
3. John Hubbard, *Schaum's Outlines: Programming with Java*, 2nd edition, Tata McGraw Hill publication, 2010.



Course Structure and Syllabus
For
B. Tech. Information Technology
Programme
(SECOND YEAR)

(With effect from the Academic Year 2011-2012)



Dr. Babasaheb Ambedkar Technological University, Lonere

Semester III						
CODE	SUBJECT	L	P	C	MSE	ESE
BH301	Engineering Mathematics-III	4	0	8	30	70
CEIT302	Numerical Methods	4	0	8	30	70
CEIT303	Switching Theory and Logic Design	3	0	6	30	70
CEIT304	Discrete Structures	4	0	8	30	70
CEIT305	Computer Organization and Architecture	4	0	8	30	70
CEIT306	Object Oriented Programming in C++	3	0	6	30	70
IT307	Programming Laboratory I *		2	2	50	50
IT308	Programming Laboratory II**		2	2	50	50
IT309	Seminar report and presentation ***			4		
		22	4	52	280	520
	*Switching Theory and Logic Design					
	**Object Oriented Programming in C++					
	***Self study report on any topic of choice based on subjects studied					
Semester IV						
CODE	SUBJECT	L	P	C	MSE	ESE
CEIT401	Probability Statistics and Queuing Theory	4	0	8	30	70
CEIT402	Data Communication	4	0	8	30	70
CEIT403	Microprocessors and Microcontrollers	4	0	8	30	70
CEIT404	Data Structures	4	0	8	30	70
IT405	Elective I: Management Information Systems	3	0	6	30	70
IT406	Programming Laboratory III**		4	4	50	50
IT407	Programming Laboratory IV***		2	2	50	50
		19	6	44	250	450
	* Self Study Course (Objective University Level Common Exam.)					
	** Microprocessors and Microcontrollers, Data Communication					
	***Data Structures					

Semester-III

BH301

Engineering Mathematics-III

8 Credits

UNIT - 1

Laplace Transform:

Transform of elementary functions, Transform periodic function, Transform of special function, Transform of derivative, Transform of integral, Properties of Laplace transform, Evaluation of integrals of Laplace transform.

UNIT - 2

Inverse Laplace Transform:

Properties of inverse laplace transform, Other methods for finding inverse Laplace transform, Convolution theorem for inverse Laplace transform, Application to the differential equations, Simultaneous linear equations with constant coefficients.

UNIT - 3

Partial Differential Equations and Applications:

Formation of Partial differential equations, Linear equations of the first order, Homogeneous linear equations with constant coefficients, Rules for finding complementary and particular integrals, Working procedure to solve the equations, Nonhomogeneous linear equations, Wave equations, One dimensional heat flow equation, Laplace equation.

UNIT - 4

Series Solution of Differential Equations and Special Functions:

Validity of series solution, Series solution when $x = 0$ is an ordinary point, Frobenius method, Bessel's equation, Recurrence relation for $J_n(x)$, Orthogonality of Bessel function.

UNIT - 5

Fourier Transform:

Fourier integral – fourier sine and cosine integral – complexity forms of fourier integral, Fourier transform - fourier sine and cosine transform – finite fourier sine and cosine transform, Properties of F- transform, Convolution theorem for F- transform, Parseval's identity for F- transform.

UNIT - 6

Integral Equations:

Conversion of linear differential equation to an integral equation and vice versa, Conversion of boundary value problem to integral equation using Green's functions, Solution of an integral equations, Integral equations of the convolution type, Abel's integral equation, Integro-differential equation, Solution of Fredholm and Volterra equations by the methods of successive approximations.

TEXT/REFERENCE BOOKS

Text Books:

1. S. Grewal, *Higher Engineering Mathematics*, Khanna publication.
2. E. Kreszig, *Advanced Engineering Mathematics*, 6th edition, Wiley Eastern publication.
3. Peter V.O. Neil, *Advanced Engineering Mathematics*, Thomson publication.

UNIT - 1

Solution of Algebraic and Transcendental Equation: Bisection method, Method of false position, Newton's method and Newton-Raphson method, Approximate solution of equation – Horner's method.

UNIT - 2

Solution of Linear Simultaneous Equation: Gauss elimination method, Gauss-Jordan method, Crout's triangular method, Iterative method of solution- Jacobi iteration method, Gauss-Seidal iteration method, Relaxation method.

UNIT - 3

Finite Differences: Forward difference operator, Backward difference operator, Central difference operator, Newton's interpolation formulae, Newton's forward-backward-central interpolation formulae, Sterling formula, Bessel's formula, Interpolation with unequal intervals.

UNIT - 4

Differentiation and Integration: Newton-Cotes formula, Trapezoidal rule, Simpson one-third rule, Simpson three-eighth rule, Weddle's rule.

UNIT - 5

Numerical Solution of ODE: Picard's methods, Taylor series method, Euler's method, Modified Euler's method, Runge - Kutta method, Predictor-corrector method, Milne's method.

UNIT - 6

Adams-Bash fourth method, Second-order differential equation, Numerical solution for elliptical partial differential equation.

TEXT/REFERENCE BOOKS

Text Books:

1. B.S Grewal, *Higher Engineering Mathematics*, 40th edition, Khanna publication.
2. S. S. Shastri, *Introduction to Numerical Methods*, PHI publication.
3. V. Rajaraman, *Computer Oriented Methods*, 3rd edition, PHI publication.

Reference Books:

1. Conte and De boor, *Elementary Numerical Analysis*, BPB publication.
2. E. Kreyszig, *Advanced Engineering Mathematics*, BPB publication.
3. Steven C Chapra, *Numerical Methods for Engineers*, 5th edition, McGraw Hill publication.

UNIT - 1

Number Systems and Codes:

Binary number system, Signed binary numbers, Binary arithmetic, Decimal number system, Hexadecimal number system, Octal number system, Arithmetic operations using 1's complement, 2's complement, 9's complement, 10's complement.

Codes: Numeric codes, Weighted and non-weighted codes, Sequential codes, Self complementing codes, Cyclic codes, Reflective codes, BCD code, Excess-3 code, Gray code, Error detecting and correcting codes.

UNIT - 2

Boolean Algebra and Logic Functions:

Introduction to analog and digital signal, Logic gates and switching functions: AND, OR, NOT, EX-OR, EX-NOR, NAND, NOR.

Implementation of universal gates using logic gates, De Morgan's theorem, Boolean algebra, Representation of logic functions using POS and SOP form, Minimization of completely and incompletely specified switching functions- Karnaugh map (2,3,4,5,6 variable).

UNIT - 3

Combinational Circuits Design:

Quine – McCluskey method, TTL and CMOS logic families, Half and full adder, Half and full subtractor, Binary parallel adder, Binary parallel subtractor, Look ahead carry header, BCD to 7- segment decoder, Binary to Gray code converter, Gray to Binary code converter.

UNIT - 4

Combinational Logic Design using MSI Circuits:

Multiplexer, Demultiplexer, BCD arithmetic: BCD adder, BCD subtractor, Arithmetic logic unit, Digital comparators, Parity generators. Design of PAL, Design of PLA, Design of PROM.

UNIT - 5

Designing with Sequential MSIs:

Comparison between sequential and combinational circuit, Synchronous sequential circuits and asynchronous sequential circuits, Registers, Shift registers, Counters: asynchronous counters and synchronous counters, Sequential circuit's implementation.

Flip flops: Edge triggered flip-flops, S-R flip flop, J-K flip flop, T flip flop, D flip flop. Flip-flop conversion.

UNIT - 6

Finite State Machines and ASM Charts:

Regular expressions using FSM, Optimization using FSM, Reduction of states, Mealy and moore machine. Representation of sequential circuits using ASM charts, Synthesis of output and next state functions, Data path and control path, Partition-based design.

TEXT/REFERENCE BOOKS

Text Books:

1. R. P. Jain, *Modern Digital Electronics*, 4th edition, TMH publication, 2010.
2. Zvi Kohavi, *Switching and Finite Automata Theory*, 3rd edition, Cambridge, 2009.
3. M. Morris Mano, *Digital Design*, 3rd edition, Prentice Hall publication, 2001.

Reference Books:

1. F. J. Gill Peterson, *Switching Theory and Logic Design*, John Wiley publication.
2. Samuel C. Lee, *Digital Circuits and Logic Design*, PHI publication.
3. V. Rajaraman, T. Radhakrishnan, *An Introduction to Digital Computer Design*, Tata McGraw Hill publication.
4. Hatchell and Gray, *Logic Synthesis and Verification Algorithms*, Kluwer Academic publication.
5. A. Anandkumar, *Switching Theory and Logic Design*, PHI Learning, 2008.

UNIT - 1

Fundamental Structures and Basic Logic:

Sets, Venn diagram, Cartesian product, Power sets, Cardinality and countability, Propositional logic, Logical connectives, Truth tables, Normal forms, Validity, Predicate logic, Limitations of predicate logic, Universal and existential quantification.

UNIT - 2

Functions and Relations:

Subjective, Injective, Bijective and inverse functions, Composition of function, Reflexivity, Symmetry, Transitivity and equivalence relations.

UNIT - 3

Proof Techniques:

Completeness, Pigeonhole principle, Modus ponens and modus tollens , Notions of implication, Converse, Inverse, Contra-positive, Negation and contradiction, Structure of formal proofs, Directs proofs, Proof by counter example, Proof by contradiction, Mathematical induction, Strong induction, Recursive mathematical definitions, Well orderings.

UNIT - 4

Graph Theory:

Basic terminology, Multi graphs and weighted graphs, Paths and circuits, Shortest path problems, Euler and Hamiltonian paths, Representation of graph, Isomorphic graphs, Planar graphs.

UNIT - 5

Trees:

Rooted trees, Path length in rooted tree, Binary search trees, Spanning trees and cut set, Minimal spanning trees, Kruskal's and Prim's algorithms for minimal spanning tree.

Algebraic Systems:

Algebraic systems, Groups, Semi group, Monoid, Subgroup, Isomorphism and homomorphism, Rings and fields, Lattices, Boolean lattices and Boolean algebra.

TEXT/REFERENCE BOOKS

Text Books:

1. C. L. Liu, *Elements of Discrete Mathematics*, 3rd edition, Tata McGraw Hill publication, 2008.
2. Kenneth H. Rosen, *Discrete Mathematics and its Applications*, 6th edition, Tata McGraw Hill publication, 2010.

Reference Books:

1. Lipschutz Lipson, *Discrete Mathematics*, 3rd edition, Tata McGraw Hill publication, 2009.
2. V. K. Balakrishnan, *Schaum's Outline Of Graph Theory*, 1st edition, Tata McGraw-hill publication.

UNIT - 1

Introduction:

Concept of computer organization and architecture, Fundamental unit, Computer function and interconnection, CPU structure and function.

Instruction Sets:

Characteristics, Types of operands, Types of operations, Assembly language, Addressing modes, Instruction format, Types of instruction, Instruction execution, Machine state and processor status, Structure of program, Introduction to RISC and CISC architecture.

UNIT - 2

Computer Arithmetic:

The arithmetic and logic Unit, Integer representation, Integer arithmetic, Floating-point representation, Floating-point arithmetic, Introduction of arithmetic co-processor.

UNIT - 3

Memory Organization:

Internal Memory: Semiconductor main memory, Error correction, Advanced DRAM organization, Virtual memory systems and cache memory systems.

External Memory: Organization and characteristics of magnetic disk, Magnetic tape, Optical memory, RAID, Memory controllers.

UNIT - 4

Control Unit:

Control unit operation: Micro-operations, Control of the processor, Hardwired implementation,

Micro - programmed Control Unit:

Basic concepts, Microinstruction sequencing, Microinstruction execution, Applications of microprogramming.

