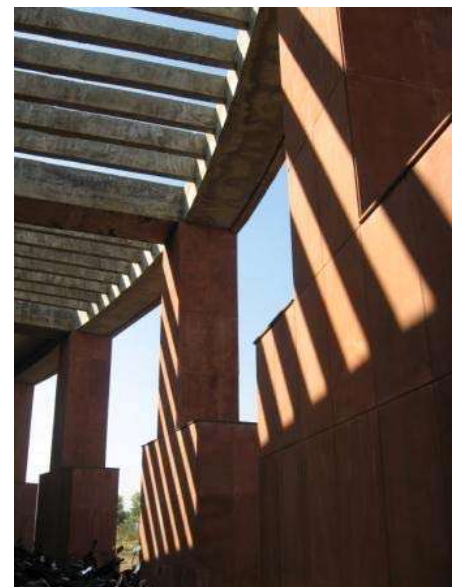




Course Structure and Syllabus
For
B. Tech. Computer Engineering
Programme

(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	2	8
BH104	Engineering Chemistry - I	3	2	8
EM105	Engineering Mechanics	3	0	6
ID106	Energy and Environmental Engineering	2	0	4
WS107	Workshop Practice	0	4	4
CP108	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	2	8
BH204	Engineering Chemistry - II	3	2	8
CL205	Basic Civil Engineering	2	0	4
ME206	Basic Mechanical Engineering	2	0	4
ME207	Engineering Graphics***	1	4	6
CP208	Branch Specific Programming and Softwares**	3	0	6
XC209	NCC/NSS/Sports	0	0	0
Total		20	8	48

*CP108: Introduction to Computer Engineering, for Computer Department

*CP208: Programming and Softwares for Computer Engineering Department

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CODE	COURSE OF STUDY	L	P	C	MSE	ESE
CEIT301	Engineering Mathematics III	4	-	8	30	70
CEIT302	Numerical Methods	4	-	8	30	70
CEIT303	Switching Theory and Logic Design	3	-	6	30	70
CEIT304	Discrete Structures	4	-	8	30	70
CEIT305	Computer Organization and Architecture	4	-	8	30	70
CEIT306	Object Oriented Programming in C++	3	-	6	30	70
CE309	Seminar Report and Presentation		-	4	-	0
CE307	Programming Laboratory I (STLD)		2	2	50	
CE308	Programming Laboratory II (OOP)		2	2	50	
CE309	NSS/NCC/Sports/Arts					
		22	4	52	280	520
CODE	COURSE OF STUDY	L	P	C	MSE	ESE
CE405	Elective I Information System Analysis and Design	3	-	8	30	70
CEIT401	Probability Statistics and Queuing Theory	4	-	8	30	70
CEIT402	Data Communication	4		6	30	70
CEIT403	Microprocessors and Micro-Controllers	4		8	30	70
CEIT404	Data structures	4		8	30	70
CE406	History of Science and Technology (Self-Study Course)					
CE407	Programming Laboratory III (MM,DC)					
CE408	Programming Laboratory IV (Data Structures)		2	2	50	50
XC409	NSS/NCC/Sports/Arts					
		19	6	48	300	450

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CODE	SUBJECT	L	P	C	MSE	ESE
CE505	Elective II Object-Oriented Analysis Design	3		6	30	70
CEIT501	Database Management System(DBMS)	4		8	30	70
CEIT502	Design and Analysis of Algorithms (DAA)	4		8	30	70
CEIT503	Theory of Computation (TOC)	4		8	30	70
CEIT504	Operating System (OS)	4		8	30	70
CE506	Programming Laboratory V(DBMS/OS)		4	4	50	50
CE507	Programming Laboratory VI (DAA)		2	2	50	50
CE508	Seminar		2	4	50	
XC509	NSS/NCC/Sports/Arts					
		19	8	48	300	450
CODE	SUBJECT	L	P	C	MSE	ESE
CE605	Elective III Human Computer Interactions	3		6	30	70
CEIT601	Software Engineering	4		8	30	70
CEIT602	Computer Networks	4		8	30	70
CEIT603	Principles of Compiler Design	4		8	30	70
CE604	Computer Graphics	4		8	30	70
CE606	Programming Laboratory VII (CN/SE)		4	4	50	50
CE607	Programming Laboratory VIII (CG)		2	2	50	50
CE608	Industrial Training					
XC609	NSS/NCC/Sports/Arts					
	Total	19	6	44	250	450

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CODE	SUBJECT	L	T	P	C	MSE	ESE
CE704	Elective IV Advanced Programming Technologies(APT)	3	-	-	6	30	70
CEIT701	Inter-networking Protocols (IP)	3	-	-	6	30	70
CE702	Software Architecture	3	-	-	6	30	70
CE703	Advanced Database Techniques (ADBT)	3	-	-	6	30	70
CE705	Programming Lab IX(IP)	-	-	2	2		
CE706	Programming Lab X (ADBT/SA)	-	-	4	4		
CE707	Project Phase – I	-	-	2	6		
CE708	Seminar based on Project work	-	-	2	4		
CE709	Technical Project related to Community	-	-	-	2		
CE610	Industrial Training*	-	-	-	-		
		14	-	10	42	120	280
CODE	SUBJECT	L	T	P	C	MSE	ESE
CE804	Elective IV Artificial Intelligence	3		-	6	30	70
CEIT801	Information Security	3		-	6	30	70
CEIT802	Distributed System (DS)	3		-	6	30	70
CEIT803	Software Testing	3		-	6	30	70
CE804	Programming Lab XI(/DS/IS/ST)	-		6	6		
CE805	Project Phase II	-		6	10		
		12		10	40	120	280

