22. SCHEME OF INSTRUCTION

B.TECH (Information Technology) Course Structure – VR10

First Year – Semester I

S.No	Sub. Code	Subject Title	L	T	P	C	I	E	T
1	FY 1001	Engineering Mathematics -I	4	1	--	4	30	70	100
2	FY 1002 C	Engineering Chemistry	3	1	--	3	30	70	100
3	FY 1003 B	Basics of Civil and Mechanical Engineering	4	--	--	4	30	70	100
4	FY 1004 M	Mechanics for Engineers	4	1	--	4	30	70	100
5	FY 1005	Introduction to Computing	2	--	--	2	30	70	100
6	FY 1006	Professional Ethics	2	--	--	2	75*	--	75
7	FY 1051 C	Engineering Chemistry Lab	--	--	3	2	25	50	75
8	FY 1052	Basic Computing Lab	--	--	3	2	25	50	75
9	FY 1053	Workshop Practice	--	--	3	2	25	50	75
Total=			**19**	**3**	**9**	**25**			**800**

First Year – Semester II

S.No	Sub. Code	Subject Title	L	T	P	C	I	E	T
1	FY 2001	Engineering Mathematics -II	4	1	--	4	30	70	100
2	FY 2002 P	Engineering Physics	3	1	--	3	30	70	100
3	FY 2003 E	Technical English and Communication Skills	2	--	2	3	30	70	100
4	FY2004 EN	Environmental Science	3	1	0	3	30	70	100
5	FY 2005	Programming in C	3	1	--	3	30	70	100
6	FY 2007	Engineering Graphics	2	--	6	5	30	70	100
7	FY 2051P	Engineering Physics Lab	--	--	3	2	25	50	75
8	FY 2052	C Programming Lab	--	--	3	2	25	50	75
Total=			**17**	**4**	**14**	**25**	**230**	**520**	**750**

L: Lecture **T**: Tutorial **P**: Practical **C**: Credits
I: Internal Assessment **E**: End Examination **T**: Total Marks

Second Year – Semester III

S.No	Sub. Code	Subject Title	L	T	P	C	I	E	T
1	IT 3001	Engineering Mathematics III	4	1	--	4	30	70	100
2	IT 3002	Basic Electrical Engineering	4	--	--	4	30	70	100
3	IT 3003	Discrete Mathematical Structures	3	1	--	3	30	70	100
4	IT 3004	Data Structures	4	1	--	4	30	70	100
5	IT 3005	Computer Organization	4	--	--	4	30	70	100
6	IT 3006	Principles of Operating System	4	--	--	4	30	70	100
7	IT 3051	Data structures Lab	--	--	3	2	25	50	75
8	IT 3052	Communication Skills Lab	--	--	3	1	25	50	75
Total=			**23**	**3**	**6**	**26**	200	550	**750**

Second Year – Semester IV

S.No	Sub. Code	Subject Title	L	T	P	C	I	E	T
1	IT 4001	Probability and Statistics	4	1	--	4	30	70	100
2	IT 4002	Data Base Management Systems	4	--	--	4	30	70	100
3	IT 4003	Operating System: Use and Configuration	3	2	--	4	30	70	100
4	IT 4004	Object Oriented Programming	4	1	--	4	30	70	100
5	IT 4005	Basic Electronics	4	--	--	4	30	70	100
6	IT 4051	Data Base Management Systems Lab	--	--	3	2	25	50	75
7	IT 4052	Object Oriented Programming Lab	--	--	3	2	25	50	75
8	IT 4053	Operating Systems Lab	--	--	3	2	25	50	75
Total=			**19**	**4**	**9**	**26**	200	525	**725**

L: Lecture **T**: Tutorial **P**: Practical **C**: Credits
I: Internal Assessment **E**: End Examination **T**: Total Marks

Third Year – Semester V

S.No	Sub. Code	Subject Title	L	T	P	C	I	E	T
1	IT 5001	Design And Analysis of Algorithms	3	1	--	3	30	70	100
2	IT 5002	Advanced Data Base Management System	3	2	--	4	30	70	100
3	IT 5003	Software Engineering	3	1	--	4	30	70	100
4	IT 5004	Java Programming	4	1	--	4	30	70	100
5	IT 5005	Computer Networks	4	--	--	4	30	70	100
6	IT 5006	Distributed Systems	4	--	--	3	30	70	100
7	IT 5051	Java Programming Lab	--	--	3	2	25	50	75
8	IT 5052	Networking Lab	--	--	3	2	25	50	75
Total=			**21**	**5**	**6**	**26**	200	550	**750**

Third Year – Semester VI

S.No	Sub. Code	Subject Title	L	T	P	C	I	E	T
1	IT 6001	Fundamentals Of Computer Vision	4	--	--	4	30	70	100
2	IT 6002	Data Warehousing	4	--	--	4	30	70	100
3	IT 6003	Engineering Economics and Management	3	1	--	3	30	70	100
4	IT 6004	Web Technologies	4	1	--	4	30	70	100
5	IT 6005	Network Security	4	1	--	4	30	70	100
6	IT 6051	Computer Vision Lab	--	--	3	2	25	50	75
7	IT 6052	Data Warehousing Lab	--	--	3	2	25	50	75
8	IT 6053	Web Technologies Lab	--	--	3	2	25	50	75
9	IT 6054	Term Paper	--	1	--	1	75*	--	75
Total=			**19**	**4**	**9**	**26**	275	525	**800**

L: Lecture **T**: Tutorial **P**: Practical **C**: Credits
I: Internal Assessment **E**: End Examination **T**: Total Marks

Final Year – Semester VII

S.No	Sub. Code	Subject Title	L	T	P	C	I	E	T
1	IT 7001	Operations Research	3	1	--	3	30	70	100
2	IT 7002	Data Mining	4	--	--	4	30	70	100
3	IT 7003	Object Oriented Analysis and Design	3	2	--	4	30	70	100
4	IT 7004	Wireless Networks	4	--	--	4	30	70	100
5	IT 7005	Elective-I	4	--	--	3	30	70	100
	IT 7005A	i) Industry Need Based Elective							
	IT 7005B	ii) Virtual Reality							
	IT 7005C	iii) Software Project Management							
	IT 7005D	iv) Grid Computing							
	IT 7005E	v) Network Management Systems							
6	IT 7006	Elective-II	4	--	--	3	30	70	100
	IT 7006A	i) Industry Based Elective							
	IT 7006B	ii) Real Time Systems							
	IT 7006C	iii) Design Patterns							
	IT 7006D	iv) Introduction To Main-Frame Systems							
	IT 7006E	v) Artificial Intelligence							
7	IT 7051	Data Mining Lab	--	--	3	2	25	50	75
8	IT 7052	Wireless Networks Lab	--	--	3	2	25	50	75
9	IT 7053	Mini Project	--	1	2	1	50	--	50
Total=			**22**	**4**	**8**	**26**	200	550	**750**

L: Lecture **T**: Tutorial **P**: Practical **C**: Credits
I: Internal Assessment **E**: End Examination **T**: Total Marks

Final Year – Semester VIII

S.No	Sub. Code	Subject Title	L	T	P	C	I	E	T
1	IT 8001	Software Testing Methodologies	4	--	--	4	30	70	100
2	IT 8002	Elective III	4	--	--	4	30	70	100
	IT 8002 A	i) Industry Based Elective							
	IT 8002 B	ii) Information Retrieval Systems							
	IT 8002 C	iii) Bioinformatics							
	IT 8002 D	iv) E-Commerce							
	IT 8002 E	v) Advanced Computer Architecture							
3	IT 8003	Elective IV	4	--	--	4	30	70	100
	IT 8003 A	i) Soft Computing							
	IT 8003 B	ii) Business Intelligence And Its Application							
	IT 8003 C	iii) Principles Of TCP/IP		.					
	IT 8003 D	iv) Pattern Recognition							
	IT 8003E	v) Middleware Technologies							
6	IT 8051	Software Testing Tools Lab	--	--	3	2	25	50	75
7	IT 8052	Major Project	2	6	10	12	50	100	150
Total=			**14**	**6**	**13**	**26**	175	360	**525**