UNIT - 5

Input/ Output Organization:

External devices, I/O module, Programmed I/O, Interrupt driven I/O, Direct memory access, I/O channels and processors, External interface.

UNIT - 6

Instruction pipelining: Concepts.

Parallel processing: Multiple processor organization, Symmetric multiprocessor, Cache coherence and the MESI protocol.

TEXT/REFERENCE BOOKS

Text Books:

1. William Stallings, *Computer Organization and Architecture: Designing for Performance*, 8th edition, Prentice Hall publication, 2009.
2. Hayes, *Computer Architecture and Organization*, 3rd edition, Tata McGraw Hill publication, 2010.
3. Zaky, *Computer Organization*, 5th edition, Tata McGraw Hill publication.

Reference Books:

1. Hennessy and Patterson, *Computer Architecture: A Quantitative Approach*, 4th edition, Morgan and Kaufman publication, 2007.
2. Morris Mano, *Computer Architecture and Organization*, PHI publication.

UNIT - 1

Introduction to Object Oriented Programming:

Need of object oriented programming, The object oriented approach, Characteristics of object oriented languages.

UNIT - 2

Objects and Classes and Operator Overloading:

A class, Objects as data types, Constructors, Objects as function arguments, Returning objects. Overloading unary and binary operators, Data conversion.

UNIT - 3

Inheritance and Polymorphism:

Derived and base class, Public and private inheritance, Levels of inheritance, Multiple inheritance, Examples, Virtual functions, Dynamic binding, Abstract classes and pure virtual functions, Friend functions, The this pointer.

UNIT - 4

Streams and Files:

Streams, Stream output and input, Stream manipulators, Files and streams, Creating, Reading, Updating sequential and random files.

UNIT - 5

Templates and Exception Handling:

Function templates, Overloading function templates, Class templates, Exception handling overview, Need of exceptions, An exception example, Multiple exceptions, Exception specifications.

UNIT - 6

Standard Template Library (STL):

Introduction to STL- Containers, Iterators, Algorithms, Sequence containers, Associative containers, Container adapters.

TEXT/REFERENCE BOOKS

Text Books:

1. E. Balagurusamy, *Object Oriented Programming with C++*, 4th edition, Tata McGraw Hill publication, 2008.
2. Robert Lafore, *Object Oriented Programming in C++*, 4th edition, Sams publishing, 2009.

Reference Books:

1. P. J. Deitel, H.M. Deitel, *C++ How to Program*, PHI publication.
2. John Hubbard, *Programming with C++*, *Schaum's outlines*, Tata McGraw-Hill publication.

Switching Theory And Logic Design

List of experiments:

1. Implementation of Logic gates and Universal Gates.
2. Implementation of Boolean Functions using Logic Gates.
3. Study of Boolean algebra and DeMorgan's Theorem.
4. Implementation of 4 bit Binary to Gray Code Converter and vice-versa, Excess-3 Code to BCD and vice-versa.
5. Implementation of Half and Full Adder.
6. Implementation of Half and Full Subtractor.
7. Implementation of Multiplexer and Demultiplexer.
8. Study of Flip Flops.
9. Study of Shift Registers.
10. Designing of Divide by N-Counter using 7490/74191.
11. Implementation of BCD-to-7 segment decoder.
12. Study of ASM.

List of experiments:

1. A program to demonstrate Function.
 - a. Call by Value
 - b. Call by Reference
2. A program to demonstrate Arrays.
3. A program to demonstrate Friend function.
4. A program for creation of object using Simple class.
5. A program to demonstrate Inline function.
6. A program to illustrate Function Overloading.
7. A program to illustrate Operator Overloading.
8. A program to illustrate Inheritance.
9. A program to demonstrate Polymorphism.
10. A program for Exception handling.
11. A program using templates.

Semester- IV

CEIT401

Probability Statistics and Queuing Theory

8 Credits

UNIT - 1

Probability Theory:

Definition of probability: classical, empirical and axiomatic approach of probability, Addition theorem of probability, Multiplication theorem of probability, Bayes' theorem of inverse probability, Properties of probabilities with proofs, Examples.

UNIT - 2

Random Variable and Mathematical Expectation:

Definition of random variables, Probability distributions, Probability mass function, Probability density function, Mathematical expectation, Joint and marginal probability distributions, Properties of expectation and variance with proofs, Examples.

UNIT - 3

Theoretical Probability Distributions:

Binomial distribution, Poisson distribution, Normal distribution, Fitting of binomial distributions, Properties of binomial, poisson and normal distributions, Relation between binomial and normal distributions, Relation between Poisson and normal distributions, Importance of normal distribution, Examples.

UNIT - 4

Correlation:

Introduction, Types of correlation, Correlation and causation, Methods of studying correlation, Karl Pearson's correlation coefficient, Spearman's rank correlation, Coefficient, Properties of Karl Pearson's correlation coefficient, Properties of Spearman's rank correlation coefficient, Probable errors, Examples.

UNIT - 5

Linear Regression Analysis:

Introduction, Linear and non-linear regression, Lines of regression, Derivation of regression lines of y on x and x on y, Angle between the regression lines, Coefficients of regression, Theorems on regression coefficient, Properties of regression coefficient, Examples.

UNIT - 6

Queuing Theory:

Introduction, Queuing systems, The input or arrival pattern, The service pattern and service discipline, Notation, Performance measures, Little's formula, Relation between the probabilities of states, M/M/1/ ∞ systems, Examples.

TEXT/REFERENCE BOOKS

Text Books:

1. S. C. Gupta, *Fundamentals of Statistics*, 46th edition, Himalaya publishing house, 2010.
2. G.V. Kumbhojkar, *Probability and Random Processes*, 14th edition, C. Jamnadas and co., 2010.
3. G. Haribaskaran, *Probability, Queuing Theory and Reliability Engineering*, 6th edition, Laxmi publications, 2010.

Reference Books:

1. Kishor S. Trivedi, *Probability, Statistics with Reliability, Queuing and Computer Science Applications*, 2nd edition, Wiley India Pvt. Ltd., 2008.

UNIT - 1

Introduction to communication, Network Models, Data and Signals:

Components of communication, Data representation, Data flow, Communication model, Network, Network topologies, Network connection, Network categories, LAN, WAN, MAN, Internet.

Layered tasks, OSI Model – Layered architecture, Layers in OSI model TCP/IP model, Comparison.

Analog and digital data, Analog and digital signals, Periodic and non-periodic signals, Sine wave, Parameters of sine wave, Time and frequency domain, Composite signals, Bandwidth, Digital signal-bit rate, Baseband and broadband transmission, Transmission impairments, Nyquist bit rate, Shannon capacity, Performance: Throughput, Latency, Bandwidth-delay product, Jitter.

UNIT - 2

Analog Transmission and Multiplexing:

Digital to analog conversion- Amplitude shift keying, Frequency shift keying, Phase shift keying, Quadrature amplitude modulation, Analog to analog conversion - Amplitude modulation, Frequency modulation, Phase modulation.

Need of multiplexing, Introduction, Multiplexer and demultiplexer, Frequency division multiplexing, Wavelength division multiplexing, Time division multiplexing – Statistical TDM, Synchronous TDM, Data rate management in TDM

UNIT - 3

Digital Transmission:

Digital to digital conversion, Signals element, Data element, Signal rate, Data rate, DC-component, Self synchronization, Line coding schemes - NRZ, NRZI, Bipolar AMI, Pseudoternary, Manchester, Differential Manchester. Block coding schemes - 4B/5B,

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8B/10B, Scrambling –HDB3, B8ZS, Analog to digital conversion: Pulse code modulation, Delta modulation, Transmission modes- serial and parallel transmission.

UNIT - 4

Transmission Media and Introduction to fiber optics:

Guided Media – Twisted pair cable, Co-axial cable, Fiber optic cable, Performance of each, Unguided media – Radio waves, Microwaves, Infrared.

Nature of light, Fiber characteristics, Sources and detectors, Connectors and splices.

UNIT - 5

Error Detection and Correction:

Introduction: Types of errors, Redundancy, Detection versus correction, Forward error correction and retransmission, Modular arithmetic, Block Coding: error detection, error correction, Hamming distance, Minimum hamming distance, Linear block codes, Cyclic Codes: Cyclic Redundancy check, Hardware implementation, Polynomials, Cyclic code analysis, Checksum : Concept, One's complement, Internet checksum.

UNIT - 6

Multiple Access, Cellular Phones and Satellite Networks:

Random Access Protocol: ALOHA, CSMA, CSMA/CD, CSMA/CA, Controlled access: Reservation, Polling, Token passing, Channelization: FDMA, TDMA, CDMA.

Frequency reuse principle, roaming, Three generations, Satellite networks: Orbits, GEO, MEO, LEO satellite.

TEXT/REFERENCE BOOKS

Text Books:

1. Schweber, *Data Communication*, 1st edition, Tata McGraw Hill publication, 2009.
2. Behrouz Forouzan, *Data Communications and Networking*, 4th edition, Tata McGraw Hill publication, 2010.
3. Stalling, *Data Communications and Computer Network*, PHI publication.

UNIT - 1

Architecture of Microprocessors:

General definitions of mini computers, Microprocessors, Micro controllers and digital signal processors.

Overview of 8085 microprocessor, Overview of 8086 microprocessor, Signals and pins of 8086 microprocessor.

UNIT - 2

Assembly language of 8086:

Description of Instructions, Assembly directives, Assembly software programs with algorithms.

UNIT - 3

Interfacing with 8086:

Interfacing with RAMs, ROMs along with the explanation of timing diagrams, Interfacing with peripheral ICs like 8255, 8254, 8279, 8259, etc., Interfacing with key boards, LEDs, LCDs, ADCs, and DACs etc.

Coprocessor 8087 : Architecture of 8087, interfacing with 8086. Data types, Instructions and programming.

UNIT - 4

Architecture of Micro controllers:

Overview of the architecture of 8051 microcontroller and 8096: 16 bit microcontroller.

Description of Instructions, Assembly directives, Assembly software programs with Algorithms.

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UNIT - 5

Interfacing with 8051:

Interfacing with keyboards, LEDs, 7 segment LEDs, LCDs, Interfacing with ADCs, Interfacing with DACs, etc.

UNIT - 6

High end processors:

Introduction to 80386 and 80486.

TEXT/REFERENCE BOOKS

Text Books:

1. Douglas Hall, *8086 Microprocessor, Architecture and Programming*, 5th edition, PHI publication, 2007.
2. Muhammad Ali Mazidi, *The 8051 Microcontrollers & Embedded System*, Pearson Education India publication.
3. Turley *Advanced 80386 Programming*, McGraw Hill publication, 2008.

Reference Books:

1. Liu, Gibson, Microcomputer system – *The 8086/8088 Family*, PHI publication.
2. John F. Uffenbeck, *The 8086/8088 Family Design, Programming and Interfacing*, PHI publication.
3. Intel 8086, 80386, 80486 manuals.
4. K. Ray and K. M. Bhurchandi, *Advanced Microprocessors and peripherals*, Tata McGraw Hill publication.

UNIT - 1

Introduction:

Data, Data types, Data structure, Abstract Data Type (ADT), representation of Information, characteristics of algorithm, program, analyzing programs, time and space complexity, Big 'O' and ' Ω ' notation, best average and worst cases.

UNIT - 2

Arrays:

Concept of sequential organization, linear and non-linear data structure, storage representation, array processing sparse matrices, transpose of sparse matrices.