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 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

CE102

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

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

BH103

Engineering Physics - I

8 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,

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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 Books

1. M.N. Avadhanulu and P.G. Kshrisagar, *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

BH104

Engineering Chemistry - I

8 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 antibonding 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:

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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 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

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

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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 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

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 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*,

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Khanna Publishers, Delhi, 2005

2. Glynn Henry J., Gary W. Heinke, *Environmental Science and Engineering*, Pearson Education, Inc, 2004

WS107

**Workshop Practice
Credits**

4

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

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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

EX108	Introduction to Electronics and Tele-Communication Engineering	6 Credits
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UNIT - 1

Introduction:

History of major inventions in electronics and communication Engineering, Overview of various specializations in ECE

UNIT - 2

Basics of telecommunication:

Basics of telecommunication infrastructure: Different types of channels, Bandwidth, power, range, interference, frequency reuse, fading

UNIT - 3

Industries and R & D:

Industries and R & D institutions in India

UNIT - 4

Future Scope:

Career opportunities, Avenues for higher studies in India and abroad, In plant training, Internships, Distinguished alumni in India and Abroad

UNIT - 5

Library:

Introduction to library facility in department, central library and other institutes, National and International journals, accessing digital library: Science direct and IEEE Explore, e-books and learning resources in the intranet and internet

UNIT - 6

Departmental Facilities:

Brief overview of different laboratories in ECE dept., Electronic test and measurement equipments, Energy sources, Specification for electronic components, Mini projects, Technical report preparation and presentation

Text/Reference Books

Lecture notes prepared by Department of Electronics and Telecommunication Engineering

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.

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

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:

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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

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

BH203

Engineering Physics - II

8 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, Interplanar 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 Clausius-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, 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

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

Text/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

BH204

Engineering Chemistry - II

8 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

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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 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

CL205

Basic Civil Engineering
Credits

4

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

- 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

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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

6 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

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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 Books

1. N.D. Bhatt, *Engineering Drawing*, Charotar publishing House, 46th Edition, 2003
- 2.K.V. Nataraajan, *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

EX208 Electronics and Tele-Communication Engineering: Programming and Software 6Credits

UNIT - 1

Introduction to MATLAB:

MATLAB and Its family, Menus and toolbars, Types of windows and types of files, MATLAB Help system, Basic calculations in MATLAB, Vectors and arrays, Multi-dimensional arrays, Element by element operations, Polynomial operations using arrays , X-Y Plotting functions, Subplots, 3-D Plots and Contour plots

UNIT - 2

Functions and Files and Programming Techniques:

Elementary mathematical functions, User defined functions, working with input and output files, Program design and development, Relation and Logical Operators, Conditional statements, Loops and switch structure

UNIT - 3

Introduction to Polymath:

Equation solvers available with polymath, plotting with polymath

UNIT - 4

Introduction to FEMLAB

Overview of FEMLAB application modes, creating and opening models, modeling using GUI, Time dependent simulation, solving differential equations and logical functions, Electromagnetic Waves modeling

UNIT - 5

Introduction to Office Automation:

Word processor (Ms Office) and LaTeX, Spread sheet (Ms Excel)

UNIT - 6

Introduction to Simulation Softwares

Introduction to Webpack, Modelsim, Micro-wind, Proteus, Multisim, Compiler, Assembler, Debugger, Emulator, Workbench, Optisim, Com-sim, IE3D, Mathematica, Universal Programmer

Hand on Experience

- a) Five programs using MATLAB (Program will be on Basic Calculation, Calling Data file and sending results to Data file, Control structure, Plots and Subplots, creating and using built in functions) (5 Program Submissions)
- b) Solving differential equation using polymath (One)
- c) Simple models using FEMLAB (Three)
- d) Journal Paper will be created using Ms Word and using LaTeX each. (Two)
- e) One exercise using Ms Excel (One)

Text Books

Getting started with MATLAB: A quick introduction for scientists and engineers' by Rudra Pratap, Oxford University press, 2003

Reference Books

- 1. Introduction to MATLAB 7 for Engineers, by W. L. Palm III, McGraw Hill ,2005
- 2. FEMLAB user manual
- 3. Polymath user manual (Freely downloadable from Polymath official website)
- 4. User manuals for each of the software's in unit VI

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 $J_n(x)$, Crthogonality of Bessel function.

UNIT - 5

Fourier Transform:

Fourier integral – fourier sine and cosine integral – complexity forms of fourier integral, Fourier transform -

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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

1. B. 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.

CEIT302:

Numerical Methods

8 Credits

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

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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

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

CEIT303:

Switching Theory and Logic Design

6 Credits

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 complimenting 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

1. R. P. Jain, *Modern Digital Electronics*, 3rd edition, TMH publication, 2003.
2. Zvi Kohavi, *Switching and Finite Automata Theory*, 2nd edition, TMH publication, 2001.
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.