L: Lecture **T**: Tutorial **P**: Practical **C**: Credits
I: Internal Assessment **E**: End Examination **T**: Total Marks

23. **Categories of Courses and Distribution**:

Basic Sciences Courses (BS) >=24

Course name		L-T-P: C
FY 1001	Engineering Mathematics –I	4-1-0: 4
FY 2001	Engineering Mathematics – II	4-1-0: 4
FY 1002P	Engineering Physics	3-1-0: 3
FY 2002(C)	Engineering Chemistry	3-1-0: 3
FY 1051 P	Engineering Chemistry Lab	0-0-3: 2
FY 2051 C	Engineering Physics Lab	0-0-3: 2
IT 3001	Mathematics – III	4-1-0: 4
IT 4001	Probability and Statics	4-1-0: 4

Basic Engineering Sciences Courses (BES) >=24

Course name		L-T-P: C
FY 1004M	Mechanics for Engineers	4-1-0: 4
FY 1053W	Workshop Practice	0-0-3: 2
IT 4005	Basic Electronics	4-0-0: 4
IT 3002	Basics of Electrical Engineering	4-0-0: 4
IT 1003	Basics of Civil and Mechanical Engineering	4-0-0: 4
IT 2007	Engineering Graphics	2-0-6: 5
IT 4053	BEE lab	0-0-3: 2

Humanities and Social Science Courses (HU) >= 08

Course name		L-T-P: C
FY2003F	Technical English & Communication skills	2-0-2: 3
IT 3052	Communication Skills Lab	0-0-2: 1
IT 6003	Engineering Economics and Management	3-1-0: 3

Mandatory Learning Courses (ML) >=05

Course name		L-T-P: C
FY 1006	Professional Ethics	2-0-0: 2
FY 2004EN	Environmental Science	3-1-0: 3
IT 7001	Operations Research	3-1-0: 3

Student Practice courses (SP) >=2*

Course name		**L-T-P: C**
SPA 901	Research orientation	0-1-1: 1
SPA 902	Industry practice	0-2-1: 1
SPA 903	Self learning	0-0-3: 1
SPA 904	Co-curricular participation	0-0-3: 1
SPA 905	Extra- curricular participation	0-0-3: 1
SPA 906	NSS	0-0-3: 1
SPA 907	NCC	0-0-3: 1
SPA 908	Social Service	0-0-3: 1
SPA 909	Rural development	0-0-3: 1
SPA 910	Yoga	0-0-3: 1
SPA 911	Educational tour	0-0-3: 1
SPA 912	Practice School	0-2-2: 1
SPA 913	Personality Development	0-2-1: 2

* Students will have to earn a minimum of 4 credits during the entire tenure of the degree programme, out of which Personality Development course is mandatory.

FY 1001
ENGINEERING MATHEMATICS – I

Lecture	**:**	4 hrs/ Week	**Internal Assessment:**	30
Tutorial	**:**	1 hr/ week	**Final Examination:**	70
Practical	**:**	-	**Credits:**	4

Objectives:

- The objective of this course is to get understanding different methods for solving ordinary, partial differential equations and matrices.
- Deploy mathematical skills effectively in the solution of problems, principally in the area of engineering.

Learning Outcomes: **Upon completion of this course the student will be familiar with:**

- Solve system of linear equations.
- Understanding the concept of convergences and finding the sum of infinite series.
- Solve first order separable and linear differential equations and use these methods to solve applied problems.
- Formation of Partial differential equations and solving for a solution

UNIT I

Matrices: Rank of a matrix, Elementary transformations, Echelon-form of a matrix, normal form of a matrix, Inverse of a matrix by elementary transformations (Gauss – Jordan method). **Solution of system of linear equations**: Non homogeneous linear equations and homogeneous linear equations. Linear dependence and linear independence of vectors.
Characteristic equation, Eigen values, Eigen vectors, Properties of Eigen values. Cayley-Hamilton theorem (without proof). Inverse of a matrix by using Cayley-Hamilton theorem.

UNIT II

Reduction to diagonal form, Modal matrix orthogonal transformation. Reduction of quadratic form to canonical form by orthogonal transformations, Nature of a quadratic form, Hermitian and skew-Hermitian matrices.
Sequences and series: Convergence of series – comparison test – D'Alemberts Ratio test – Cauchy's Root Test – Alternating series – Absolute convergence – Leibnitz's Rule.

UNIT III

Ordinary differential equations: Formation, separable equations, exact equations, integrating factors, linear first order differential equations, Bernoulli's equation, orthogonal trajectories. Newton's Law of Cooling, Heat Flow, Linear equations of higher order with constant coefficients.

UNIT IV

Linear dependence of solutions, method of variation of parameters, equations reducible to linear equations, Cauchy's homogeneous linear equation, Legendre's linear equation, simultaneous linear equations with constant coefficients.
Partial Differential Equations: Formation of Partial Differential Equations, Solutions of a

Partial Differential Equation – Equations solvable by direct integration, Linear Equation of First order.

Content Beyond Syllabus:

- Integral calculus
- Interpolation

Learning Resources:

Text Books:

[1] Dr.B.S.Grewal, A text book of Higher Engineering Mathematics, 40 ed. Khanna Publishers.
[2] N.P.Bali and M. Goyal, A Text book o Engineering Mathematics: Laxmi Publications(P) Limited.
[3] B.V.Ramana, A text book of mathematics Tata MC Graw Hill.

Reference Books:

[4] Krezig, Advanced Engineering Mathematics, 8 ed.: John Wiley & Sons.
[5] Peter.V., et al., Advanced Engineering Mathematics.
[6] R.K.Jain and S.R.K.Iyengar, Advanced Engineering Mathematics, 3 ed.: Narosa Publishers.

Web resources:

[7] Peeyush Chandra, 20 January). A lecture notes on Engineering mathematics. Available: http://nptel.iitm.ac.in/courses/Webcourse-contents/IIT-KANPUR/mathematics- 2/index.html
[8] P. A. Mattuck. 20 January). A lecture notes on Differential Equations. Available: http://www.learnerstv.com/lectures.php?course=ltv223&cat=Maths&page=1
[9] P. R. Cascaval and (2009, 20 January). A video lecture notes on Ordinary differential equations. Available: http://freevideolectures.com/Course/2789/Math-443-Ordinary-Differential-Equations#
[10] Prof. Sunita Gakkhar, (20 January). A video lecture series on Mathematics - II. Available: http://www.learnerstv.com/lectures.php?course=ltv092&cat=Maths&page=1

FY 1002C
ENGINEERING CHEMISTRY

Lecture :	3 hrs/ Week	**Internal Assessment:**	30
Tutorial :	1 hr/ week	**Final Examination:**	70
Practical :	-	**Credits:**	3

Objectives:

- The objective of the course is to know application of principles of chemistry emerges into technology.
- Learn role of chemistry in the field of engineering.

Learning Outcomes:

Upon completion of this course the student will be familiar with:

- Water being an important engineering material, its role in the industries and in particular boilers is to be thoroughly understood. A lot of work is being done on purification of brackish water and hence one is supposed to be informed of the technology of purification of sea water.
- Electrochemistry and electrochemical energy systems provide an insight into the electrical world that includes power generators, battery systems and electrical sensors that control various systems.
- Understand global problem of Corrosion.
- Acquire analytical skills in handling various machines, instruments, apart from understanding the mechanism involved.