UNIT - 3

Linked Lists:

Concept of linked organization, singly and doubly linked list and dynamic storage management, circular linked list, operations such as insertion, deletion, concatenation, traversal of linked list, dynamic memory management, garbage collection.

UNIT - 4

Stacks and Queues:

Introduction, stack and queue as ADT, representation and implementation of stack and queue using sequential and linked allocation, Circular queue and its implementation, Application of stack for expression evaluation and expression conversion, recursion, priority queue.

UNIT - 5

Trees and Graphs:

Basic terminology, binary trees and its representation, insertion and deletion of nodes in binary tree, binary search tree and its traversal, threaded binary tree, Heap, Balanced Trees. Terminology and representation of graphs using adjacency matrix, Warshall's algorithm.

UNIT - 6

Searching and Sorting:

Sequential, binary searching, skip lists – dictionaries, linear list representation, skip list representation, operations – insertion, deletion and searching. Insertion sort, selection sort, radix sort. File handling.

TEXT/REFERENCE BOOKS

Text Books:

1. Mark Allen Weiss, *Data structures and algorithms analysis in C++*, Pearson Education, 2013.
2. S. Lipschutz, *Data Structures*, McGraw Hill Publication.
3. Y. Langsm, M. Augenstin, A. Tanenbaum, *Data Structure using C and C++*, Pearson Education Asia Publication.
4. Trembley and Sorenson, *Introduction to Data Structures*, PHI Publication.

Reference Books:

1. E. Horowitz, S. Sahani, *Data Structure and Algorithms*, Galgotia Publication.
2. Thomas Cormen, *Introduction to Algorithms*, PHI Publication.

UNIT - 1

Introduction to Information System:

Foundations of information systems: Need and objective of information systems, Components and resources of information systems, Types of information systems: Operations support systems and management support systems.

Management Information Systems: Definition, Role and impact of MIS, Functions of the managers: planning, organizing, staffing, coordinating and directing, MIS as a support to the management.

Management of Business: Concept of corporate planning, Essentiality of strategic planning, Development of business strategies, Types of strategies, MIS for business planning.

UNIT - 2

Decision Support Systems:

Concept and philosophy ,Characteristics, Components of DSS, Tools, Using decision support systems: What-if analysis, Sensitivity analysis, Goal-seeking analysis, Optimization analysis, GDSS, Programming languages for DSS, Data warehouse in decision making, Data mining for decision support, Artificial intelligent systems, Knowledge based expert systems, GIS for decision making process.

UNIT - 3

Electronic Commerce Systems (eCommerce) :

Introduction, Scope, B2C, B2B and C2C, C2G, G2G, Essential e-Commerce processes, Electronic payment processes, M commerce, E-governance, Basic principles and emerging trends.

Customer Relationship Management (CRM): Introduction, What is CRM?, Three phases of CRM, Benefits, Challenges and trends in CRM, E-ERM.

Supply Chain Management: Role of SCM, Benefit, Challenges and trends in SCM.

UNIT - 4

Applications of MIS:

Applications in manufacturing sector: HR management, Marketing, management, Finance management, Materials management, Marketing management.

Applications in service: Banking, Insurance, Airline, Hotel, Hospital, Education.

Cross-Functional Enterprise Systems: Introduction, Collaboration systems in manufacturing, Enterprise application integration, Transaction processing systems.

UNIT - 5

Enterprise Management Systems (EMS):

Introduction, Enterprise resource planning (ERP) systems: Basic features, Benefits, Selection, Implementation, EMS and MIS.

BPO Services: Business process outsourcing, What is BPO?, Voice BPO, Inbound call center services, Outbound call center services, Non-voice BPO, Scope of BPO, Challenges in BPO management.

ITES: Objectives of ITES, ITES Services and applications like Medical Transcription, Document processing.

UNIT - 6

Security and Ethical Challenges:

Introduction, Ethical responsibility of business professionals, Cyber crime, Hacking, Cyber theft, Software piracy, Patents, Copy writes, Privacy issues, Health issues, Cyber laws and Information technology act.

Disaster management: System controls and audits, Contingency management and their solutions.

Global Management of Information Technology: Cultural, Political and geo-economic challenges, Platforms and data access issues.

TEXT/REFERENCE BOOKS

Text Books:

1. O'Brien James, *Management Information Systems*, 7th edition, Tata McGraw-Hill publication.
2. Rober Schulthesis, Mary Sumner, *Management Information System*, Tata McGraw- Hill publication.
3. Arpita Gopal, Chandrani Singh, *E-world Emerging trends in Information Technology*, Excel Books.

Reference Books:

1. K.C. Laudon, J.P. Loudon, *MIS Managing Digital Firm*, Pearson Education.
2. W. Jawadekar, *Management Information Systems*, 3rd edition, Tata McGraw-Hill publication, 2006.

Microprocessors and Microcontrollers Lab

List of experiments:

1. Write an assembly language program for 8086 and 8051 to perform 8 bit, 16bit addition and subtraction.
2. Write an assembly language program for 8086 and 8051 to perform 8 bit, 16 bit multiplication and to perform 16 bit by 8 bit division.
3. Write an assembly language program for 8086 and 8051 to perform conversion from
Two ASCII numbers to packed BCD and BCD to Hex.
4. Write an assembly language program to implement 8051 Timer/counter programming.
5. Write an assembly language program to implement 8051 serial communication programming.
6. Write an assembly language program to implement 8051 interrupt programming.
7. Write an assembly language program to interface 8086 to ADC and DAC.
8. Write an assembly language program to interface 8051 to LCD, ADC, sensors.

Data Communications Lab

List of experiments:

1. Study of Sampling theorem.
2. Study of Amplitude Modulation and Demodulation
3. Study of Frequency Modulation and Demodulation.
4. Study of Frequency Division Multiplexing and Demultiplexing.
5. Study of Time Division Multiplexing and Demultiplexing
6. Study of PCM and Demodulation.
7. Study of Delta Modulation and Demodulation.
8. Study of Fiber Optics communication.

Data Structures Lab

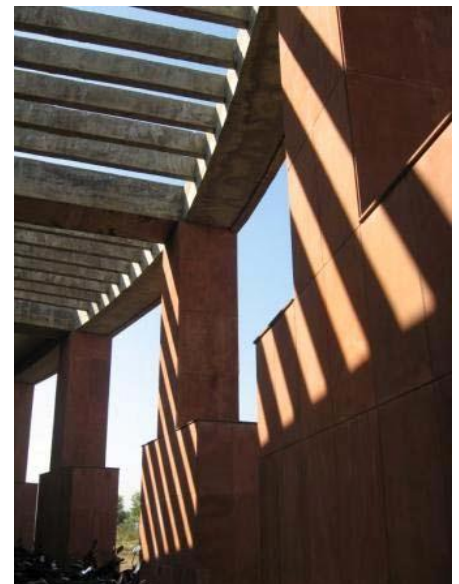
List of experiments:

1. Implementation of Single linked list.
2. Implementation of Double linked list.
3. Implementation of sequential representation of Stack and Queue.
4. Implementation of linked representation of Stack and Queue.
5. Implementation of Tree traversal methods (Inorder, Preorder, Postorder).
6. Implementation of sequential and linked representation of Graph.
7. Implementation of Graph traversal methods (DFS,BFS).
8. Implementation of Sorting methods: Insertion Sort, Radix Sort, Bubble Sort, Selection Sort.
9. Implementation of Searching methods: Linear Search, Binary Search.



Course Structure and Syllabus
For
B. Tech. Information Technology
Programme
(THIRD YEAR)

(With effect from the Academic Year 2012-2013)



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Semester V						
CODE	SUBJECT	L	P	C	MSE	ESE
CEIT501	Database Management Systems	4	0	8	30	70
CEIT502	Design and Analysis of Algorithms	4	0	8	30	70
CEIT503	Theory of Computation	4	0	8	30	70
CEIT504	Operating Systems	4	0	8	30	70
IT505	Elective II: IT Business Methodology	3	0	6	30	70
IT506	Programming Laboratory V*	0	4	4	50	50
IT507	Programming Laboratory VI**		2	2	50	50
IT508	Seminar ***		2	4	50	
		19	8	48	300	450
	*Database Management Systems, Operating Systems					
	**Design and Analysis of Algorithms					
	***Topic of Choice based on the Subjects studied so far or beyond, recent trends in IT					
Semester VI						
CODE	SUBJECT	L	P	C	MSE	ESE
CEIT601	Software Engineering	4	0	8	30	70
CEIT602	Computer Networks	4	0	8	30	70
CEIT603	Principles of Compiler Design	4	0	8	30	70
IT604	Embedded Systems	4	0	8	30	70
IT605	Elective III: Cyber Laws (Open for all branches)	3	0	6	30	70
IT606	Programming Laboratory VII*		4	4	50	50
IT607	Programming Laboratory VIII**		2	2	50	50
IT608	Industrial Training***					
		19	6	44	250	450
	* Computer Networks, Software Engineering					
	**Embedded Systems					
	***Four weeks in Industry					

Semester- V

CEIT501

Database Management Systems

8 Credits

UNIT - 1

Introduction:

Database system versus file system, Views of data models, Database languages, Overall architecture of DBMS.

UNIT - 2

Data Models:

Entity relationship model and relational model, Brief description of hierarchical and network model.

UNIT - 3

Relational Database Model:

SQL and other relational languages like relational algebra, Tuple calculus and domain calculus, Integrity and security, Relational database design.

UNIT - 4

Data Storage:

Storage and file structure, Indexing and hashing.

UNIT - 5

Query Processing.

UNIT - 6

Advanced Topics:

XML and database system architecture.

TEXT/REFERENCE BOOKS

Text Books:

1. C. J. Date, *Introduction to Database Management*, Narosa publication.
2. Korth, Silberchatz, Sudarshan, *Database System Concepts*, 6th edition, McGraw-Hill publication, 2011.
3. James Martin, *Principles of Database Management*, Tata McGraw Hill publication.

Reference Books:

1. *Understanding Oracle*, BPB publication.
2. Wiederhold, *Database Design*, McGraw-Hill publication.
3. Navathe, *Fundamentals of Database System*, Addison Wesley publication.

UNIT - 1

Introduction:

Definition, Algorithm specification, Design and performance analysis, Recurrences, Randomized algorithms.

UNIT - 2

Divide and Conquer Technique:

General method, Binary search, Finding maximum and minimum number, Merge sort, Quick sort, Selection sort, Strassen's matrix multiplication.

UNIT - 3

The Greedy Method:

The general method, Knapsack problem, Job sequencing with deadlines, Minimum cost spanning tree, Optimal storage on tapes, Optimal merge pattern, Single source shortest path.

UNIT - 4

Dynamic Programming:

The general method, Multistage graph, All pairs shortest path, Optimal binary search trees, 0/1 knapsack, The traveling salesperson problem.

UNIT - 5

Basic Traversal and Search Techniques:

Techniques for binary trees, Techniques for graphs, Connected components and spanning trees.

UNIT - 6

Amortized analysis, NP-hard and NP-complete problems:

Aggregation analysis, Accounting method, The potential method. NP-hard and NP-complete problems, Basic concepts of NP-hard and NP-complete, NP hard graph problems.

TEXT/REFERENCE BOOKS

Text Books:

1. Elise Horowitz, Sartaj Sahni, S. Rajasekaran, *Fundamentals of Computer Algorithms*, 2nd edition, University Press (India) Private Ltd.
2. Sara Base, *Computer algorithms: Introduction to Design and Analysis*, 3rd edition, Pearson Education, 2008.

Reference Books:

1. Cormen, *Introduction to Algorithms*, 2nd edition, PHI publication.
2. Aho, Ullman, *Data Structure and Algorithms*, Addison Wesley publication.