CEIT304:

Discrete Structures

8 Credits

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, Direct 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.

UNIT - 6

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:

C. L. Liu, *Elements of Discrete Mathematics*, 3rd edition, Tata McGraw Hill publication, 2008.

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.

CEIT305:

Computer Organization and Architecture

8 Credits

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.

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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:

William Stallings, *Computer Organization and Architecture: Designing for Performance*, 8th edition, Prentice Hall publication, 2009.

Hayes, *Computer Architecture and Organization*, 3rd edition, Tata McGraw Hill publication, 2010.

Zaky, *Computer Organization*, 5th edition, Tata McGraw Hill publication.

Reference Books:

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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.

CEIT306:

Object Oriented Programming in C++

6 Credits

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

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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

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

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.

CE307: Programming Laboratory I

2 Credits

Switching Theory and Logic Design Lab

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.

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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.

CE308:

Programming Laboratory II

2 Credits

Object Oriented Programming in C++ Lab

List of experiments:

1. 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.

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:

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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.

CEIT402:

Data Communication

6 Credits

UNIT - 1

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

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

Data and Signals:

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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:

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.

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

UNIT - 4

Transmission Media:

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

Introduction to fiber optics: Nature of light, Fiber characteristics, Sources and detectors, Connectors and splices.

UNIT - 5

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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 component, Internet checksum.

UNIT - 6

Multiple Access:

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

Cellular Phones and Satellite Networks:

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

TEXT/REFERENCE 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.

CEIT403:

Microprocessors and Micro-controllers

8 Credits

UNIT - 1

Architecture of Microprocessors:

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

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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, 8259 etc., Interfacing with keyboards, 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, Overview of the architecture of 8096 16 bit microcontroller.

Assembly language of 8051: Description of Instructions, Assembly directives, Assembly software programs with Algorithms.

UNIT - 5

Interfacing with 8051:

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

UNIT - 6

Unit 6

High end processors:

Introduction to 80386 and 80486.

TEXT/REFERENCE BOOKS

Text Books:

1. Douglas Hall, *8086 Microprocessor, Architecture and Programming*, PHI publication.

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2. Muhammad Ali Mazidi, *The 8051 Microcontrollers & Embedded System*, Pearson Education

India publication.

3. Turley, *Advanced 80386 Programming*, McGraw Hill publication.

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.A. K. Ray and K. M. Bhurchandi, *Advanced Microprocessors and Peripherals*, Tata McGraw

Hill publication.

CEIT404:

Data Structures

8 Credits

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:

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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++*, Second edition, Pearson Education.
2. S. Lipschutz, *Data Structures*, McGraw Hill Pub.
3. Y. Langsm, M. Augenstin, A. Tanenbaum, *Data Structure using C and C++*, Pearsons Education

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Asia Pub.

4. Trembley and Sorenson, *Introduction to Data Structures*, PHI Pub.

Reference Books:

E. Horowitz, S. Sahani, *Data Structure and Algorithms*, Galgotia Pub.

Thomas Cormen, *Introduction to Algorithms*, PHI.

CE405:	Elective I Information system Analysis and Design	8 Credits
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UNIT - 1

Introduction to Information System Development: What is System Analysis and Design?, Business System concepts, Categories of Information systems, System development Strategies. **Managing the application development portfolio:** How system projects have begun, Managing project review and selection, Preliminary investigation, Selecting the project development strategies.

UNIT - 2

Tools for determining system requirement:

What is requirements determination?, Fact finding techniques, Tools for documenting procedure and decision.

UNIT - 3

Structured Analysis development strategies: Structured Analysis, Developing Data flow diagrams. Computer Aided Systems Tools: Role of Tools, Categories of automated Tools, CASE Tools, Benefits of CASE.

UNIT - 4

The Analysis to design transitions: Specifying Application requirements, Objectives in designing Information systems, What features must be designed?

Design of computer output: How to identify computer Output needs, How to present information, Designing printed output, Designing visual concerns guide input design, Capturing data for input, Input validation.

UNIT - 5

Design of online dialogue: How is online different?, What is an interface, Designing dialogue, Dialogue strategy, Data entry dialogues.

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Design of files and use of auxiliary storage devices: Basic file terminology, Data Structure Diagrams, Types of files, Methods of file organization.

UNIT - 6

Systems Engineering and Quality assurance: Design objectives, Program structure charts, Design of software, Managing quality assurance, Managing testing practices.

Managing system implementation: Training, Conversion, post implementation review. **Managing information systems development:** Estimation and management of development time, Estimation, Personnel and development management.

Hardware and Software selection: Hardware selection, Software Selection

TEXT/REFERENCE BOOKS

Text Book:

1. James A. Senn, “ Analysis and Design of Information Systems”, Second Edition, TMH.

Reference Books:

1. Elias M. Award, “System Analysis and Design”, Second Edition, Galgotia Publishing Ltd.
2. Hoffer J. A., “Modern Systems Analysis & Design”, Third Edition, Tata Mcgraw Hill publication.
3. Kendall & Kendall, “Systems Analysis and Design”, Eighth Edition, Prentice Hall publication.

CE407:

Programming Laboratory III

2 Credits

Microprocessors and Micro-controllers 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.