UNIT I

Water technology: Water treatment for drinking purpose - sedimentation, coagulation, filtration, various methods of disinfection and concept of break-point chlorination. **Boiler troubles**: Scales, sludges, caustic embrittlement and boiler corrosion, causes and prevention, Desalination of brakish water, Principle and process of electrodialysis and reverse osmosis.

Polymer technology: Conducting polymers – Examples, classification-intrinsically conducting polymers and extrinsically conducting polymers- mechanism of conduction of undoped, p-doped and n-doped polyacetylenes – applications of conducting polymers – structure, importance and applications of polyaniline.

UNIT II

Electrochemistry and Electrochemical energy systems

Reference electrodes: Calomel electrode, silver-silver chloride electrode, quinhydrone electrode and glass electrode, determination of pH using glass electrode, concept of concentration cells. Conductivity – Conductometric titrations and Potentiometric titrations.

Electrochemical energy systems: Types of electrochemical energy systems – Storage cells – Zinc-air battery, Ni-Cd battery, Lithium batteries – Li/MnO_2, $Li/SOCl_2$, Li/TiS_2 and $Li_xC/LiCoO_2$ – Advantages of lithium batteries – Electrochemical sensors – Principle, working and applications – Simple introduction to the terms – polarization, decomposition potential and overvoltage.

UNIT III

Corrosion and its control: Introduction – chemical and electrochemical corrosion – electrochemical theory of corrosion – corrosion due to dissimilar metals, galvanic series – differential aeration corrosion – concept of passivity.

Forms of corrosion –pitting, crevice, stress corrosion cracking and microbiological corrosion.

Factors affecting corrosion: Relative anodic and cathodic areas, nature of corrosion product, concentration of D.O., pH and temperature.

Protection methods: Cathodic protection (impressed current and sacrificial anode), anodic protection, corrosion inhibitors – types and mechanism of inhibition.

Electrolytic methods in electronics: Electroplating – principle and process of electroplating of copper on iron – Electroless plating – principle and electroless plating of copper, Self assembled monolayers.

UNIT – IV

Instrumental techniques in chemical analysis:

Introduction of spectroscopy – interaction of electromagnetic radiation with matter. UV-visible (electronic) spectroscopy: Frank-Condon principle – types of electronic transitions. Lambert-Beer's law, numericals (simple substitution) – Instrumentation-Single beam UV-visible spectrophotometer. **Applications of UV-visible spectroscopy:** Qualitative analysis, quantitative analysis, detection of impurities, determination of molecular weight and dissociation constants.

Infrared (vibrational) spectroscopy: Principle of IR spectroscopy, types of molecular vibrations-stretching and bending vibrations, vibrational spectra diatomic molecules, selection rule for harmonic vibrational transition – Instrumentation. **Applications of IR spectroscopy:** Determination of force constant – numericals (simple substitution), detection of impurity and identification of nature of hydrogen bonding.

Content Beyond syllabus:

- Water Technology-I
- Water Technology-II and Science of corrosion.

Learning Resources:

Textbooks:

FY 1003 B
BASICS OF CIVIL AND MECHANICAL ENGINEERING

Lecture :	4 hrs/ Week	**Internal Assessment:**	30
Tutorial :	--	**Final Examination:**	70
Practical :	-	**Credits:**	4

Objectives:

- To get an overview of civil and mechanical engineering and their role in the economy and daily life.
- To solve several engineering problems at the systems level (criteria and specifications).
- To satisfy the acquired rudimentary competencies in design of civil and mechanical systems.

Learning Outcomes: **Upon completion of this course the student will be familiar with:**

- Apply knowledge of engineering, information technology, mathematics and science
- Design a system or component or process to meet stated specifications.
- Identify, formulate and solve engineering problems.
- Consider social, environmental, economic and ethical impact of engineering activities in a given context.

Part – A Civil Engineering

UNIT I

Simple stress and strains: Definition of Mechanics- External and Internal forces-Stress and Strain-Elasticity and Hook's Law- Relations between elastic constants.
Civil Engineering Materials: Bricks, Stones, Cement, Steel and Cement Concrete.
Sub-structure and Super structure: Soil, Types of Foundations, Bearing capacity of Soil, Brick Masonry, Stone Masonry, Flooring, Roofing and Plastering.

UNIT II

Surveying: Objectives, Types, Principles of Surveying. Measurement of distances, angles – Leveling. **Civil Engineering Structures:** Roads- Classification, Cross section of roads. Bridges- Necessity, Components, Classification. Dams- Purpose, Classification

Part – B Mechanical Engineering

UNIT III

Basic Manufacturing Methods: Principles of casting, green sand moulds, Advantages and applications of casting; Principles of gas welding and arc welding, Soldering and Brazing. Hot working – hot rolling, Cold working – cold rolling; Description of basic machine tool- Lathe – operations – turning, threading, taper turning and drilling.
Power Transmission: Introduction to belt and gears drives, types of gears, Difference between open belts and cross belts, power transmission by belt drives (theoretical treatment only).

UNIT IV

Power Plants: Introduction, working principle of nuclear power plant and steam power plant, Alternate sources of energy – solar, wind and tidal power.

Refrigeration & Air Conditioning: Definition – COP, Unit of Refrigeration, Applications of refrigeration system, vapor compression refrigeration system, simple layout of summer air conditioning system

C Engines: Introduction, Main components of IC engines, working of 4-stroke petrol engine and diesel engine, working of 2- stroke petrol engine and diesel engine, difference between petrol and diesel engine, difference between 4- stroke and 2- stroke engines.

Contents Beyond Syllabus:

- Drinking Water Supply Systems, Estimation of the Demand, Identification of Resource and Quality Estimation.
- Survey for Treatment Plant and Distribution.

Learning Resources:

Text Books

[1] Palanichamy, Basic Civil Engineering: Tata Mc Graw-Hill Publishing Company Limited, 2002,398 pages.

[2] T. Rajan, Basic Mechanical Engineering: Wiley Eastern Ltd., New Age International Ltd, 1993,236 pages

References

[3] G. Shanmugam and M. S. Palanichamy, Basic Civil and Mechanical Engineering: Tata Mc Graw-Hill Publishing Company Limited, New Delhi, 2004.

[4] R. Rudramoorthy, Thermal Engineering, Tata McGraw-Hill Publishing Company Ltd. New Delhi. 2003.

[5] N. K. Giri, Problems in Automotive Mechanics: Khanna Publishers, New Delhi, 2004.

[6] N. K. Giri, "Automotive Mechanics," 1989

[7] K. Singh, Automobile Engineering vol. 1: Standard Publishers, New Delhi, 1997.

Web Resources:

[8] Dr.Jayanth Kumar Gosh and 21 January). Surveying lecture notes NPTEL. Available: http://nptel.iitm.ac.in/courses/Webcourse-contents/IIT-ROORKEE/SURVEYING/home.htm

[9] P. s. Som. 20 January). Lecture Series On Basic Thermodynamics. Available: http://www.nptelvideos.com/video.php?id=1157&c=7

[10] Dr. B. Bhattacharjee. 20 January). A video lecture series on Building Materials and Construction. Available: http://www.learnerstv.com/video/video.php?video=1719&cat=Engineering

[11] P. M. Ramgopal. 20 January). Refrigeration and Air Conditioning. Available: http://nptel.iitm.ac.in/courses.php?branch=Mechanical

FY 1004M
MECHANICS FOR ENGINEERS

Lecture :	4 hrs/ Week	**Internal Assessment:**	30
Tutorial :	1 Hr/Week	**Final Examination:**	70
Practical :	-	**Credits:**	4

Objectives:

- To provides the basic knowledge of Newtonian mechanics, rigid-body mechanics, structural analysis and their applications in engineering.
- To acquire fundamental knowledge in engineering design.