UNIT - 1

Finite Automata and Regular Expressions:

Definition of deterministic finite automata, Non deterministic finite automata, Moore and Mealy machines and their conversions, Regular expressions, Recursive definition, NFA with e-moves, Inter-conversion between NFA and DFA , Regular expression and FA, Pumping lemma.

UNIT - 2

Context Free Grammars:

Definition, Production rules, Ambiguous grammar, Removal of ambiguity, Chomsky hierarchy, Context Free Grammar (CFG) – definition, Simplification of CFG.

UNIT - 3

Context Free Languages:

Definition of context free languages, Regular grammar definition, Left linear, Right linear grammar, Interconversion between left linear and right linear regular grammar, Regular grammar and finite automata, CNF, GNF, Derivation graphs, Type 0 and Type 1 grammars.

UNIT - 4

Pushdown Automata:

Formal definition, Pushdown automata (PDA), Deterministic pushdown automata (DPDA) – definition, Non-deterministic pushdown automata (NPDA)-definition, relative powers of DPDA and NPDA.

UNIT - 5

Turing Machines:

The definition of a Turing machine, Computing with Turing machine, Extensions of Turing machines, Random access Turing machines, Non-deterministic Turing machines, Grammars,

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The Church's Turing hypothesis, Universal Turing machines, The Halting problem, Unsolvability problems about Turing machines.

UNIT - 6

Applications:

Applications of RE and FA - Lexical analyzer, Text editor and searching using RE, Applications of PDA - Expression conversion, Applications of CFG-syntax analysis, Language definition.

TEXT/REFERENCE BOOKS

Text Books:

1. Hopcroft, Ullman, Motwani, *Introduction to Automata Theory, Languages, and Computation*, Addison Wesley publication.
2. Daniel I. A. Cohen, *Introduction to Computer Theory*, Wiley publication.

Reference Books:

1. John C. Martin, *Introduction to Languages and Theory of Computation*, Tata McGraw Hill publication.
2. Papadimitriou, Lewis, *Elements of the Theory of Computations*, PHI publication.
3. E. V. Krishnamurthy, *Theory of Computer Science*, EWP publication.

UNIT - 1

Introduction and Operating system structures:

Definition, Types of Operating system, Real-Time operating system, System Components- System Services, Systems Calls, System Programs, System structure. Virtual Machines, System Design and Implementation, System Generations.

UNIT - 2

Processes and CPU Scheduling:

Process Concept, Process Scheduling, Operation on a process, Co-operating processes. Threads, Interprocess Communication, Scheduling criteria, scheduling Algorithms, Multiple-Processor Scheduling, Real-Time Scheduling, Scheduling Algorithms and performance evaluation.

UNIT - 3

Process Synchronization:

The critical-section problem, Critical regions, Synchronization Hardware, Semaphores, Classical Problems of synchronization, Monitors Synchronizations in Solaris.

UNIT - 4

Deadlocks:

Systems Model, Deadlock characterization, Methods for handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock, Combined approach to deadlock Handling.

UNIT - 5

Memory Management and Virtual Memory:

Logical versus Physical address space, Swapping, Contiguous allocation, Paging, Segmentation with Paging, Demand Paging, Page replacement algorithms, Thrashing.

File Management:

File System and Secondary storage devices, Real-Time Operating Systems, RT Linux and Case Studies: MS-DOS and UNIX.

TEXT/REFERENCE BOOKS

Text Books:

1. Silberschatz, Peter B Galvin, Operating System Concepts, 9th edition, Wiley Publications, 2013.
2. Andrew S. Tanenbaum, Modern Operating System, Pearson Publications, 2009.

Reference Books:

1. D.M. Dhamdhare, Systems Programming and Operating Systems, 2nd Edition, Tata McGraw Hill, 2006.
2. Garry Nutt, Operating Systems Concepts, Addison Wesley Publication.
3. Harvey M. Deitel, An Introduction to Operating Systems, Addison Wesley Publication.

UNIT - 1

Introduction to ERP:

Overview, Accommodating variety, Integrated management information, Integration, Supply chain and resource management, Integrated data model scope, Technology and benefits of ERP & the modern enterprise.

UNIT - 2

Business Modeling for ERP:

Overview, Concept, Significance and principles of business engineering, BRP, ERP and IT business engineering, ERP and management concerns, Building an MIS, Business as a system, Core process in a manufacturing company, Entities for data model in a manufacturing company, Extended ERP.

UNIT - 3

ERP Implementation:

Overview, Role of consultants, vendors and users, Customization, Precautions, Post implementation, Option, ERP implementation methodology and guidelines for ERP implementation, Mercedes Bens, Keethin Industries, Bull Electronics Angers Plant Manufactures, Twentieth century companies, A Meritech Essar Steel, Jindal Iron and Steel Company Ltd., Goderaj Soaps and associate companies, IREDA, Comparison and conclusions.

UNIT - 4

Getting Started on Basic SAP R/3 Elements:

The client or SAP customer, The clients representative, The SAP consultant, The SAP R/3 business application software architecture, Financial accounting and controlling (FI/CO) modules, The sales and distribution (SD) module, The materials management (MM) module, The plant maintenance (PM) and service management, The production planning (PP) module, The project system (PS) module, The human resources (HR) module, The SAP retail model, Industry solutions (IS) modules, The ASAP roadmap.

UNIT - 5

Electronic Commerce Environment and Opportunities, Modes of Electronic Commerce:

Background, The electronic commerce environment, Electronic marketplace technologies, Conclusion, Overview of Electronic Commerce, Electronic data interchange, Migration of Open EDI, Electronic commerce with WWW/internet, Commerce Net Advocacy, Web commerce going forward.

UNIT - 6

Approaches to Safe Electronic Commerce, Electronic Cash and Electronic Payment:

Overview, Secure transport protocols, Secure transactions, Secure Electronic Payment Protocol (SEEP), Secure Electronic Transaction (SET), Certificates for authentication, Security on web servers and enterprise networks, Conclusion. Internet monetary payment and security requirements, payment and purchase order process, Online electronic cash.

TEXT/REFERENCE BOOKS

Text books:

1. Vinod Kumar Garg, N. K. Venkita Krishna, *Enterprise Resource Planning-Concept and Practice*, PHI publication.
2. Alexis Leon, *Enterprise Resource Planning Demystified*, Tata McGraw Hill publication, 2000.
3. Daniel Minoli, Emma Minoli, *Web Commerce Technology Handbook*, McGraw Hill Publication.

Reference Books :

1. Sadagopan S., *ERP-A Managerial Perspective*, Tata McGraw-Hill, 2001.
2. Jose Antonio Hernandez, *The SAP R/3 Handbook*, Tata McGraw-Hill, 2001.
3. Vinod Kumar Garg and Bharat Vakharia, *Enterprise Resource Planning Strategy*, Jaico publishing house, Mumbai.
4. Garg & Venkitakrishnan, ERPWARE, *ERP Implementation Framework*, Prentice Hall publication.
5. Brady, *Enterprise Resource Planning*, Thomson Learning publication, 2001

Database Management Systems Lab

List of Experiments

1. Drawing ER diagram
2. Study of various DDL SQL queries
3. Study of various DML SQL queries
4. Study of Join Operations
5. Implementation of JDBC/ODBC (Embedded SQL)
6. Implementation of Database Driven Webpages
7. Implementation Functions and Procedures
8. Implementation Triggers
9. Study of Normalization

Operating Systems Lab

List of experiments:

1. Study of Unix commands.
2. Study of making disk bootable and installation of operating systems.
3. Program for FCFS CPU scheduling algorithm.
4. Program for SJF CPU scheduling algorithm.
5. Program for RR CPU scheduling algorithm.
6. Program for priority CPU scheduling algorithm.
7. Implementation of various synchronization problems using semaphores, Producer-Consumer problem, Dining Philosopher problem.
8. Program for Banker's algorithm.
9. Program for page replacement algorithms (FIFO, LRU, Optimal).

Design and Analysis of Algorithms Lab

List of experiments:

1. Implementation of Binary Search.
2. Implementation of finding maximum and minimum number using divides and conquer.
3. Implementation of Merge/ Quick sort.
4. Implementation of Selection sort.
5. Implementation of Job Sequencing with deadlines.
6. Program for finding minimum cost Spanning Tree.
7. Implementation of single source shortest path.
8. Implementation of all pairs shortest path.
9. Program for Tree traversal techniques.
10. Program for Graph traversal technique.

Seminar topic is included to enable the students to apply their knowledge to understand advanced technologies, designs etc. Literature survey may help to select such topics which are invaluable to an engineer in an Information Technology industry. It will encourage students to develop their presentation skills, good communication skills and skills of collecting the correct information regarding the technical topic.

The students will be able to deliver seminar with useful information. He/she should understand the technologies, designs and skills of writing technical report, to do literature survey and to attempt the queries from examiner.

Report and Assessment

The concerned guide will assess the term work as a continuous activity done by students to complete seminar. The students will have to deliver seminar for 20-25 minutes, during examination and explain the topic in presence of all students and department faculties. Questions and answers session will be of five minutes to each student. Examiner, concerned guide and senior faculty of the department will assess the performance during examination. Report writing should be as per given format.

Semester- VI

CEIT601

Software Engineering

8 Credits

UNIT - 1

Software Engineering and The Software Process:

Introduction, Process models.

UNIT - 2

Modeling-Part I:

Principles that guide practice, Understanding Requirements, Requirements modeling: Scenarios, Information, and analysis classes, Requirements modeling: Flow, Behavior, Patterns, and webapps.

UNIT - 3

Modeling-Part II:

Design concepts, Architectural design, Component level design, User interface design, Pattern based design, Webpage design.

UNIT - 4

Quality Management:

Quality concepts, Review techniques, Software quality assurance, Software testing strategies, Testing conventional applications.

UNIT - 5

Quality Management-Part II:

Testing Object-Oriented applications, Testing web applications, Software configuration management, Product metrics.

UNIT - 6

Managing Software projects:

Project management concepts, Process and project Metrics, Estimation for software projects, Project scheduling, Risk management, Maintenance and reengineering.

TEXT/REFERENCE BOOKS

Text Books:

1. Roger Pressman, *Software Engineering: A Practitioners Approach*, 7th edition, Tata McGraw Hill publication.
2. Jalota Pankaj, *An Integrated Approach to Software Engineering*, 3rd edition, Narosa publication.

Reference Books:

1. Jawadkar, *Software Engineering*, 5th edition, Tata McGraw Hill publication, 2013.
2. Sommerville, *Software Engineering*, 9th edition, Pearson Education, 2010.

UNIT - 1

Introduction:

Uses of Computer Networks, Network hardware, Network software, Reference models.

Physical Layer: Transmission media, Wireless transmission, Communication satellites, Structure of telephone system, Mobile telephone system.

UNIT - 2

Data Link Layer:

Design issues, Error detection and correction, Elementary data link protocols, Sliding window protocols.

UNIT - 3

Medium Access Control sub-layer:

Channel allocation problem, Multiple access protocols, Ethernet, Wireless LANs.

UNIT - 4

Network Layer:

Design issues, Routing algorithms, Congestion control algorithms.

UNIT - 5

Transport Layer:

Services, Elements of transport protocols, Simple transport protocol.

UNIT - 6

Application Layer:

Domain Name System (DNS), Electronic mail- architecture and services, World Wide Web- Architectural overview.

TEXT/REFERENCE BOOKS

Text Books:

1. A.Tanenbaum, *Computer Networks*, 5th Edition, Pearson publication, 2010.
2. B. Forouzan, *Data Communications and Networking*, 3rd edition, Tata McGraw Hill publication, 2004.