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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 Communication Lab

List of experiments:

1. Study of Sampling theorem.
2. Study of Amplitude Modulation, Frequency Modulation, Phase Modulation.
3. Study of Frequency Division Multiplexing and Demultiplexing.
4. Study of Time Division Multiplexing and Demultiplexing
5. Study of Amplitude Shift Keying (ASK), Frequency Shift Keying (FSK), Phase Shift Keying (PSK)
6. Study of Stop and Wait protocol.
7. Study of Sliding Window protocol.
 - (a) Go Back n
 - (b) Selective Repeat
8. Study of ALOHA and CSMA.
9. Study of CSMA/CD.
10. Study of token passing access method.

CE408:

Programming Laboratory IV

2 Credits

List of experiments:

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

CEIT501:	Database Management Systems	8 Credits
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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

VData Storage: Storage and file structure, Indexing and hashing.

UNIT - 5

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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, Schilberschatz, *Database System Concepts*, 5th edition, Tata McGraw Hill publication.
3. James Martin, *Principles of Database Management*, Tata McGraw Hill publication.

Reference Books

1. *Understanding Oracle*, BPB publication.
2. Wiederhold, *Database Design*, MGH publication. Navathe, *Fundamentals of Database System*, Addison Wesley publication.

CEIT502:

Design and Analysis of Algorithms

8 Credits

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*, 2nd edition, Addison Wesley publication, 1988.

Reference Books:

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

CEIT503:

Theory of Computation

8 Credits

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, The Church's Turing hypothesis, Universal Turing machines, The Halting problem, Unsolvable 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

Hopcroft, Ullman, Motwani, *Introduction to Automata Theory, Languages, and Computation*, Addison Wesley publication.

Daniel I. A. Cohen, *Introduction to Computer Theory*, Willey publication.

Reference Books

John C. Martin, *Introduction to Languages and Theory of Computation*, Tata McGraw Hill publication.

Papadimitriou, Lewis, *Elements of the Theory of Computations*, PHI publication.

E. V. Krishnmurthy, *Theory of Computer Science*, EWP publication.

CEIT504:

Operating Systems

8 Credits

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.

UNIT - 6

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:

Silberschatz, Peter B Galvin, Operating System Concepts, Addison Wesley Publishing Company, 1993.

Andrew S. Tanenbaum, Modern Operating System, PHI Pub, 1995.

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Reference Books:

1. D.M. Dhamdhere, Systems Programming and Operating Systems, 2nd Edition, Tata McGraw Hill, 1996.
2. Garry Nutt, Operating Systems Concepts, Addison Wesley Publication.
3. Harvey M. Deitel, An Introduction to Operating Systems, Addison Wesley Publication.

CE505:

Object-Oriented Analysis and Design (Elective II)

6 Credits

UNIT - 1

Introduction Overview of object oriented system, Object orientation, Objects, attributes, object behavior, Object respond to messages, encapsulation, Inheritance, Polymorphism, object relationships and association, aggregation, Object identity static and dynamic binding, Object persistence, meta classes. Object oriented system development life cycle.

UNIT - 2

Object oriented modeling Modeling, UML Modeling, class diagram, activity diagram, Sequence diagram, collaboration diagram, statechart diagram, interaction diagram, Implementation diagram, use case diagram.

UNIT - 3

Use case analysis, CRC card analysis

UNIT - 4

Object Oriented Design Design Patterns.

UNIT - 5

Implementation From Design to Implementation, Programming Style, Object-Oriented languages, Non-Object-Oriented languages, Object Oriented Databases.

UNIT - 6

Computer animation, Electrical Distribution design System, Future of Object-Oriented Technology.

TEXT/REFERENCE BOOKS

Text Books

Grady, Booch, Object Oriented analysis and design with applications; 2nd Edition, PHI

James Rumbaugh, Object-Oriented Modeling And design, 1st Edition, PHI Pub

Ali Bahrami, Object Oriented Systems Development , 1st Edition Tata Mcgraw - Hill Pub

Reference Books

Robert Lafore, Object oriented programming, Galgotia Pub.

E – Balagurusamy, Object oriented programming, TMH Pub.

S. Koshafian, Object Orientation, Wiley Pub

CEIT506:	Programming Laboratory V	4 Credits
	Database Management Systems Lab	

List of Experiments

1. Study of oracle installation.
2. Study of oracle commands.
3. Study of set operations commands.
4. Study of aggregation functions.
5. Implementation of nested queries.
6. Implementation of complex queries.
7. Study of views.
8. Modification of database.
9. Study of join operations.

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.

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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).

CEIT507:

**Programming Laboratory VI
Design and Analysis of Algorithms Lab**

2 Credits

List of experiments:

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

13.

CEIT508:

Seminar

4 Credits

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,

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concerned guide and senior faculty of the department will assess the performance during examination. Report writing should be as per given format.

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.

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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.
2. Sommerville, *Software Engineering*, 7th edition, Pearson Education, 2007.

CEIT602:

Computer Networks

8 Credits

UNIT - 1

Introduction: Applications of computer networks, Network hardware and software, Reference models: OSI and TCP/IP, Example networks: Internet, X.25, Frame relay, ATM, Ethernet, Wireless LANs, Network standardization, Switching, Buffering and multicasting.