Learning Outcomes: **Upon completion of this course the student will be familiar with:**

- Solve for the resultants of any force systems, Determine equivalent force systems.
- Determine the internal forces in axial members and support reactions.
- Solve the mechanics problems associated with friction forces.
- Find the centroid for some standard and composite areas.
- Describe the motion of a particle in terms of its position, velocity and acceleration (constant and variable).
- Analyze the forces causing the motion of a particle in rectilinear translation and curvilinear translation.

UNIT I:

Concurrent Forces in a Plane:

Principles of statics, Force, Addition of two forces: Parallelogram Law – Composition and resolution of forces – Constraint, Action and Reaction. Types of supports and support reactions. Free body diagram. Equilibrium of concurrent forces in a plane – Method of Projections –Moment of a force, Theorem of Varignon, Method of moments.

Parallel Forces in a Plane:

Introduction, Types of parallel forces, Resultant. Couple, Resolution of Force into force and a couple. General case of parallel forces in a plane.

Centroids: Determination of centroids by integration method, centroids of composite plane figures.

UNIT II

General Case of Forces in a Plane:

Composition of forces in a plane – Equilibrium of forces in a plane.

Friction: Introduction, Classification of friction, Laws of dry friction. Co-efficient of friction, Angle of friction, Angle of repose, Cone of friction, Wedge friction.

Moment of Inertia of Plane Figures & Rigid Bodies:

Moment of Inertia of a plane figure with respect to an axis in its plane and an axis perpendicular to the plane of the figure, Parallel axis theorem. Concept of Mass moment of

inertia.

UNIT III

Kinematics of Rectilinear Translation:
Introduction, displacement, velocity and acceleration. Motion with Uniform acceleration.
Kinetics of Rectilinear Translation:
Equations of rectilinear motion. **Equations of Dynamic Equilibrium:** D'Alembert's Principle. – Work and Energy, Conservation of energy.

UNIT IV

Kinematics of Curvilinear Motion: Introduction, rectangular Components of velocity & acceleration. Normal and Tangential acceleration, Motion of projectiles.
Kinetics of Curvilinear Translation:
D'Alembert's Principle in curvilinear motion- Rectangular components, Normal & tangential components - simple problems.

Content Beyond Syllabus:
Displacements, Velocity and acceleration, their relationship – Relative motion – Curvilinear motion – Newton's law – Work Energy Equation of particles – Impulse and Momentum – Impact of elastic bodies.

Learning Resources:

Textbooks:

[1] S. Timoshenko and D. H. Young, Engineering Mechanics: McGraw Hill International Edition.
[2] A. K. Tayal, Engineering Mechanics Statics and dynamics: Umesh Publication, Delhi.

Reference books:

[3] Beer and Johnston, Vector Mechanics for Engineers Statics and Dynamics: Tata McGraw Hill Publishing Company, New Delhi.
[4] S. Bhavikatti and K. Rajasekharappa, Engineering Mechanics.
[5] K. V. K. Reddy and J. S. Kumar. Singer's Engineering Mechanics: Statics and Dynamics 3 ed.

Web Resources:

[6] S. Karmakar. 18 December). Lecture notes Available: http://my.opera.com/sarpyl/blog/?id=22107012
[7] P. M. K. Harbola. 18 December). Video Lecture NPTEL. Available: http://nptel.iitm.ac.in/video.php?courseId=1048
[8] M. Negahban. 21 January). Lecture notes Available: http://emweb.unl.edu/

FY 1005
INTRODUCTION TO COMPUTING

Lecture :	2 hrs/ Week	**Internal Assessment:**	30
Tutorial :	-	**Final Examination:**	70
Practical :	-	**Credits:**	2

Objectives:

- The objectives for Introduction to computing are to use the computer effectively in a multitude of academic scenarios.
- Understand the basic parts of a computer system and their relationships.
- Master the basic functions of the Windows operating System.
- Understand and use basic computer terminology.
- To equip the graduates with a broad foundation of basic engineering concepts and fundamentals of Computer Engineering.
- To develop in graduates the capability to apply these learned concepts in engineering design and to implement such a career as a practicing engineer.

Learning Outcomes: **Upon successfully completing this course, student will be familiar with:**

- Convert and calculate in binary, decimal, and hexadecimal number systems.
- Use correct terminology associated with information processing.
- Define CPU in terms of manufacturer, model number, speed, maximum addressable RAM, and bus size.
- Describe an Information System using examples from business, education, and personal use.
- Compare input and output devices found with a variety of PCs – sub-notebooks, notebooks, laptops, desktops, and etc.
- List and describe classes of software available for use today.
- Identify common elements in a graphical user interface.
- Compare and contrast operating systems to include graphical user interface and non-graphical user interface environments.
- Identify media, hardware, software and procedural components linking telecommunications systems.
- Evaluate options for connecting to the Internet, Send e-mail, access remote servers and identify resources available on the Web.

UNIT I:

Introduction:

Algorithms, Simple model of a computer, Characteristics of a computer, Problem solving using computers.

Data Representation: Representation of characters in computer, representation of Integers, fractions, number systems, binary system, octal system, hexadecimal system, organizing of memories, representation of numbers, alpha numeric characters, error detection codes.

Computer Generation and Classification: Computer generations, Classifications of computers.

UNIT II:
Computer Architecture:
Interconnection of units, **Input Units:** Keyboard, VDU, OMR, MICR, OCR and BAR Coding. **Output Units:** Types of Printers, Plotters.
Computer memory: Memory cell, Organization, Read-Only-Memory, Magnetic Hard Disk, CDROM.

UNIT III:
Computer Languages:
Why programming Language, Assembly language, Higher Level Programming Languages, Compiling High Level Languages.
Algorithm and Flowcharting:
Introductory programming techniques, Algorithms, Structure of Algorithms, Types of Algorithms, Structure of a Flowchart, Terminal Symbol Off page connector symbol, Modification Symbol, Group instruction symbol, Connection symbol, Drawing efficient flowcharts.

UNIT IV
Introduction to operating system, functions of operating system, basic introduction to DOS, LINUX, WINDOWS –XP.
Definition and Applications of Computer Network, LAN, MAN and WAN, Intranet, Internet.

Content beyond Syllabus:
Basics of System Software:
1. Translators - Compilers
2. Loader - Linker

Learning Resources:

Textbook:

[1] V. Rajaraman, Fundamentals of Computers, 4 th Edition ed.: PHI.

References:

[2] M. C. S. Govindaraju and T. R. N. A. Abdul Haq, ntroduction to Computer Science: Wiley Eastern Limited.
[3] P. Sinha, Computer Fundamentals: BPB Publications, New Delhi.

Web Resources:

FY 1006PE
PROFESSIONAL ETHICS

Lecture :	2Hrs/Week	**Internal Assessment:**	30
Tutorial :	-	**Final Examination:**	70
Practical :	-	**Credits:**	2

Objectives:
- To understanding of Morals, characterization.

Learning outcomes : **Upon completing this course student will be familiar with know:**
- The morals and Human Values.
- Ethics and Safety.
- Responsibilities and Rights.

UNIT I

Engineering Ethics: Senses of Engineering Ethics - variety of moral issued - types of inquiry - moral dilemmas - moral autonomy - Kohlberg's theory - Gilligan's theory - consensus and controversy – Models of Professional Roles - theories about right action - Self-interest - customs and religion - uses of ethical theories.