Reference Books:

1. S. Keshav, *An Engineering Approach to Computer Networking*, Pearson education.
2. D. Comer, *Computer Networks and Internet*, 5th edition, Pearson education, 2008.
3. M. Gallo, W. Hancock, *Computer Communications and Networking Technologies*, Course Technology.

UNIT - 1

Introduction to Compiling and Lexical Analysis:

Definition, analysis of the source program, the phases of a compiler, the grouping of phases, Compiler-Construction tools, The role of the Lexical analyzer, Input buffering, Specification of Tokens, A Language for Specifying Lexical Analyzers, Design of a Lexical Analyzer generator.

UNIT - 2

Syntax Analysis:

The role of the Parser, Context-free grammars, Writing a Grammar, Top-Down Parsing, Bottom- Up Parsing, Operator-precedence Parsing, LR-Parsers, Using Ambiguous Grammars, Parser Generators.

UNIT - 3

Syntax-Directed Translation:

Definitions, Construction of Syntax Trees, Bottom-Up Evaluation of S-Attributed definitions, Top-Down Translation, Bottom-Up Evaluation of Inherited attributes.

UNIT - 4

Intermediate Code Generation:

Intermediate Languages, Declarations, Assignment Statements, Boolean Expressions, Case Statements, Back patching, Procedure Calls.

UNIT - 5

Code Generation:

Issues in the Design of a Code Generator, The target Machine, Run-Time Storage Management, Basic Blocks and Flow Graphs, Next-Use Information, Simple Code Generator, Register allocation and Assignment, The DAG Representation of Basic Blocks,

UNIT - 6

Code Optimization:

Peephole Optimization, Principal sources of optimization, Introduction to Global data flow analysis.

TEXT/REFERENCE BOOKS

Text Books:

1. Aho, Sethi, Ullman, *Compilers-tools and Techniques*, 2nd edition, Pearson, 2011.
2. Trembly, Sorenson, *Theory and Practice of Compiler Writing*, McGraw Hill Publication.
3. Hopcroft, *Introduction to Automata Theory, Languages and Computation*, Pearson Publication.

Reference Books:

1. Paul G. Sorenson, *Compiler Writing*, Tata McGraw Hill.
2. Hunter, *The Essence of Compilers*, Pearson Publication.
3. Lewis, *Elements of the Theory of Computation*, Pearson Publication.

UNIT - 1

Introduction to Embedded System:

Review of microcontrollers and Digital Signal Processors (DSP), architecture, peripheral modules. Embedded micro controller cores (ARM, RISC, CISC, SOC), addressing modes, interrupts structure, hardware multiplier, pipelining. Hardware/Software co-design. Architecture of embedded systems.

UNIT - 2

Embedded Software Development:

Embedded C programming 8 bit: Key words, memory models, memory types, data types, bit types, pointers, functions, interrupt functions, reentrant functions. Embedded C programming 32bit: Basic C data types, C looping instructions, Register allocation, Function calls, Pointer aliasing, structure arrangements, Bit-fields, unaligned data and endianness, division, floating point, inline functions and assembly, portability issues.

UNIT - 3

Design with ARM Processor

Introduction to ARM instruction set, addressing modes, operating modes with ARM core, ARMTDMI modes, ADC, Timers, Interrupt structure. Byte ordering (LE, BE), Thumb mode normal mode instructions changes, Pipeline utilization with all register allocations. Compare with ARM7, ARM9, and ARM11 with new features additions. System design with ARM processor.

UNIT - 4

Input / Output Interfacing

Interfacing with switches, keyboards, LED.s, LCD.s, transistors used for digital controlled current switches, digital-controlled relays, solenoids, DC, AC and stepper motors, analog interfacing and data acquisition systems.

UNIT - 5

Real-time Operating System

Real Time Operating System Concepts, Kernel Structure, Critical Sections, Multitasking, Task Management, Time Management, Schedulers, Event Control Blocks, Priorities, Deadlocks, Synchronization, Semaphore Management, Mutual Exclusion, Message Mailbox Management, Message Queue Management, Memory Management, RTOS implementation. Examples of OSs for embedded systems - RT Linux, us/OS.

UNIT - 6

Applications of Embedded Systems

Database applications; Image processing, Process-control, Robotics, Automation, Security and communication. Case study of coding for vending machine system using MUCOSRTOS

TEXT/REFERENCE BOOKS

Text Books:

1. Dr. K. V. K. K. Prasad, *Embedded / Real Time System: Concepts, Design, & Programming – Black Book*, Dreamtech Press Publication.
2. Dr. K. V. K. K. Prasad, Gupta Dass, Verma , *Programming for Embedded System*, Wiley- Dreamtech India Pvt. Ltd.
3. David E. Simon, *An Embedded Software Primer*, Pearson Education.
4. Andrew N. Sloss, Dominic Sysmes, Chris Wright, *ARM System Developer's Guide Designing and Optimizing System Software*, Elsevier publication.

Reference Books:

1. Rajkamal *Embedded System: Architecture, Programming and Design*, Tata McGraw Hill Publication.
2. Hollabaugh *Embedded Linux*, Pearson Education.
3. Sriram Iyer, Pankaj Gupta, *Embedded Real time Systems Programming*, Tata McGraw Hill.
4. Ramesh Gaonkar , *Fundamentals of Microcontrollers and Applications in Embedded Systems*, Penram International Publishing (India) Pvt. Ltd.
5. Willam Hohel, *ARM assembly language: fundamentals and Technique*.

UNIT - 1

Object and Scope of the IT Act:

Genesis, Object, Scope of the act, Amendments.

UNIT - 2

E-Governance and IT Act 2000:

Legal recognition of electronic records, Legal recognition of digital signature, Use of electronic records and digital signatures in government and its agencies.

UNIT - 3

Certifying Authorities:

Need of certifying authority and power, Appointment, Function of controller, Who can be a certifying authority?, Digital signature certifications, Generation, Suspension and revocation of digital signature certificate.

UNIT - 4

Domain Name Disputes and Trademark Law:

Concept of domain names, New concepts in trademark jurisprudence, Cyber squatting, Reverse hijacking, Meta tags, Framing, Spamming, Jurisdiction in trademark dispute.

UNIT - 5

The Cyber Crimes (S-65 to S-74):

Tampering with computer source documents(S-65), Hacking with computer system(S-66), Publishing of information which is obscene in electronic form (s-67), Offences : Breach of confidentiality and privacy (S-72),Offences : Related to digital signature certificate (S-73 & S-74).

UNIT - 6

E-banking and Legal Issues:

Regulating e-transactions, Role of RBI and legal issues, International transactions of e-cash, Credit card and internet, Laws relating to internet credit cards.

TEXT/REFERENCE BOOKS

Text Books:

1. Farooq Ahmad, *Cyber Law in India*, Pioneer Books.
2. Vakul Sharma, *Information Technology Law and Practice*, Universal Law Publishing Co. Pvt. Ltd.
3. Suresh T Vishwanathan, *The Indian Cyber Law*, Bharat Law House, New Delhi.

Reference Books:

1. P.M. Bakshi and R. K. Suri, *Hand book of Cyber and E-commerce Laws*, Bharat Law House, New Delhi.
2. Rodney D. Ryder, *Guide to Cyber Laws*, Wadhwa and Company, Nagpur.
3. *The Information Technology Act, 2000 – Bare Act*, Professional Book publishers, New Delhi.

Computer Networks Lab

List of experiments:

1. Introduction to Computer Networks
2. Study of different types of Network cables and practically implement the Cross-wired cable and straight through cable
3. Study of data link layer protocols
4. Study of Network Devices
5. Study of network addresses
6. Connect the computers in Local Area Network
7. Study of basic network commands
8. Client Server programming in Java
9. Study of Network Simulator-2 (NS2)
10. Study of application layer protocols

Software Engineering Lab

List of Experiments:

Part: I RDBMS

To develop a mini project for an RDBMS, the following exercise have been specified to give idea/prerequisite learning for the concept required in defining the problem statement for an RDBMS.

Design and draw an ER/EER diagram and map this diagram to the database tables.

Create database tables for the problem. Perform add, insert, delete, update operations.

Use DDL statements and apply all constraints on tables to make the operations on tables.

Write and execute triggers and procedures/functions.

Generate a simple report.

Part: II

Following exercise has been specified to give idea/prerequisite learning for the concept in defining the problem statement for a front end to RDBMS based system.

Front end tools support developments of the following concept:

1. Controls
2. Properties for every control of the form
3. Events
4. Programming components
5. Proper interface to the back end database

The desktop database can be chosen from MSSQL, ORACLE, MySQL or equivalent databases packages. The front end development tools can be chosen from VB6, .NET, JAVA or equivalent tools.

Part: III

The statement of the problem will be the mini project for the group. The design of the project shall follow the software development life cycle. It should prepare a report for each stage (this will be the part of project manual later).

The group should understand and prepare proper documentation in relation with following,

1. Problem definition in detail.
2. Literature survey.
3. Requirement analysis.
4. System analysis (Draw Level 2 DFD at least).
5. System design
6. Implementation
7. Use cases
8. Testing

While designing the project the care should be taken to follow the coding conventions, software project design standards, data dictionary, etc.

Staff in-charge will frame the mini project specification to be performed by group of students. There will be different problem definition to each group. The students will prepare an installable CD for the mini projects; *README* file will have the project description, system requirements, development details, and installation instruction.

User manual will have the interaction screens and the way to use the developed project

Embedded Systems Lab

List of experiments-

1. Study of Microcontrollers
2. Case study of any Embedded System
3. Assembly language program to generate square wave
4. Interfacing of stepper motor
5. Interfacing of LCD
6. Interfacing of Keyboard
7. Interfacing of ADC and DAC
8. Interfacing of transducers
9. Writing Serial Communication program using RS232
10. Writing timer and counter Programming
11. Study of ARM Processor

The students receive theoretical knowledge of the basic engineering and applied engineering in first six semesters. They have to do in plant training of four weeks at least during vacation after sixth semester. The training enables the students to expose to industry during their training, provides orientation and improves their prospects for employment.

The students should prefer industrial training in the domain of Information Technology.

Training report and Assessment

During the industrial training he/she will observe layout, working environment, various equipments, tools, instruments etc. under the supervision of supervisor and engineer of the company.

Students are required to submit a printed report of industrial training in the seventh semester. The report should contain information about the major field of company, particularly about the section/department where he/she have undergone the training giving the details of equipments, product, tools their detailed specification, use etc. The training report and field work done by students will be assessed by internal examiner(s) and appropriate grade will be awarded.



Course Structure and Syllabus
For
B. Tech. Information Technology
Programme
(FOURTH YEAR)

(With effect from the Academic Year 2013-2014)



Dr. Babasaheb Ambedkar Technological University, Lonere

Semester VII						
CODE	SUBJECT	L	P	C	MSE	ESE
CEIT701	Internetworking Protocols	3	0	6	30	70
IT702	Web Technologies	3	0	6	30	70
IT703	Intelligent Systems	4	0	8	30	70
IT704	Mobile Computing	4	0	8	30	70
IT705	Elective IV -Data Warehouse and Data Mining, Machine Learning	3	0	6	30	70
IT706	Programming Laboratory IX*	0	4	4	50	50
IT707	Programming Laboratory X**	0	2	2	50	50
IT708	Project Phase-I	0	2	4	50	
IT709	Community Project	0	0	2		
IT608	Industrial Training Seminar***					
		17	8	46	300	450
	*IT706: Internetworking Protocols, Intelligent Systems					
	**IT707: Web Technologies					
	***IT608: Evaluation of Four weeks Industrial Training.					
Semester VIII						
CODE	SUBJECT	L	P	C	MSE	ESE
CEIT801	Information Security	3	0	6	30	70
CEIT802	Software Testing	3	0	6	30	70
IT803	Distributed Operating Systems	4	0	8	30	70
IT804	Elective V - Natural Language Processing, Advanced Database Technology, Digital Image Processing	3	0	6	30	70
IT805	Programming Laboratory XI*	0	2	2	50	50
IT806	Programming Laboratory XII**	0	2	2	50	50
IT807	Project Phase-II	0	2	12	50	50
		13	6	42	270	430
	* IT805: Information Security					
	**IT806: Software Testing					

CEIT701

Internetworking Protocols

6 Credits

Prerequisite: Computer Networks

UNIT - 1

Review of Networking Technologies and Internetworking Concepts and Architectural Model:
Application level and network level interconnection, Properties of the internet, Internet architecture, Interconnection through IP routers.