UNIT - 2

Data Link Layer: Design issues: Services, Framing, Error and flow control, Stop-and-wait protocol, Sliding window protocol, Go-Back-N ARQ, Selective repeat ARQ, HDLC, Data link layer in Internet and ATM.

Point-to-Point-Access (PPP): Frame format, Transition states, PPP Stack: LCP, NCP.

Network Hardware Components: Connectors, Transceivers and media converters, Repeaters, NICs, Bridges and switches.

UNIT - 3

Medium Access Control sub-layer: Channel allocation: static and dynamic allocation, Multiple access protocols: ALOHA, CSMA, Collision-free and limited-contention protocols, WDMA, Wireless LAN protocols, Ethernet: Cabling, Encoding, MAC sub-layer protocol, Switched, fast and gigabit Ethernet, Logical link control, Wireless LANs and Digital cellular radio, Broadband wireless, Virtual LANs, Bluetooth, Virtual circuit switching: Frame relay and ATM.

UNIT - 4

Network Layer: Design issues, Packet switching, Connectionless and connection-oriented services, Virtual circuit and datagram subnets, Routing algorithms, Internetworking, Firewalls.

Congestion Control and QOS: General principles, Congestion prevention policies, Load shading, Jitter control, Quality of service, Internetworking.

Network Layer Protocols: ARP, IP protocol, IP addresses, IPV6, ICMP, Unicast routing algorithms: RIP, OSPF, BGP, Multicast Routing: IGMP, Mobile IP.

UNIT - 5

Transport Layer: Services and service primitives, Sockets and socket programming, Elements of transport protocol: Addressing, Connection establishment and release, Flow control and buffering, Multiplexing, Crash recovery, Simple transport protocol, UDP: Introduction, RPC, TCP: Introduction, Model, Protocol, Header, Connection establishment and release, Connection management, Transmission policy, Congestion control, Timer management, Introduction to wireless TCP and UDP, Performance issues.

UNIT - 6

Application Layer: Domain name systems (DNS), and DNS server, Electronic mail architecture and services, Message formats, MIME, message transfer ,SMTP, Mail gateways, Relays, Configuration mail servers, File transfer protocol, General model commands, TFTP.

TEXT/REFERENCE BOOKS

Text Books:

1. A.Tanenbaum, *Computer Networks*, 4th Edition, PHI publication.
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*, 2nd edition, Pearson education.
3. M. Gallo, W. Hancock, *Computer Communications and Networking Technologies*, Course Technology.

CEIT603:

Principles of Compiler Design

8 Credits

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

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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, Generating Code from DAGs, Dynamic Programming, Code-Generation Algorithm, Code-Generators.

UNIT - 6

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

TEXT/REFERENCE BOOKS

Text Books:

Aho, Sethi, Ullman, *Compilers-tools and Techniques*, Addison Wesley, 1987

Trembly, Sorenson, *Theory and Practice of Compiler Writing*, McGraw Hill, 1984.

Hopcroft, *Introduction to Automata Theory, Languages and Computation*, Pearson Publication.

Reference Books:

Paul G. Sorenson, *Compiler Writing*, Tata McGraw Hill.

Hunter, *The Essence of Compilers*, Pearson Publication.

Lewis, *Elements of the Theory of Computation*, Pearson Publication.

CE604:

Computer Graphics

8 Credits

UNIT - 1

Basic Concepts

Introduction to computer graphics, lines, line segments, pixels and frame buffers, anti-aliasing techniques and character generation methods. Graphics Display devices (monochrome, color) interactive devices, Scanners and digitizers, touch panels, tablets, mouse, joysticks, trackball, light pen.

UNIT - 2

2-D Transformations Line and circle plotting using Bresenham's and other algorithms, transformation matrices, scaling, rotation, translation, picture transformation, mirror image.

UNIT - 3

Windowing and Clipping

Introduction, viewing transforms, 2-D clipping, Sutherland Cohen approach, Cyrus Beck Method, Midpoint subdivision algorithm, Liang-Barsky line clipping algorithm, polygon clipping, text clipping, generalized clipping.

UNIT - 4

3-D Graphics

Introduction, 3-D geometry, Co-ordination system, 3D transformation, rotation about an arbitrary axis, orthogonal projections, multiple views, isometric projection, perspective projections, 3-D clipping.

UNIT - 5

Hidden Surfaces and lines

Introduction, Back face removal algorithm, Z-buffers, Scan line and Painters algorithm hidden surface removal, curved surface generation, generation of solids, sweep method, interpolation.

UNIT - 6

Graphical User Interface

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X-Windows, use of graphics tools like OpenGL, DirectX, Windows and Motif, Graphic Standards. Animation: Introduction, devices for producing animation, computer assisted animation, real time animation, method for controlling animation (fully explicit control, procedural).

TEXT/REFERENCE BOOKS

Text Books:

Newman, Sprouall, Interactive Computer Graphics, McGraw Hill Pub.

Hearn, Baker, Computer Graphics, PHI Pub.

Reference Books:

Harrington, Computer Graphics, McGraw Hill Pub.

Rogers, Procedural Elements of Computer Graphics, McGraw Hill Pub.