UNIT II

Human Values: Morals, Values and Ethics – Integrity – Work Ethic – Service Learning – Civic Virtue – Respect for Others – Living Peacefully – caring – Sharing – Honesty – Courage – Valuing Time – Co-operation – Commitment – Empathy – Self-Confidence – Character – Spirituality**.**

UNIT III

Engineering as Social Experimentation: Engineering as experimentation - engineers as responsible experimenters - codes of ethics - a balanced outlook on law - the challenger case study.

Safety, Responsibilities and Rights: Safety and risk - assessment of safety and risk - risk benefit analysis and reducing risk - the three mile island and Chernobyl case studies.

Collegiality and loyalty - respect for authority - collective bargaining - confidentiality - conflicts of interest - occupational crime - professional rights - employee rights - Intellectual Property Rights (IPR) – discrimination.

UNIT IV

Global Issues: Multinational corporations - Environmental ethics - computer ethics - weapons development - engineers as managers-consulting engineers-engineers as expert witnesses and advisors - moral leadership-sample code of Ethics (Specific to a particular Engineering Discipline).

Content Beyond the Syllabus:

Case Studies on
- Safety, Responsibilities and Rights.
- Computer ethics.

Learning Resources

Text Books:

[1] M. M. a. R. Schinzinger, Ethics in engineering: McGraw Hill, New York, 1996,439 pages
[2] N. S. Govindarajan M, Senthil Kumar V. S, Engineering Ethics: Prentice Hall of India, New Delhi, 2004.

Reference Books:

[3] Engineering ethics Gail D. Baura - Academic Press, 2006 - 220 pages.
[4] Engineering ethics Charles E. Harris, Michael S. Pritchard, Michael Jerome Rabins - 2009, 313 pages.

Web Resources:

BT 1051C
ENGINEERING CHEMISTRY LABORATORY

Lecture :	-	**Internal Assessment:**	25
Tutorial :	-	**Final Examination:**	50
Practical :	3 Hrs/Week	**Credits:**	2

Objectives:

- To make students familiarize with the practical aspects of volumetric analysis of water samples and determine the parameters like alkalinity, chlorides and hardness.
- To improve the knowledge of different types of titrations used in volumetric analysis.
- To make students develop in terms of practical skills required for analytical projects.
- To imbibe the advantages of instrumental methods of chemical analysis.
- To make students observe practically the aspects of corrosion rate determination, preparation of plastics and process of electroplating.

Learning Outcomes: **After performing the experiments listed in the syllabus, the student will be familiar with :**

- Distinguish different types of titrations in the volumetric analysis.
- Assess the quality of water based on the analysis done by them.
- Acquire practical knowledge about corrosion and its inhibition process, photochemical reactions, electroplating etc.
- Exhibit the skills in performing experiments based on the theoretical fundamentals available.

List of Experiments

1. Determination of total alkalinity of water sample
    a) Standardization of HCl solution
    b) Determination of total alkalinity
2. Determination of chlorides in water sample
    a) Standardization of $AgNO_3$ solution
    b) Determination of chlorides in the water sample
3. Determination of hardness of water sample
    a) Standardization of EDTA solution
    b) Determination of total hardness of water sample
4. Determination of available chlorine in bleaching powder
    a) Standardization of sodium thiosulphate
    b) Determination of available chlorine
5. Estimation of Mohr's salt – Dichrometry
    a) Standardization of $K_2Cr_2O_7$ solution
    b) Estimation of Mohr's salt
6. Estimation of Mohr's salt – Permanganometry
    a) Standardization of $KMnO_4$ solution
    b) Estimation of Mohr's salt

7. Conductometric determination of a strong acid using a strong base
8. pH metric titration of a strong acid vs. a strong base
9. Determination of corrosion rate of mild steel in the absence and presence of an inhibitor
10. Electroplating of Nickel on iron article
11. Chemistry of Blue Printing
12. Colorimetric determination of potassium permanganate
13. Preparation of Phenol-Formaldehyde resin
14. Spectrophotometry

Learning Resources:

Text Books:

Design Experiments

- Essential oils.
- Determination of rate constant of hydrolysis of ester.
- Estimation of hardness of water by EDTA method. (or)Estimation of calcium in limestone by Permanganometry.

FY 1052
BASIC COMPUTING LABORATORY

Lecture :	--	**Internal Assessment:**	25
Tutorial :	-	**Final Examination:**	50
Practical :	3 hrs/ Week	**Credits:**	2

Objectives:

- To train on Productivity tools including Word, Excel, Power Point, access, Internet & World Wide Web and PC Hardware.
- To study the crafting professional word documents, excel Spread sheets, power point presentations and access using the Microsoft suite of office tools.
- To learn the usage of web browsers, email, newsgroups and discussion forums would be covered.
-

Learning Outcomes: **Upon completion of this course the student will be familiar with:**

- Understanding the concept of Information Technology and its Scope.
- Operating a Computer.
- Use various tools of MS-Office using Internet etc.

LIST OF PROGRAMS

1. Execution of Simple DOS Commands COPY, REN, DIR, TYPE, CD, MD, BACKUP
2. Create your Bio-Data in MSWord giving Educational and Personal Details.
3. Create an Excel Worksheet entering marks in 6 subjects of 10 Students. Give ranks on the basis of Total marks and also generate graphs.
4. Create a Database in MS-Access for Storing Library Information.
5. Ex Fields: Book name, author, book code, subject, rack no, price, volumes Enter Sample data of 15 books in to database.
6. Design a PowerPoint presentation with not less than 10 slides on any of your interesting topic.
7. Ex: Literacy, Freedom Struggle, Siddhartha Engineering College, Evolution of Computers, Internet etc.
8. Register for new Email address with any free Email provider and send.
9. Email using Internet to your friends, parents, teachers etc.
10. Search Internet using Search Engines like Google.com, Yahoo.com.
11. Ask.com for files, pictures, power point presentations etc. Downloading files, EBooks, EContent from Internet.
12. Practice in installing a Computer System by giving connection and loading System Software and Application Software.
13. Accessing and Changing BIOS settings.
14. Installing Windows XP operating System.
15. Assembling of PC.
16. Disassembling of PC.

Learning Resources:

Text Books :

[1] A. L. a. M. Leon, Introduction to Computers with MSOffice: TATA McGraw HILL.
[2] A. L. a. M. Leon, Internet for Every One: Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi.
[3] Familiarity With the computer, Software, Internet and their uses.

Reference Books:

[4] G. SK Basandra, Computers Today Publication Pvt. Ltd., New Delhi.
[5] L. a. Leon, Fundamentals of Information Technology: Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi.
[6] A. Wirasinha, Surviving in an E-World: Prentice Hall of India Pvt. Ltd.

Design Experiments:

- Windows Basic Navigation.
- Spread sheet.
- Internet research and Boolean searches.

FY 1053
WORKSHOP PRACTICE

Lecture :	-	**Internal Assessment:**	25
Tutorial :	-	**Final Examination:**	50
Practical :	3 hrs/ Week	**Credits:**	2

Objectives:

- To provide the students with hands on experience on different trades of Engineering like Carpentry, Tin Smithy, Welding and House Wiring.
-

Learning Outcomes: **Upon completion of this course the student are familiarize with :**

- The Basics of tools and equipment used in Carpentry, Tin Smithy, Welding and House Wiring.
- The production of simple models in the above four trades.

LIST OF PROGRAMS

Week 1: Carpentry

To make the following jobs with hand tools

a) Lap joint
b) Lap Tee joint
c) Dove tail joint
d) Mortise & Tenon joint
e) Cross-Lap joint

Week 2: Welding using electric arc welding process / gas welding.