UNIT - 2

Internet Addresses, Mapping Internet Addresses to Physical Addresses (ARP) & Determining an Internet Addresses at Startup (RARP):

Universal identifiers, Three primary classes of IP addresses, Network and broadcast addresses, Limited broadcast, Dotted decimal notation, Weakness in internet addressing, Loopback addresses, Address resolution problem, Two types of physical addresses, Resolution through direct mapping, Resolution through dynamic binding, Address resolution cache, ARP to other protocols, Reverse address resolution protocol, Timing RARP transaction, Primary and backup RARP servers.

UNIT - 3

Internet Protocol: Connectionless Datagram Delivery and Internet Protocol: Routing IP Datagram:

The concepts of unreliable delivery, Connectionless delivery system, Purpose of the internet protocol, The internet datagram, Routing in an internet, Direct and indirect delivery, Table driven IP routing, Next hop routing, Default routes, Host specific routes, The IP routing algorithm, Handling incoming datagrams, Establishing routing tables.

UNIT - 4

Internet Protocol: Error and Control Message (ICMP) and Subnet and Supernet Address Extension:

The internet, Control message protocols, Error reporting versus error detection, ICMP message format, Detecting and reporting various network problems through ICMP, Transparent router, Proxy ARP, Subnet

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addressing, Implementation of subnets with masks representation, Routing in the presence of subnets, A unified algorithm.

UNIT - 5

User Datagram Protocol (UDP):

Format of UDP message, UDP pseudo header, UDP encapsulation and protocols layering and the UDP checksum computation, UDP multiplexing, De-multiplexing and ports.

UNIT - 6

Reliable Stream Transport Service (TCP):

The transmission control protocol, Ports, Connections and endpoint, Passive and active opens, The TCP segment format, TCP implementation issues.

TEXT /REFERENCE BOOKS

Text Books:

1. Douglas E. Comer, *Internetworking with TCP/IP: Principles, Protocols and Architecture*, Volume 1, 6th edition, PHI publication, 2013.
2. Behrouz A. Forouzan, *TCP-IP Protocol Suite*, 4th edition, Mc-Graw Hill publication, 2010.

Reference Books:

1. Comer, *Internetworking with TCP-IP Vol. 3*, 5th edition, Pearson publication, 2013.
2. W. Richard Stevens, *UNIX Network Programming: Interprocess Communications*, Volume 2, 2nd edition, PHI publication, 1999.
3. William Stalling, *SNMP SNMPv2, SNMPv3, and RMON 1 and 2*, 2nd edition, Pearson Education publication, 2001.
4. Hunt Craig, *TCP-IP Network Administration*, 3rd edition, O'Reilly publication, 2002.
5. Loshin, Harwurt, *TCP-IP Cleanly Explained*, BPB publication.

Prerequisite: Knowledge of Java, HTML.

UNIT - 1

XHTML:

Introduction to XHTML , Editing XHTML , Headers, Linking ,Images, Special characters and more line breaks, Lists, URL, Tables, Forms, Internal linking, Creating and using image maps , Meta elements, Frameset element , Cascading style sheets, Inline styles, Embedded style sheets ,Conflicting styles, Linking external style sheets ,Element dimensions, User style sheets.

UNIT - 2

JavaScript:

Introduction to scripting , Simple program, Memory concepts ,Arithmetic ,Decision making: Equality and Relational operators ,Control structures ,Algorithms, Pseudocode , Control structures ,If selection structure, If/else selection structure ,While do/while repetition structure, Assignment operators, Increment and decrement operators, Data types, Switch multiple-selection structure, Break and continue statements, Logical operators, Functions, Recursion, Arrays, Math object, String object, Characters and strings, Splitting strings and obtaining substrings, Date object, Boolean and number objects.

UNIT - 3

Extensible Markup Language (XML):

Structuring data, XML namespaces, Document type definitions (DTDs) and schemas : Document type definitions,W3C XML, Schema documents, XML vocabularies: MathML™, Chemical markup language (CML), Other markup languages, Document object model (DOM), DOM methods, Simple API for XML (SAX), Extensible style sheet language (XSL), Simple object access protocol (SOAP).

UNIT - 4

Web Servers (IIS, PWS and Apache):

Introduction, HTTP request types, System architecture, Client-side scripting versus server-side scripting, Accessing web servers, Microsoft Internet information services (IIS), Apache web server, Requesting documents: XHTML, ASP, Perl , Python, PHP.

Database: SQL, MySQL, DBI and ADO:

Introduction, Relational database model, Relational database overview, Structured query language :Basic queries and clauses, Merging data from multiple tables, Inserting a record, Updating a record, DELETE FROM Statement, Title author query from books.mdb.

MySQL:

Introduction to DBI, Perl database interface, Python DB-API,PHPdbx module, ActiveX data objects (ADO).

UNIT - 5

Active Server Pages (ASP):

How active server pages work?, Setup active server page objects, Simple ASP examples, File system objects, Session tracking and cookies, Accessing a database from an active server page, Server-side activeX components, Case study: Active server pages and XML.

Perl and CGI (Common Gateway Interface):

Perl, String Processing and regular expressions, Viewing client/server environment variables form processing and business logic, Server-side includes, Verifying a username and password using DBI to connect to a database, Cookies and perl, Operator precedence chart.

UNIT - 6

PHP:

String processing and regular expressions, Viewing client/server environment variables, Form processing and business Logic, Verifying a username and password, Connecting to a database cookies, Operator precedence.

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Servlets:

Servlet: Overview and architecture, Handling HTTP get requests, Handling HTTP get requests containing data, Handling HTTP post requests, Redirecting requests to other resources, Session tracking, Multi-tier applications: Using JDBC from a servlet, HttpUtils class.

Java Server Pages (JSP):

Implicit objects scripting, Scripting components, Scripting example, Standard actions, Directives, Custom tag libraries.

TEXT / REFERENCE BOOKS

Text Books:

1. John Pollack, *Javascript: A Beginner's Guide*, McGraw Hill Education.
2. Larry Randles Largerstrom, *Programming the Web Using XHTML and Javascript*, McGraw Hill Education.
3. Williamson, *XML: The Complete Reference*, McGraw Hill Education.
4. Holzner, Steven, *PHP: The Complete Reference*, McGraw Hill Education.
5. Brown, *PERL: The Complete Reference*, McGraw Hill Education.
6. Hanna, *JSP 2.0: The Complete Reference*, Tata McGraw Hill publication.
7. Robert W. Sebesta, *"Programming the World Wide Web"*, 4th edition, Pearson Education, 2008.

Reference Books:

1. Michal Daconta and AI Saqanich, *XML Development with Java 2*, SAMS Tech Media publication.
2. Russell Jones, *Mastering Active Server Pages 3*, BPB sybex publication, 2000.
3. B.V. Kumar, S.V. Subrahmanya, *Web Services: An Introduction*, Tata McGraw Hill publication, 2008.
4. Chris Bates, *Web Programming*, 3rd edition, Wiley publication, 2009.

UNIT - 1

Introduction:

Inspiration from neuroscience, History, Issues.

Simple Perception:

Feedforward network, Threshold units, Linear units, Stochastic units, Capacity of simple perceptron.

UNIT - 2

Hopfield Model:

Associative memory problem, Model stochastic networks, Capacity of stochastic network.

Optimization Problem: Weighted matching problems, Traveling salesman problem and graph bi-partitioning, Optimization problem in image processing.

UNIT - 3

Multilayer Network:

Back propagation, Examples and applications, Performance of multilayer feed forward network, Kohoanean self-organizing cognition and recognition.

UNIT - 4

Recurrent Network:

Boltzman network, Recurrent back propagation, Learning time sequences, Reinforcement learning.

Learning: Supervised, Unsupervised learning, Adaptive resonance theory, Traveling salesman problem.

UNIT - 5

Application for Artificial Neural Network (ANN):

Speech recognition, Image processing, Prediction and estimation.

UNIT - 6

Genetic Algorithm:

Introduction, Mathematical foundation, Application for genetic algorithm to multiobjective optimization, Estimation and prediction.

Computer Implementation of Genetic Algorithm: Data structure, Reproduction, Crossover and mutation, Mapping objective, Function fitness forms, Fitness scaling, Coding discrimination, Constraints.

TEXT / REFERENCE BOOKS

Text Books:

1. S. N. Sivanandam, Sumathi and Deepa, *Introduction to neural networks using MATLAB 6.0*, McGraw Hill publication.
2. Hertz, Krogh, *Introduction to the Theory of Neural Computation*, Preseus Book group.
3. Yegnarayana, *Artificial Neural Networks*, PHI publication.
4. David E. Goldberg, *Genetic Algorithms: in Search Optimization and Machine Learning*, Addison Wesley publication.

Reference Books:

1. Ranka, Mohan, *Elements of Artificial Neural Networks*, Penram International publishing.
2. Zurada, *Introduction to Artificial Neural System*, JAICO publication.
3. Efraim Turban, Jay E. Aronson, *Decision Support Systems and Intelligent Systems*, 9th Edition, Pearson publication, 2011.
4. Han, *Principles of Neuro-computing for Science and Engineering*, Tata McGraw Hill publication.
5. S.Rajasekaran, *Neural Networks, Fuzzy Logic and Genetic Algorithms*, PHI publication.
6. S.N.Sivanandam, *Introduction to Artificial Neural Networks*, Vikas publication.

IT704

Mobile Computing

8 Credits

Prerequisite: Computer Networks

UNIT - 1

Introduction of wireless transmission and Frequencies for Radio Transmission:

A short history of wireless communication, A market for mobile communication, Some research topics, A simplified reference model, Wireless transmission, Signal, Antennas, Signal propagation, Multiplicity, Modulation, Spread spectrum, Cellular systems.

UNIT - 2

Medium Access Control and Telecommunication Systems:

Motivation for a specialized MAC, SDMA, FDMA, TDMA, CDMA, Comparison of SDMA/TDMA/FDMA/CDMA, GSM, DECT, TETRA, UMTS.

UNIT - 3

Satellite Systems and Broadcast Systems:

Basics, Routing, Localization, Handover, Cyclic repetition of data, Digital Audio Broadcasting (DAB), Digital Video Broadcasting (DVB).

UNIT - 4

Wireless LAN and Wireless ATM:

Infrared vs. radio transmission, Adhoc networks, IEEE802.11, Bluetooth, Motivation for WATM, WATM services, Reference model, Functions, Radio access layer, Handover, Location management, Addressing, Mobile quality of service, Access point control protocol.

UNIT - 5

Mobile Network Layer and Mobile Transport Layer:

Mobile IP, Dynamic host configuration protocol, Adhoc networks, Traditional TCP, Indirect TCP, Mobile TCP.