CE605:	Human Computer Interactions(Elective III)	8 Credits
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UNIT - 1

Introduction

The Human, The Computer, The Interaction

UNIT - 2

Design processes

Interaction Design basics, HCI in the Software Process, Design Rules

UNIT - 3

Implementation and Evaluation

Implementation Support, Evaluation Techniques, Universal Design, Use Support

UNIT - 4

Models

Cognitive Models, Socio-Organizational Issues and Stakeholders Requirements, Communication and Collaboration models

UNIT - 5

Theories

Task Analysis Dialog notations and Design Models of the system Modeling Rich Interactions

UNIT - 6

Modern Systems

Group ware, Ubiquitous Computing computing and Augmented Realities Hypertext Multimedia and World Wide web

TEXT/REFERENCE BOOKS

Text Book

Alan Dix, Janet Finlay, Gregory Abowd, Russell Beale Human Computer Interaction 3rd Edition Pearson Education

CE606:

Programming Laboratory VII

4 Credits

Computer Networks Lab

List of experiments:

1. Write a program in 'C' for PC to PC communication using RS-232 port.
2. Write client server program using java.
3. Implementation of UTP cables-cross over, straight through, roll over.
4. Implementation and study of sliding window protocol- LAN trainer.
5. Implementation and study of multiple access protocols-LAN trainer.
6. Study of router and other internetworking device.
7. Installation of web server APACHE TOMCAT and IIS.

Software Engineering Lab

(Mini Project based on Software Engineering)

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.

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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:

Controls

Properties for every control of the form

Events

Programming components 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,

Problem definition in detail.

Literature survey.

Requirement analysis.

System analysis (Draw Level 2 DFD at least).

System design

Implementation

Use cases

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 Evaluation Board - Controlling hardware and software.
2. Develop 8 channel data acquisition system to acquire data from 8 channel, Convert it into digital format and transmit to PC .
3. Write a C program which generates packets of 32 bits. First bit of packet indicates whether the packet is control packet or data packet.
4. Using microcontroller development board, develop the software which read input from the switches.
5. Using microcontroller development board, develop the software for serial communication.
6. Develop an embedded system that takes Analog voice signal as input and converts it into digital format and send this data to PC.
7. Write a shell script that display the number of readable, writable and executable files in specified directory.
8. Write a C program that takes string input from keyboard and displays the length of string – use multi threading for message queue or shared memory.
9. Write a program that demonstrates the communication between two processes.
10. Write a program that demonstrates multithreading in RTL Linux.
11. Write a program to control an application RTL Linux.

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

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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.

CEIT701:

Inter-networking Protocols

6 Credits

Course Objectives To familiarize the students with various inter-networking protocols and their functionalities. To learn the new concepts in the 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

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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 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 Books

Text Books

1. Douglas E. Comer, *Internetworking with TCP/IP: Principles, Protocols and Architecture*, Volume 1, 5th edition, PHI publication, 2006.
2. Behrouz A. Forouzan, *TCP-IP Protocol Suite*, 3rd edition, Mc-Graw Hill publication, 2005.

Reference Books

1. Comer, *Internetworking with TCP-IP Vol. 3*, 2nd edition, Pearson publication, 2001.
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, PHI publication, 2002.
5. Loshin, Harwurt, *TCP-IP Cleanly Explained*, BPB publication.

CE702:

Software Architecture

6 Credits

Course To illustrate the significance of software architecture in product life cycle and
Objectives and familiarize students with various techniques architecture design, documentation, evaluation and architecture knowledge management

UNIT - 1

Introduction, Architectures in Context: The Reorientation of Software Engineering, Basic Concepts

UNIT - 2

Designing Architectures, Connectors, Modeling

UNIT - 3

Visualization, Analysis, Implementation

UNIT - 4

Deployment and Mobility, Applied Architectures and Styles

UNIT - 5

Designing for Non-Functional Properties, Security and Trust, Architectural Adaptation

UNIT - 6

Domain-Specific Software Engineering, Standards, People, Roles, and Teams

TEXT/REFERENCE BOOKS

Richard N Taylor, Nenad Medvidovic,, Eric M. Dashofy, Software Architecture Foundations Theory and Practice. Wiley Student Edition

CE703:

Advanced Database Technologies

6 Credits

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Course	To illustrate advanced database features such as transaction processing, query evaluation and optimization.
Objectives	To understand how to manipulate, design and manage databases. To understand functions of database management system administrator. To enhancing database models using distributed databases and their management techniques.

UNIT - 1

Transactions

Transaction concept, transaction model, Storage structure, transaction atomicity and durability, transaction isolation, serializability, transaction isolation and atomicity, transaction isolation levels, implementing 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, Insert-delete operations and predicate reads.

UNIT - 3

Recovery System

Failure classification, storage, recovery and atomicity, recovery algorithm, buffer management, failure with loss of non volatile storage, early lock release and logical undo operations, remote backup systems.

UNIT - 4

Database System Architectures and Parallel Databases

Centralized and client sever architecture, Server system architectures, Parallel systems, Distributed systems. Introduction to parallel databases, interquery and intraquery parallelism, intraoperation and interoperation parallelism, query optimization, parallelism on multicore processors, design of parallel system.

UNIT - 5

Distributed Databases

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Homogeneous and heterogeneous databases, distributed data storage, distributed transactions, commit protocols, concurrency control in distributed environment, distributed query processing, heterogeneous distributed databases, cloud based databases.