The following joints to be welded.

a) Lap joint
b) Tee joint
c) Edge joint
d) Butt joint
e) Corner joint

Week 3: Sheet metal operations with hand tools.

a) Saw edge
b) wired edge
c) lap seam
d) grooved seam
e) funnel

Week 4: House wiring

a) To connect one lamp with one switch
b) To connect two lamps with one switch
c) To connect a fluorescent tube
d) Stair case wiring.
e) Go down wiring.

Learning Resources:

Text Books :

[1] A. L. a. M. Leon, Introduction to Computers with MSOffice: TATA McGraw HILL.
[2] A. L. a. M. Leon, Internet for Every One: Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi.
[3] Familiarity With the computer, Software, Internet and their uses.

Reference Books:

[4] G. SK Basandra, Computers Today Publication Pvt. Ltd., New Delhi.
[5] L. a. Leon, Fundamentals of Information Technology: Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi.
[6] A. Wirasinha, Surviving in an E-World: Prentice Hall of India Pvt. Ltd.

Design Experiments:

- Windows Basic Navigation.
- Spread sheet.
- Internet research and Boolean searches.

FY 2001

ENGINEERING MATHEMATICS – II

Lecture:	4 hrs/ Week	**Internal Assessment:**	30
Tutorial:	1 hr/ week	**Final Examination:**	70
Practical:	-	**Credits:**	4

Objectives:

- Able to compare and contrast the idea of continuity and differentiability.
- Able to interpret the idea of optimization, locate and classify the extreme points.
- Understand the concepts of Interpolation and approximation of functions using finite difference technique.

Learning Outcomes:

Upon completion of this course the students will be familiar with

- The concept of limit, continuity and differentiability.
- Mean value theorems and can apply them in approximating functions.
- Maxima and minima of two variables with constraints, without constraints, curvature, radius of curvature.
- Evaluation of double, triple integrals by using change of order and finding area and volume in polar form and Cartesian form.
- Geometry of vector differential operators and line, surface, volume integrals.
- State and use of major theorems of vector analysis.
- Concepts of finite difference technique for finding polynomial approximations for given f(x) numerically.

UNIT I

Differential Calculus: Limit, continuity, differentiability – Rolle's Theorem – Lagrange's Mean Value Theorem – Taylor's Series (without proof) – Maxima and Minima of functions of two variables – Lagrange's multipliers – Curvature – radius of curvature – Centre of curvature.

UNIT II

Integral Calculus: Double integrals – Evaluation in Cartesian and Polar coordinates – Changing the order of integration – Evaluation of areas using double integrals – Evaluation of triple integrals – Evaluation of volume using triple integrals, change of variables.

UNIT III

Vector Calculus: Scalar and Vector fields – Differentiation of scalar and vector point functions – gradient of Scalar fields – directional derivatives – divergence and curl of vector fields – vector identities. Line and surface integrals – Green's theorem in a plane (without proof) – Gauss divergence theorem (without proof) – Stoke's theorem (without proof).

UNIT IV

Interpolation: Introduction, Finite Differences – Forward, Backward, Central Differences, Symbolic Relations, Differences of a polynomial, Newton's formula for interpolation, Central difference interpolation formulae –Gauss's, Sterling's, Bessel's formulae Interpolation with unequal intervals – Lagrange's and Newton's interpolation formulae.

Content beyond the syllabus:

Fourier series and Transformation, Numerical methods, Differentiation and Integration.

Learning Resources:

Text Books:

[1] B.V.Ramana, *A text book of mathematics*: Tata Mc Graw Hill.
[2] M. G. N.P.Bali, *A Text book o Engineering Mathematics*: Laxmi Publications.
[3] Dr.B.S.Grewal, *A text book of Higher Engineering Mathematics*, 40 ed.: Khanna Publishers,

Reference Books:

[4] Krezig, *Advanced Engineering Mathematics*, 8th ed. Singapore: John Wiley & Sons(Asia), 2001.
[5] T. Veerarajan, *Engineering Mathematics*. NewDelhi: Tata McGraw Hill 1999.
[6] T. Peter.V.O.Neil, *Advanced Engineering Mathematics*. Canada.
[7] R. K. J. a. S.R.K.Iyengar, *Advanced Engineering Mathematics*, 3rd ed.: Narosa.

Web Resources :

[8] D. C. Tisdell. *Calculus*
[9] P. I. K.Rana. *Mathematics-I*
http://www.cdeep.iitb.ac.in/nptel/Core%20Science/Mathematics%20I/TableofContents.html
[10] P.S.M.Prof.Swagato K.Ray, et al.*Mathematics*
http://nptel.iitm.ac.in/video.php?courseId=1019

FY 2002P
ENGINEERING PHYSICS

Lecture :	3 hrs/ Week	**Internal Assessment:**	30
Tutorial :	1 hr/ week	**Final Examination:**	70
Practical :	-	**Credits:**	3

Objectives:

- Aims to provide students with a fundamental knowledge of physics together with problem-solving skills.
- Helps to understand physics in engineering and how it is designed to address the needs of students in seeking innovative careers in today's technological age.
- In addition, it allows students to keep their options open between physical sciences and engineering.
- To utilize scientific method for formal investigation and to demonstrate competency with experimental methods that are used to discover and verify the concepts related to content knowledge.
- Helps to gain a deep understanding of the key elements and the emerging areas like Lasers, Super Conductivity, Optical Fibers and Nano Technology.

Learning Outcomes: **Upon completion of this course, the students will be familiar with:**

- Basics of electricity
- Implementation of basics relevant to sustain and enhance our current comfort safety and prosperity.
- Relationship of electrical currents to magnetism.
- Basics of classical mechanics, differences between classical and quantum mechanics.
- The usage of quantum mechanics in medicine and industry.
- Materials that behave at low temperatures and its causes for the behavior.
- Advanced concepts like Lasers, Optical fibers and their applications in modern communication system.
- Nanotechnology which is an emerging field of Science.

UNIT I

Electricity, Electromagnetism and Semiconductors: Gauss law in electricity (Statement and proof) and its applications: Coulomb's law from Gauss law, spherically distributed charge, Hall effect, Biot-Savart's law: B due to a current carrying wire and a circular loop, Faraday's law of induction, Lenz's law, Induced electric fields, Gauss' law for magnetism, Maxwell equations (Qualitative treatment), Electromagnetic oscillations in LC circuit (quantitative), A.C. circuit containing series LCR circuit (Resonance condition).

Semiconductors: Carrier transport, Carrier drift, Carrier diffusion, Generation and recombination process (qualitative), Classification of materials based on energy diagram.

UNIT II

Modern Physics: Dual nature of light, Matter waves and Debroglie's hypothesis, Davisson & Germer experiment, Heisenberg's uncertainty principle and its applications (Non existence of electron in nucleus, Finite width of spectral lines), Classical and quantum aspects of particle. One dimensional time independent Schrodinger's wave equation, physical significance of wave function, Particle in a box (One dimension).

Optoelectronic Devices: LED, LCD, Photo emission, Photo diode, Photo transistor and Solar cell and its applications.

UNIT III

Superconductors and Advanced Physics:

Superconductivity: Introduction, Critical parameters, Flux quantization, Meissner effect, Types of Superconductors, BCS theory, Cooper pairs, London's equation-penetration depth, high temperature super conductors, Applications of superconductors.

Advanced physics: Lasers: Spontaneous emission, stimulated emission, population inversion, Solid state (Ruby) laser, Gas (He – Ne) laser, Semiconductor (Ga As) laser, Applications of lasers, applications of Infrared radiation.

Fiber optics: Propagation of light through optical fiber, types of optical fibers, Numerical aperture, Fiber optics in communications and its advantages.