UNIT - 6

Support Layer for Mobility:

File system, WWW, WAP.

TEXT / REFERENCE BOOKS

Text Books:

1. Johan Schiller, *Mobile Communication*, Pearson Education Asia publication, 2004.
2. Malice, *Mobile and Wireless Design Essentials*, Wiley computer publication, 2003.
3. William Stallings, *Wireless Communications and Networks*, 2nd edition, Pearson Education, 2009.

Reference Books:

1. Andy Dornan, *Essential Guide of Wireless Communications Applications*, Pearson Education Asia publication, 2009.
2. Carl J. Weisman, *The Essential Guide to RF and Wireless*, 2nd edition, Pearson Education, 2002.
3. Lee, *Wireless and Cellular Telecommunications*, 3rd edition, McGraw Hill publication, 2005.
4. Kaveh Pahlavan, Prasanth Krishnamoorthy, *Principles of Wireless Networks*, Pearson Education, 2003.
5. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, *Principles of Mobile Computing*, Springer publication, 2003.

UNIT - 1

Introduction to Data Mining and Data Warehousing:

Introduction, Data mining as a subject, What is data warehouse?, Definition, Multidimensional data model, OLAP operations, Warehouse schema, Data warehouse architecture, Warehouse server, Metadata, OLAP engine, Data warehouse backend process, Other features, What is data mining?, Data mining: definitions, KDD vs. DM, DBMS vs. DM, Other related areas, DM techniques, Other mining problem, Issues and challenges in DM, DM publication areas and DM applications-case studies.

UNIT - 2

Association Rules:

Introduction, What is an association rule, Methods to discover association rules, A priori algorithm, Partition algorithm, Pincer-search algorithm, Dynamic item set counting algorithm, FP-tree growth algorithm, Discussion on different algorithms, Incremental algorithm, Border algorithm, Generalized association rule, Association rules with item constraints.

UNIT - 3

Clustering Techniques:

Introduction, Clustering paradigms, Partitioning algorithms, K-Medoid algorithms, CLARA, CLARANS, Hierarchical clustering, DBSCAN, BIRCH, CURE, Categorical clustering algorithms, STIRR, ROCK, CACTUS.

UNIT - 4

Decision Trees and Other Techniques:

Introduction, What is a Decision tree? Tree construction principle, Best split, Splitting indices, Splitting criteria, Decision tree construction algorithms, CART, ID3, C4.5, CHAID, Decision tree construction with presorting, Rainforest, Approximate methods, CLOUDS, BOAT, Pruning techniques, Integration of pruning

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and construction, Summary: An ideal algorithm, What is Neural Network? Learning in NN, Unsupervised learning, Data mining using NN: a case study, Genetic algorithm, Rough sets, Support vector machines.

UNIT - 5

Web Mining:

Introduction, what is web mining? Web content mining, Web structure mining, Web usage mining, Text mining, Unstructured text, Episode rule discovery for texts, Hierarchy of categories, Text clustering.

UNIT - 6

Temporal and Spatial Data Mining:

Introduction, What is temporal data mining?, Temporal association rules, Sequence mining, The GSP algorithm, SPADE, SPIRIT, WUM, Episode discovery, Event prediction problem, Time-series analysis, Spatial mining, Spatial mining tasks, Spatial clustering, Spatial trends.

TEXT / REFERENCE BOOKS

Text Books:

1. Arun K Pujari, *Data Mining Techniques*, 2nd edition, University Press India publication, 2013.
2. M. H. Dunham, *Data mining: Introductory and Advanced Topics*, Pearson Education publication, 2008.

Reference Books:

1. Ham, Kamber, *Data Mining: Concepts and Techniques*, 2nd edition, Morgan Kaufmann publishing, 2006.
2. Adriaans, Zantings, *Data mining*, Pearson Education publication.

UNIT - 1

Introduction:

Well-posed learning problems, Designing a learning system, Perspectives and issues in machine learning. Concept learning and the general to specific ordering : Introduction, A concept learning task, Concept learning as search, Find-S: finding a maximally specific hypothesis, Version spaces and the candidate elimination algorithm, Remarks on version spaces and candidate elimination, Inductive bias.

UNIT - 2

Decision Tree learning:

Introduction, Decision tree representation, Appropriate problems for decision tree learning, The basic decision tree learning algorithm, Hypothesis space search in decision tree learning, Inductive bias in decision tree learning, Issues in decision tree learning.

Evaluation Hypotheses:

Motivation, Estimation hypothesis accuracy, Basics of sampling theory, A general approach for deriving confidence intervals, Difference in error of two hypotheses, Comparing learning algorithms.

UNIT - 3

Bayesian learning :

Introduction, Bayes theorem, Bayes theorem and concept learning, Maximum likelihood and least squared error hypotheses, Maximum likelihood hypotheses for predicting probabilities, Minimum description length principle, Bayes optimal classifier, Gibbs algorithm, Naïve Bayes classifier, An example learning to classify text, Bayesian belief networks The EM algorithm.

UNIT - 4

Computational learning theory:

Introduction, Probability learning an approximately correct hypothesis, Sample complexity for Finite Hypothesis Space, Sample Complexity for infinite Hypothesis Spaces, The mistake bound model of learning.

Instance-Based Learning: Introduction to k -Nearest Neighbour Learning, Locally Weighted

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Regression, Radial Basis Functions, Case-Based Reasoning, Remarks on Lazy and Eager Learning.

UNIT - 5

Unsupervised Learning:

Clustering: Learning from unclassified data, Hierarchical Agglomerative Clustering, k-means partitional clustering, Batchler and Wilkin's algorithm, Spanning tree algorithmm.

UNIT - 6

Ensemble Learning: Bagging, boosting, and DECORATE. Active learning with ensembles

TEXT / REFERENCE BOOKS

TextBooks:

1. Tom M. Mitchell, *Machine Learning*, 2nd edition, McGraw- Hill publication, 1997.

ReferenceBooks:

1. S.V.N. Vishwanathan, Alex Smola, *Introduction to machine learning*, Cambridge University Press, 2000.
2. Ethem Alpaydin, *Introduction to machine learning*, 1st edition, Prentice hall of India, 2002.

Internetworking Protocols Lab

List of experiments:

1. Conversion of IP addresses
(e.g. I/P: 10.24.164.254 O/P: 00001010.00011000.10000000.11111110 and I/P:binary dotted
O/P: decimal dotted)
2. Introduction to Wireshark
3. Wireshark Lab: Ethernet & ARP
4. Wireshark Lab: IP
5. Wireshark Lab: ICMP, study of ping and traceroute command
6. Wireshark Lab: UDP
7. Wireshark Lab: TCP
8. Study of ftp, telnet tools and network configuration files
9. DHCP server configuration
10. Socket programming for UDP and TCP

Intelligent Systems Lab

List of experiments: (Any 8 Experiments)

1. Study of Neurosolution software tool for Neural Networks (Demos and Tutorials available in software).
2. Study of MATLAB software ANN tool and Genetic Algorithms tools (Demos and Tutorials available in software).
3. Application and Implementation of Multilayer Perceptron.
4. Application and Implementation of Back Propagation neural network.
5. Application and Implementation of Associative Memory .
6. Implantation of any Clustering Technique .
7. Application and Implementation of Self organizing Maps.
8. Application and Implementation of Adaptive Resonance Theory .
9. Application and Implementation of LVQ.
10. Application of Hopfield Network for optimization.

Web Technologies Lab

List of experiments:

1. Design of Static webpage.
2. Installation and configuration of Webservers.
3. Study Experiment on CSS.
4. Form Validation using javaScript.
5. Java Socket Programming.
6. Java Applet.
7. CGI PERL.
8. ASP Programming.
9. JSP Programming.
10. Servlet programming.
11. PHP MYSQL for Data base.
12. Program using XML.

The project should enable the students to combine the theoretical and practical concepts studied in his/her academics. The project work should enable the students to exhibit their ability to work in a team, develop planning and execute skills and perform analyzing and trouble shooting of their respective problem chosen for the project. The students should be able to write technical report, understand the importance of teamwork and group task. The students will get knowledge about literature survey, problem definition, its solution, and method of calculation, trouble shooting, costing, application and scope for future development.

Project work

The project work is an implementation of learned technology. The knowledge gained by studying various subjects separately supposed to utilize as a single task. A group of 03/04 students will have to work on assigned work. The topic could be a product design, specific equipment, live industrial problem etc. The project work involves experimental/theoretical/computational work. It is expected to do necessary literature survey by referring current journals belonging to Information Technology reference books and internet. After finalization of project, requisites like equipments, data, tools etc. should be arranged.

Project Activity

The project groups should interact with guide, who in turn advises the group to carry various activities regarding project work on individual and group basis. The group should discuss the progress every week in the project hours and follow further advice of the guide to continue progress. Guide should closely monitor the work and help the students from time to time. The guide should also maintain a record of continuous assessment of project work progress on weekly basis.

Phase I

1. Submission of project/problem abstract containing problem in brief, requirements, broad area, applications, approximate expenditure if required etc.
2. Problem definition in detail.
3. Literature survey.
4. Requirement analysis.
5. System analysis (Draw DFD up to level 2, at least).
6. System design, Coding/Implementation (20 to 30%).

Every group of students working for their project work will have to complete a community project assigned to them by their guide. The guide will assess the work completed by each student within the group and group as a whole, award the appropriate grade to every student.

The topic could be a product design, specific equipment, live problem, simulation, presentation, etc. related to community services. The project work involves experimental/theoretical/computational work. It is expected to do necessary literature survey.

The group should submit a completion and implementation certificate from the organization/social group for which the community project is implemented.

UNIT - 1

Introduction to Cryptography:

Active vs. passive attacks, Layers and cryptography, Authorization, Viruses, Worms, Trojan horses, The multilevel model of security, Legal issues, What is cryptography? Breaking an encryption scheme, Types of cryptographic functions, Secret key cryptography, Public key cryptography, Hash algorithms.

UNIT - 2

Secret Key Cryptography:

Generic block encryption, Data encryption standards, International data encryption algorithm, Advanced encryption standard.

UNIT - 3

Modes of Operation, Hashes and Message Digests:

Encrypting a large message, Generating MACs, Multiple encryptions DES, MD2, MD4, MD5, SHA-1, HMAC.

UNIT - 4

Public Key Algorithms:

Modular arithmetic, RSA, Diffie-Hellman, Digital signature standard.

UNIT - 5

Number Theory and Authentication:

Password based and Cryptographic based authentication protocol.

Cryptographic Standards: Kerberos, PKI, IPSec.

TEXT/REFERENCE BOOKS

Text Books:

1. Kaufman Charlie, Perlman Radia, Speciner Mike, *Network Security: Private Communication in public World*, PHI publication, 2012.
2. William Stalling, *Network Security Essentials: Applications and Standards*, 5th edition, Prentice Hall publication, 2013.
3. William Stalling, *Cryptography and Network Security*, 4th edition Prentice Hall publication, 2010.

Reference Books:

1. Vyless, *Internet Security Protocol*, Pearson publication.
2. Comer D.E., *Internetworking with TCP/IP*, 5th edition, Pearson publication, 2006.
3. Morrison, *Information Security-An Overview*, PHI publication, 2010.
4. Hunter, Berlin, *Information Security Handbook-Computer communications and Networks*, Springer publication, 2007.

UNIT - 1

Principles of Testing:

Software Development Life Cycle Model: Phases of software project, Quality, Quality assurance and quality control, Testing, Verification and validation, Process models to represent various phases, Life cycle models, Software testing life cycle.

UNIT - 2

White Box Testing (WBT) and Black Box Testing:

Static testing, Structural testing, Challenges in WBT. Black Box Testing: What, Why and When (W3), How to do BBT.