UNIT - 6

Dataware housing and data mining

Decision support systems, Dataware housing, data mining, classification, association rules, clustering

TEXT/REFERENCE BOOKS

Text Books:

Korth, Silberchatz, Sudarshan, Database System concepts, 6th Edition, TMH Pub.

C. J. Date, Database Management System, TMH Pub.

Reference Books:

Stefano Ceri, Giuseppe Pelagatti, Distributed databases-Principles and system, MGH.

Desai Bipin, An introduction to Database systems, Galagotia Pub.

CE704:	Advanced Programming Technologies	6 Credits
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Course	This course will introduce the essential topics of Internet Programming predominately with the Java programming language. Students will be able to design and write interactive WWW pages using Java, HTML, CGI. Students will also be able to develop software that manipulates different forms of data such as hypertext, graphics, video, and sound.
Objectives	

UNIT - 1

Introduction to Internet Programming

Client Server model, Browsers - Graphical and Hypertext Access to the Internet, HTTP- HyperText Transfer Protocol.

UNIT - 2

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Creating Internet, World Wide Web pages

HTML - HyperText Markup Language, Headers, body, html tags, tables Text, graphics, sounds, video clips, multi-media, Client side image mapping, web page counters, HTML resources, HTML converters and tools.

UNIT - 3

HTML forms and scripting

Building a form, Text fields and value, size, maxlength, html buttons, radio, checkboxes, prechecked. Selection lists, Introduction to CGI scripting. Action and Method - GET and POST. HTML form interface with CGI scripts. Automating processing such as info forms and email. Programming CGI interfacing via forms.

UNIT - 4

Introduction to Java

Introduction to Java, Javac, Java class libraries, JDK, jdbc, Java Byte Codes. Classes and Objects, Applets, Applet parameter passing Control Structures. Basic Windows, mouse and buttons Events, the Java event model. Basic I/O. JAR Files, Java archiver.

UNIT - 5

Advanced Java Programming Graphic User Interface with AWT. AWT calls, Windows, dialog boxes, pop-up menus. Graphics. Using a Layout manager. Manipulating Images. Image animation. Threads- Process Management. Socket programming - client-server processing. URL Connections. Java Beans.

UNIT - 6

XML TechnologiesXHTML(Extensible HTML) - A stricter and cleaner XML based version of HTML. XML DOM (XML document object model)- A standard document model for accessing and manipulating XML. XSL(XML Style sheet Language)- transforms XML into other formats, like HTML ,XSL Formatting Objects)- for formatting XML to screen, paper, a language for navigating XML documents.

TEXT/REFERENCE BOOKS

Text Books

Deitel and Deitel. "Java - How to Program", Addison-Wesley Press, Reading, Mass.

Kahate Godbole“Web Technologies”

Dr. Babasaheb Ambedkar Technological University, Lonere

A.W. Ganczarski. "Database and XML Technologies"

Reference Books:

Scott Oaks and Henry Wong. "Java Threads", O'Reilly and Associates Publishing, Sebastopol, CA.

Gary Cornell, Cay Horstmann. "Core Java", SUN Soft Press Publishing, Mountain View

1. Peter A. Rizzi, "Fundamentals of Microwave Engineering", Prentice Hall of India
2. Sisodia and Raghuvanshi, "Microwave Circuits and Passive Devices", Wiley Eastern
3. B. E. Keiser, "Principles of Electromagnetic Compatibility", Artech

CEIT801 :

Information Security

6 Credits

Course To understand the basic categories of threats to computer and network.

Objectives To understand intrusion and intrusion detection.

To defend the need for protection, security, and the role of ethical consideration in computer use.

To describe efficient basic number algorithms.

To discuss the fundamental ideas and algorithms of secret key cryptography and public-key cryptography.

UNIT - 1

Introduction to Cryptography: Active vs. passive attacks, Layers and cryptography, Authorization, Viruses, Worms, Trojan horses, The multi level 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

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Public Key Algorithms: Modular arithmetic, RSA, Diffie-Hellman, Digital signature standard, Elliptic curve cryptography.

UNIT - 5

Number Theory and Authentication: Password based and Cryptographic based authentication protocol.

UNIT - 6

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, 2001.
2. William Stalling, *Network Security Essentials: Applications and Standards*, 2nd edition, Prentice Hall publication, 2002.
3. William Stalling, *Cryptography and Network Security*, Prentice Hall publication, 2003.

Reference Books

1. Vyles, *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, 1995.
4. Hunter, Berlin, *Information Security Handbook-Computer communications and Networks*, Springer publication, 2007.

CE802:

Distributed Systems

6 Credits

UNIT - 1

Dr. Babasaheb Ambedkar Technological University, Lonere

Fundamentals

Introduction, Distributed Computing System, Evolution of Distributed Computing System, Distributed Computing System models, Distributed Computing System Gaining Popularity, Distributed Operating System, Introduction to Distributed Computing Environment (DCE), network Types, LAN Technologies, WAN technologies, Communication Protocols, Internetworking, ATM Technology, Desirable Features of a Good Message- Passing System, Issues in IPC by Message- Passing, Synchronization, Buffering, Multidatagram message, Encoding and Decoding of message data, Process addressing, Failure Handling, Group Communication, Case Study: BSD UNIX IPC Mechanism.