UNIT IV

Nanotechnology: Introduction, Physical & Chemical properties, **Fabrication:** AFM, SEM, TEM, STM, And MRFM. **Production of nanoparticles:** Plasma Arcing, Sol-gel, Chemical vapour deposition. **Carbon nanotubes:** SWNT, MWNT, Formation of carbon nanotubes: Arc discharge, Laser ablation, Properties of carbon nanotubes, Applications of CNT's & Nanotechnology.

Content Beyond the syllabus:

Optics, fiber optics, Magnetic properties, superconductivity, dielectric properties, Thermal properties, Science and technology of nanomaterials.

Learning Resources:

Text Books:

[1] H. a. Resnick, *Physics* vol. Part-II.
[2] G. a. Gupta, "*Engineering Physics."*
[3] Halliday, Resnick and Krane; John Wiley & Son.*"Physics Volume 2 by"*
[4] Dr. P. Appala Naidu & Dr. M. ChandraShekar, *"Applied Physics"*

Reference Books:

[5] S.O.Pillai, *Solid State Physics.*
[6] M.Armugam, *Engineering Physics*

[7] A.S.Vasudeva, *Modern engineering physics.*
[8] P. K. Palanisamy, *Engineering Physics*

Web Resources:

FY2003E
TECHNICAL ENGLISH AND COMMUNICATION SKILLS

Lecture :	2 hrs/ Week	**Internal Assessment:**	30
Tutorial :	-	**Final Examination:**	70
Practical :	2 hrs/ Week	**Credits:**	3

Objectives:

- Professional communication aims to develop Listening, Speaking, Reading and Writing skills in Engineering students' professional development contexts such as projects, competitive exams, organizational communication and soft skills.
- Endeavors to Refurbish and Fortify the Linguistic Awareness and Communicative Competence of the learners by offering insights into various Morphological, Semantic, Syntactic & Stylistic aspects of English Language.
-

Learning Outcomes:

Upon completion of this course, the students will be familiar with:

- Understand the project presentations, competitive exam exercises, organizational communication activities.
- Presentation of project reports, self introduction.
- Participate in GD and interview in work context.
- Collecting of information for project report writing.
- Reading and understanding of the comprehension passages given in competitive examinations.
- Analyzing of a company profile.
- Preparing of project report adhering to proper format.
- Creation of paragraphs and essays using their own ideas.
- Preparation of circulars, minutes of the meetings and curriculum vitae etc.

UNIT I

Written Communication Skills: Description (through Paragraph Writing), Reflection (through Essay Writing), and Persuasion (through indented Letter Writing).

UNIT II

Reading Comprehension: Types of Reading, Sub skills of Reading, Eye span – fixation, Reading Aloud & Silent Reading, Vocalization & Sub-vocalization.

UNIT III

Vocabulary and Functional English: Vocabulary – a basic word list of one thousand words, Functional grammar, with special focus on Common Errors in English, Idioms & Phrasal verbs.

Listening and Speaking: The use of diphthongs, Elements of spoken expression, Varieties of English, Towards accent neutralization.

UNIT IV

Technical Communication Skills: Technical Report Writing (Informational, Analytical & Special reports), Technical Vocabulary.

Content beyond the syllabus:

Writing: Structure-Sentence structure, CV Writing, Writing in Work context-Circulars, Minutes of the meeting.

Learning Resources:

Text Books:

[1] R. Quirk and Longman, *"Use of English,"* 2004.
[2] T. A. J. M. A.V, *"Practical English Grammar,"* 2001
[3] T. E. Berry, *"Common Errors in English,"* 2001.
[4] B.S.Sarma, *Structural Patterns & Usage in English*, th edition ed., 2007.
[5] J. Langan, *College Writing Skills*: McGraw Hill, 2004.
[6] L. e. a. Sellinkar, *English for Academic and Technical Purposes* Newbury House Publishers, 1981.
[7] M. Cutts, *Oxford guide to Plain English*: Oxford University Press, 2004.
[8] V.Sethi and P. V. Dhamija, *Phonetics and spoken English*: Orient Longman, 2004.
[9] M. Raman and S. Sharma, *Technical Communication- Principles and Practice*: Oxford University Press, 2009.

Reference Books :

[10] Cambridge, *"Tony Lynch: Study Listening,"* 2007.
[11] S. Sharma and B. Mishra, *Communication Skills for Engineers and Scientists*.
[12] H. M. Prasad and U. R. Sinha, *Objective English for Competitive Examination*: Tata McGraw – Hill, 2005.

Web Resources :

[13] Web Tutorial by *Vocational Information Center* http://www.khake.com/page66.html
[14] D. o. H. a. S. S. Dr. T. Ravichandran Associate Professor of English, Indian Institute of Technology Kanpur http://home.iitk.ac.in/~trc/
[15] D. o. E. S. Eric Mario de Santis . *Presentation* http://acoustics.aau.dk/~ems/comm/Technical%20English%20Communication.ppt

FY2004EN
ENVIRONMENTAL SCIENCE

Lecture :	3Hrs/Week	**Internal Assessment:**	25
Tutorial :	1 Hr/Week	**Final Examination:**	75
Practical :	--	**Credits:**	3

Objectives:

- Aims to study about the environment and provides a solution of environmental problems.
- Helps to develop an integrated, quantitative and interdisciplinary approach to the study of environmental systems.

Learning outcomes : **Upon completion of this course, the students will be familiar with:**

- Thinking about environmental issues from an interdisciplinary perspective.
- Global climatic changes that occur.
- Analyzing the fresh water ecosystem.

UNIT I

Introduction: Definition, Scope and Importance of Environmental Sciences, Present global issues

Natural resources management: Forest resources–use and over exploitation, Mining and Dams, their effects on Forest and Tribal people.

Water resources-Use and over utilization of surface and ground water, Floods, Droughts, Water logging and Salinity, Water conflicts.

Energy resources- Energy needs renewable and Non renewable Energy sources, use of alternate Energy sources, Impact of Energy use on Environment.

UNIT-II

Ecosystems: Introduction, characteristic features, structure and functions of Ecosystem – Forest, Grass land, Desert, Aquatic.

Biodiversity and Conservation: Value of Biodiversity- Consumptive and Productive use, Social, Ethical, aesthetic and option values, Bio-geographical classification of India- India as a mega diversity Habitat, Threats to Biodiversity- Hot spots, Habitat Loss, Poaching of Wildlife, loss of species, seeds, etc., In-situ and Ex- situ conservation of Biodiversity.

UNIT III

Environmental Pollution: Causes, effects and control measures of Air pollution, Indoor Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution.

Solid waste management: Urban, Industrial, nuclear and e-waste management.

UNIT IV

Information technology and Environment: Role of information technology in environmental sciences.

Social issues and Environment: Effects of human activities on the Quality of Environment: Urbanization, Transportation, Industrialization, Green revolution, Water scarcity and Ground water depletion.

Population growth and Environment: Environmental Impact Assessment.

Environmental Acts: Water (Prevention and control of pollution) act, air (prevention and control of pollution) act, Environmental Protection Act, Forest conservation act.

Content beyond the syllabus:
Ecosystem: Solar Radiation, Productivity, Food Chains and Food Webs, Metabolism and Size of Individuals, Carrying Capacity, Complexity, Sustainability, Net energy, Energy Futures, Money

Learning Resources

Text Books:

[1] AnjaneyuluY, *Introduction to Environmental sciences*. Hyderabad: B S Publications .
[2] Anjireddy.M, *Environmental science & Technology*. Hyderabad: BS Publications.
[3] B. Joseph, *Environmental Studies.* New Delh: Tata McGraw- Hill, 2005.
[4] P. V. G. Rao, *Principles of Environmental Science. & Engg*. New Delhi: Prentice-Hall of India 2006.
[5] R. G. Santosh Kumar Garg and o. R. Garg, *Ecological and Environmental Studies.* New Delhi: Khanna Publishers, 2006.
[6] K. J. R. Nagendran, *Essentials of Environmental Studies*: Pearson Education publishers, 2005.
[7] O. E. P. a. B. G. W., *Fundamentals of Ecology*: Thomson Brooks/Cole, 2005

Reference Books:

[8] A. K. Dee, *Environmental Chemistry:* New Age India.
[9] B. Erach: Mapin Publishing.