UNIT - 3

Integration Testing:

As a type of testing, As a phase of testing, Scenario testing, Defect bash.

UNIT - 4

System and Acceptance Testing

What, Why (W2), Functional Vs Non Functional, Functional system testing, Non-functional system testing, Acceptance testing.

UNIT - 5

Performance testing, Regression testing, Internationalization testing, Adhoc testing.

Factors governing performance testing, Methodology, tools and process for performance testing. Regression Testing: Introduction, Types of Regression Testing, When and How to do Regression Testing. Adhoc testing: Introduction, Buddy testing, Pair testing, Exploratory testing, Iterative testing, Agile and extreme testing, XP work flow, Defect seeding.

UNIT - 6

Testing Object Oriented Software: Introduction, Comparison of OO and Procedural software, System testing example, Unit testing of classes, Tools for testing OO software. Testing Web Application

TEXT/REFERENCE BOOKS

Text Books:

1. Srinivasan Desikan, Gopalaswamy Ramesh, Software Testing: Principles and Practices, Pearson publication.
2. Loise Tamres, Introducing Software Testing, Pearson publication.

Reference Books:

1. Boris Beizer, Software Testing Techniques, Dream Tech. publication.
2. Ross Patton, Software Testing, Pearson publication.

Objective: This course aims to build concepts regarding the fundamental principles of distributed systems. The design issues and distributed system concepts are covered.

Pre-requisites: Operating Systems, Computer network

UNIT - 1

Fundamentals: Distributed computing, system model, distributed operating system, advantages, designing operating system, Introduction to DCE2. **Message Passing:** Desirable features message passing system, Issues in message passing, synchronization, buffering, mult Datagram messages, Encoding and decoding of message data, Process addressing, Failure handling, Group communication.

UNIT - 2

Remote procedure call: RPC model, Transparency of RPC, implementing RPC mechanism, Stub generation, Marshaling arguments and Results, Server Management, Parameter-passing Semantics, call Semantics, Communication protocols for RPCs, Complicated RPC, Client server binding, Security, special types of RPCs, RPCs in Heterogeneous Environments, Lightweight RPC, Optimizations for better Performance.

UNIT - 3

Distributed Shared Memory:

General architecture of DSM systems, Design and implementation of DSM, Granularity, structure of shared memory space, Replacement Strategy, Thrashing, other approaches to DSM, Heterogeneous DSM, and Advantages of DSM

UNIT - 4

Synchronization: clock synchronization, event ordering, mutual exclusion,

Deadlock, Election Algorithm

UNIT - 5

Resource and Process Management: Desirable Features of global Scheduling algorithm, Task assignment approach, Load balancing approach, load sharing approach, Introduction to process management, process migration, Threads.

UNIT - 6

Distributed File Systems: Introduction, good features of DFS, File models, File Accessing models; File sharing Semantics, File-Caching Schemes, File Replication, Fault Tolerance, Atomic Transactions and design principles.

TEXT/ REFERENCE BOOKS

Text Books:

1. Pradeep K Sinha “*Distributed Operating Systems : Concepts and design*” IEEE computer society press
2. A. Tanuenbaum “*Distributed Operating System*” Pearson Edition
3. PUDER, ROMER “*Distributed Systems Architecture : Middleware approach*” ELSEVIER publication

Reference Books:

1. G. Coulouris, J. Dollimore and T. Kindberg “*Distributed Systems : Concepts and design*” Pearson Edition
2. M. Singhal, N. Shivaratri “*Advanced Concepts in Operating Systems*” TMH

Prerequisite: Compiler Construction

UNIT - 1

Introduction to Natural Language Understanding:

The study of language, Applications of natural language understanding, Evaluating language understanding systems, The different levels of language analysis, Representations and understanding, The organization of natural language understanding systems.

UNIT - 2

Linguistic Background: An Outline of English Syntax:

Words, The elements of simple noun phrases, Verb phrases and simple sentences, Noun phrases revisited, Adjective phrases, Adverbial phrases.

UNIT - 3

Grammar and Parsing:

Grammars and sentence structure, What makes a good grammar, A top-down parser, A bottom-up chart parser, Top-down chart parsing, Finite state models and morphological processing, Grammars and logic programming.

UNIT - 4

Features and Augmented Grammars:

Feature systems and augmented grammars, Some basic feature systems for English, Morphological analysis and the lexicon, A simple grammar using features, Parsing with features, Augmented transition networks, Definite clause grammars, Generalized feature systems and unification grammars.

UNIT - 5

Grammars for Natural Language:

Auxiliary verbs and verb phrases, Movement phenomena in language, Handling questions in context-free grammars, Noun phrases and relative clauses, The hold mechanism in ATN, Gap threading.

Toward Efficient Parsing and Ambiguity Resolution:

Statistical Methods: Human preferences in parsing, Encoding uncertainty: Shift-reduce parsers, A deterministic parser, Techniques for efficient encoding of ambiguity, Partial parsing.

Basic probability theory, Estimating probabilities, Part-of-speech tagging, Obtaining lexical probabilities, Probabilistic context-free grammars, Best-first parsing, A simple context-dependent best-first parser.

TEXT / REFERENCE BOOKS

Text Books:

1. James Allen, *Natural Language Understanding*, 2nd edition, Pearson Education, 2005.
2. Robert Dale, Hermann Moisl, H. L. Somers, *Handbook of Natural Language Processing*, 2nd edition, CRC Press Publication, 2000.

Reference Books:

1. Orient Long Man, *Natural Language Processing and Knowledge*, 1st edition, University Press, 2009.
2. Hermann Helbig, *Knowledge Representation and The Semantics of Natural Language (cognitive Technologies)*, Springer publication, 2006.

Prerequisite: Database Management Systems

UNIT - 1

Transactions:

Transaction concepts, A simple transaction model, Storage structure, Transaction atomicity and durability, Transaction isolation, Serializability, Transaction isolation and atomicity, Transaction isolation levels, Implementation of isolation levels, Transaction as SQL statements

UNIT - 2

Concurrency Control:

Lock-based protocols, Deadlock handling, Multiple granularity, Timestamp-based protocols, Validation-based Protocols, Multiversion schemes, Snapshot isolation, Insert operations, Delete operations, and predicate reads, Weak levels of consistency in practice.

UNIT - 3

Recovery System:

Failure classification, Storage, Recovery and atomicity, Recovery algorithm, Buffer management, Failure with loss of nonvolatile storage, Early lock release and logical Undo operations

UNIT - 4

Database-System Architectures, Spatial and Temporal Data and Mobility:

Centralized and Client–Server architectures, Server system Architectures, Parallel systems, Distributed systems, Network types, motivation, Time in databases, Spatial and geographic data, Multimedia databases, Mobility and personal databases

UNIT - 5

Parallel Databases:

Introduction, I/O parallelism, Interquery parallelism, Intraquery parallelism, Intraoperation parallelism, Interoperation parallelism, Query optimization, Design of parallel systems, Parallelism on multicore processors

UNIT - 6

Distributed Databases:

Homogeneous and Heterogeneous Databases, Distributed Data Storage, Distributed Transactions, Commit Protocols, Concurrency Control in Distributed Databases, Availability, Distributed Query Processing, Heterogeneous Distributed Databases

TEXT/REFERENCE BOOKS

Text Books:

1. Korth, Silberchatz, Sudarshan, *Database System Concepts*, 6th edition, McGraw-Hill publication, 2011.
2. Elmasri and Navathe, *Fundamentals of Database Systems*, Pearson Education publication, 2003.

Reference Books:

1. Peter Rob and Coronel, *Database Systems, Design, Implementation and Management*, Thomson Learning publication, 2001.
2. Raghu Ramakrishnan, Johannes Gehrke, *Database Management Systems*, McGraw- Hill publication, 2003.
3. C.J.Date, Longman, *Introduction to Database Systems*, 8th edition, Pearson Education publication, 2006.

UNIT - 1

Image, digitized image & its properties: Elements of visual perception & its attributes, Digitized Image - image function, mathematical representation. Image digitization - Sampling & Quantization, Properties - distance, pixel adjacency, region, background, holes, brightness, segmentation, border, edge, convex hull, histograms, color, Noise.

UNIT - 2

Image preprocessing: Brightness transformation, geometric transformation, Local Processing, Image smoothening and edge detection.

UNIT - 3

Image enhancement in special domain: Threshold, Edge-based segmentation, Edge relaxation, Border tracing, Hough transform, Region-based segmentation, Region merging, Region splitting.

UNIT - 4

Image Enhancement in frequency domain: Fourier Transform, 1-D & 2-D, DFT, Hadamard Transform, Discrete Cosine Transforms, Introduction to Wavelet Transform, Application of Image transform.

UNIT - 5

Space reorientation and Detection: Region Identification, Contour-based representation. Chain codes, B-Spline Reorientation.

UNIT - 6

Image compression Fundamentals, Coding redundancy, interpixel redundancy, fidelity criteria, image compression model, lossless predictive coding, Lossy predictive coding, DCT compression.

TEXT/REFERENCE BOOKS

Text Books:

1. Milan Sonaka “*Computer vision & Image processing*”, 4th edition, Cengage Learning, 2014.
2. Gonzalez “*Digital Image Processing*” 3rd edition, Pearson Publication, 2009.

Reference Books:

1. Andrew Low “*Elements of Digital Image Processing & Computer Vision*” McGraw Hill Publication.
2. Pratt “*Digital Image Processing*” 4th edition, Wiley Publication, 2007.

List of experiments:

1. Study of different viruses and worms, implementation of virus programs.
2. Implementation of Mono-alphabetic cipher.
3. Implementation of Data Encryption Standard (DES).
4. Study of International Data Encryption Algorithm (IDEA), implementation of submodules.
5. Study of Message Digests- MD4, MD5.
6. Cryptography:
 - Symmetric Encryption Scheme – Stream cipher , RC4.
 - Symmetric Encryption Scheme, Block cipher: S-DES, 3 – SDES.
 - Asymmetric Encryption Scheme, Block cipher: RSA
 - Hashing scheme – MD5
 - Block cipher modes: ECB, CBC, CFB, OFB.
7. Network Identification: Enumeration.
8. Network System Threats: Denial of service (DOS), Distributed denial of service (DDOS).
9. Malware Tools: Trojans and Backdoors, Virus and Antivirus Methods.
10. Web Vulnerabilities: Web based password capturing.

(*Practicals 6 to 10 based on Benchmark's I-SecuriT – Cryptography and Network Security Assurance Laboratory)

Software Testing Lab

1. Take any system (e.g. ATM system) and study its system specifications and report the various bugs.
2. Write the test cases for any known application (e.g. Banking application)
3. Create a test plan document for any application (e.g. Library Management System)
4. Study of any testing tool (e.g. Win runner)
5. Study of any web testing tool (e.g. Selenium)
6. Study of any bug tracking tool (e.g. Bugzilla, bugbit)
7. Study of any test management tool (e.g. Test Director)
8. Study of any open source-testing tool (e.g. Test Link)

This is continuous work to the project phase I. Every students will have to submit a completed report (3 copies)* of the project work. Report preparation guidelines should be followed as per given format. The students will prepare a power point presentation of the work. Panel of examiners comprising of guide, internal examiner, senior faculty, external examiner, etc. will assess the performance of the students considering their quality of work.

Phase II

1. Coding/Implementation.
2. Use cases.
3. Testing/Trouble shooting.
4. Data dictionary/ Documentation.
5. Finalization of project in all respect.

*(For guide, Personal copy, Departmental library.)

In a presentation, the students should focus to clarify problem definition and analysis of the problem.