UNIT - 2

Remote Procedure Calls

Introduction, the RPC model, Transparency of RPC, Implementing RPC Mechanism, Stub Generation, RPC messages, Marshaling arguments and Results, Server Management, Parameter Passing Semantics, Call Semantics, Communication Protocols for RPCs, Complicated RPCs, Client- Server Binding, Exception Handling, Security, Some Special Types of RPCs, RPC in Heterogeneous Environments, Lightweight RPC, Optimization for Better Performance, Case studies: Sun RPC, DCE, RPC

UNIT - 3

Distributed Shared Memory

Introduction, general Architecture of DSM Systems, Design and Implementation Issues of DSM, Granularity, Structure of Shared Memory Space, Consistency Models, Replacement Strategy, Thrashing, Other Approaches to DSM, Heterogeneous DSM, Advantages of DSM.

UNIT - 4

Synchronization

Introduction, Clock Synchronization, Event Ordering, Mutual Exclusion, Deadlock, Election Algorithms.

UNIT - 5

Resource Management And Process Management

Introduction, Desirable Features of a Good Global Scheduling Algorithm, Task assignment Approach, Load-Balancing Approach, load Sharing Approach, Process Migration, Threads.

UNIT - 6

Distributed File System

Introduction, Desirable Features of a Good Distributed File System, File Models, File Accessing Models, File Sharing Semantics, File Caching Schemes, File Replication, Fault Tolerance, Atomic Transactions, Design Principles, Case Study: DCE Distributed File Service.

TEXT/REFERENCE BOOKS

Text Books:

1. . K. Sinha, *Distributed Operating System*, PHI Pub. P
2. olorouis, *Distributed Systems*, Addison Wesley Pub. C

Reference Books:

Tanabaum, *Distributed Systems*, PHI Pub.

CE803: Software Testing 6 Credits

- Course Objectives**
1. To understand the importance, principles, and limitations of software testing. This course is designed to enable a clear understanding and knowledge of the foundations, techniques, and tools in the area of software testing and its practice in the industry.
 2. To understand the broad approaches and techniques for test case design and the aspects involved in planning for software testing.
 3. To learn strengths and weaknesses of various software testing techniques.

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)

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 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.

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. Shriniwasan Desikan, Gopalswamy 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.

CE804:

Artificial Intelligence

6 Credits

UNIT - 1

Introduction

Definition of A.I, Foundation of A.I., History, intelligent Agents, Agent Architecture, A.I. A.I. Representation, Properties of internal representation, Futures of A.I, A.I Techniques, Importance of A.I – Representation of Knowledge, Knowledge Base Systems, State Space Search – Production Systems – Problem Characteristics

UNIT - 2

Heuristics Search Techniques

Generate and test – Hill Climbing, Depth First Search, Breadth First Search, Best First Search, A* and AO* Algorithm, Problem reduction – Constraint satisfaction – Means-Ends Analysis. Game playing – Minimax and Alpha-Beta Cutoffs, waiting for Quiescence, Secondary search.

UNIT - 3

Predicate Logic

Using predicate logic: Predicate Calculus, Predicate and arguments, ISA Hierarchy, Frame notation, Resolution, Natural Deduction representing simple facts in Logic – Logic Programming, computable functions in predicates, resolution – unification, Forward and Backward reasoning , Forward and Backward chaining rules.

UNIT - 4

Structured Knowledge Representation

TMS (Truth maintenance system), Statistical and probabilistic reasoning , Associative Networks, Semantic Nets, Frames Structures, Conceptual Dependencies and Scripts Learning – Concept of Learning – Learning Automata, Genetic Algorithm, Learning by induction, Planning: Block world, strips, Implementation using goal stack, Non linear planning with goal stacks, Hierarchical planning, least commitment strategy.

UNIT - 5

Natural Language Processing

Dr. Babasaheb Ambedkar Technological University, Lonere

Overview of Linguistics, Grammars and Languages, basic Parsing techniques, Semantic analysis and representation structures. Natural Language generation and Natural Language Systems. Syntactic Processing, ATN, RTN.s

UNIT - 6

Expert Systems

Architecture – Need and Justification of Expert Systems – knowledge representation, Knowledge acquisition and validation. Utilization and functionality, Perception and Action, real time search, perception, action, vision, robot architecture, Basics of PROLOG

TEXT/REFERENCE BOOKS

Text Books

1. Eugene, Charniak, Drew Mcdermott: "Introduction to artificial intelligence." Addison-Wilskey, 1985
2. Eiaine Rich and Kerin Knight: "Artificial Intelligence.", Tata McGraw-Hill, second edition.

Reference Books

1. Stuart Russell and Peter Nerving: "Artificial Intelligence: A Modern Approach", Prentice Hall, 2nd Edition.
2. Ivan Bratko : "Prolog Programming For Artificial Intelligence" , 2nd Edition Addison Wesley, 1990.
3. Herbert A. Simon, "The Sciences of the Artificial ", MIT Press, 3rd Edition (2nd Printing), 1995.
4. Tim Jones "Artificial Intelligence Application Programming" M. Dreamtech Publication