Web Resources :

[10] S. Dutch. *Environmental Science Notes and Visual Aids.* http://www.uwgb.edu/dutchs/EnvSC102Notes.HTM
[11] D. J. R. Anderson. *Environmental Science.* http://facstaff.gpc.edu/~janderso/world.htm
[12] G. Ritchison. *Environmental Sciences.* http://people.eku.edu/ritchisong/envscinotes1.html

FY 2005
PROGRAMMING IN C

Lecture	**:**	3 Hrs/week	**Internal Assessment:**	30
Tutorial	**:**	1 Hr/week	**Final Examination:**	70
Practical	**:**	-	**Credits:**	3

Objectives:

- Aims at fundamental concepts of C programming.
- Can learn more challenging aspects of pointers, arrays, structures and defined types.
- Can enable to understand and use standard C libraries.
- Enables to work with the GNU C compiler and debugger.
- To provide basic idea in memory allocation
- Can enable to Modular programming.
- Provides an understanding of high level language to meet business and technical requirements.

Learning Outcomes: **Upon completion of this course the students will be familiar with:**

- Implementation and usage of variables.
- Listing and can describe C operators.
- Implementation of conditional statements, looping constructs.
- Creation and Implementation of procedures.
- Error handling.

UNIT I

Constants, Variables and Data Types: Character Set, Keywords and Identifiers, Constants, Variables, Data Types, Declaration of Variables, Assigning values to Variables, Declaring variable as a constant.

Operators and Expressions: Introduction, Arithmetic Operators, Relational Operators, Logical Operators, Increment and decrement operators, Conditional Operators, Bitwise Operators Special Operators. Precedence of Arithmetic Operators.

Managing Input and Output Operations: Introduction, reading a character, writing a character, formatted I/O.

UNIT II

Decision Making and Branching: Introduction, Decision making with IF statement, Simple IF Statement, the IF ELSE Statement, Nesting of IF ELSE Statement. The ELSE IF Ladder, The Switch Statement, the GOTO Statement, break and continue.

Decision Making and Looping: Introduction, the WHILE statement, the DO Statement, the FOR statement, Jumps in Loops.

UNIT III

Arrays: Introduction, One Dimensional Arrays, Declaration of one dimensional arrays, Initialization of one dimensional array, two-dimensional arrays, initializing two dimensional arrays,

multi dimensional arrays.

Character Arrays and Strings: Introduction, Declaring and Initializing string variables. Reading strings from Terminal. Writing string to screen. Arithmetic operations on characters. Putting strings together, Comparison of two strings, string handling functions.

User Defined functions: Introduction, user defined functions, storage classes, a multi function program, elements of user defined functions, definition of functions, return values and their types, function calls, function declaration, parameter passing techniques, recursion.

UNIT IV

Structures and Unions: Introduction, Defining a structure, Declaring structure variables, Accessing structure members, Structure initialization, Operations on individual members, Unions.

Pointers: Introduction, Understanding Pointers, Accessing the address of the variable, Declaring pointer variables, Initialization of pointer variables, Accessing a variable through its pointer.

File Management in C: Introduction, Defining and Opening a file, Closing a file, Input/Output Operations on files, Pre processor directives and macros.

Content beyond the syllabus:

Derived types, Searching, Introduction to Data Structures and trees.

Learning Resources:

Text Book:

[1] Balagurusamy, Programming in ANSI C 4ed.: TMH, 2009.

Reference Books:

[2] B. Gottfried, *Programming with C (Schaum's Outlines)* Tata Mcgraw-Hill.
[3] Kernighan and Ritchie, *The C programming language*: Prentice Hall.
[4] Venugopal, *et al., Programming with C*: TMH.
[5] B.A. Forouzan and R.F. Gilberg, *A structured programming approach using C*, Third edition, Thomson.
[6] A.S.Tanenbaum, Y. Langsam, and M.J. Augenstein, *DataStructures Using C,* PHI/Pearson education.

Web resources:

[7] Kernighan and Ritchie. *The C Programming Language*.http://c-faq.com/~scs/cclass/krnotes/top.html
[8] S. Summit. *Introductory C Programming Class Notes*.http://www.eskimo.com/~scs/cclass/notes/top.html
[9] S. Holmes. *C Programming University of Strathclyde Computer Centre*. http://www.neu.edu.cn/cxsj/materal/otherc/imada/

FY 2007G
ENGINEERING GRAPHICS

Lecture :	2 hrs/ Week	**Internal Assessment:**	30
Tutorial :	-	**Final Examination:**	70
Practical :	6 hrs/ Week	**Credits:**	5

Objectives:

- To visualize and communicate all geometrical elements
- Aims to understand the fundamentals of geometry like engineering curves, planes, solids, sections, developments & isometric views and its applications in the daily life.

Learning Outcomes: **Upon completion of this course, the student will be familiar with:**

- Thorough knowledge of various Geometrical Elements used in Engineering Practice.
- Insight into the Concepts of all 2D elements like Conic Sections and 3D Objects like various Prisms, Cylinders, Pyramids and Cones.
- Understanding of the Projections of various objects and their representations with dimensioning.
- The Concept of Isometric Projections that helps in visualization of any object.

UNIT I

General: Use of Drawing instruments, Lettering - Single stroke letters, Dimensioning, Representation of various type lines - Geometrical Constructions.
Scales: Construction and use of plain and diagonal scales.
Conic Sections: conic sections - general construction method for ellipse, parabola and hyperbola, Special methods for conic sections.
Curves: Curves used in Engineering practice - Cycloidal curves - Cycloid, Epicycloid and Hypocycloid; Involute of circle.

UNIT II

Method of Projections: Principles of projection - First angle projection and third angle projection of points and straight lines.
Projection of Planes: Projections of planes of regular geometrical lamina.

UNIT III

Projections of Solids: Projections of simple solids such as Cubes, Prisms, Pyramids, Cylinders and Cones with varying positions.
Sections of Solids: Sections of solids such as Cubes, Prisms, Pyramids, Cylinders and Cones, true shapes of sections. (Limited to the Section Planes perpendicular to one of the Principal Planes).

UNIT IV

Development of Surfaces: Lateral development of cut sections of Cubes, Prisms, Pyramids, Cylinders and Cones.

Isometric Projections: Isometric Projection and conversion of Orthographic Projections into isometric views. (Treatment is limited to simple objects only). Introduction to Isometric Projections to Orthographic Projections.

Content Beyond the syllabus:

Learning Resources:

Text Book:

[1] N. D. B. V. M. Panchal, *Elementary Engineering Drawing*, Forty-Ninth ed.: Charotar Publishing House, Anand, 2006.

Reference Books:

[2] K. L. N. P. Kannaiah. and *Text Book on Engineering Drawing* vol. Second Edition – fifth reprint 20006: Scitech publications(India) Pvt. Ltd., Chennai

Web Resources :

FY2051P
ENGINEERING PHYSICS LABORATORY

Lecture :	-	**Internal Assessment:**	25
Tutorial :	-	**Final Examination:**	50
Practical :	3 Hrs/week	**Credits:**	2

Objectives:

- Will be able to demonstrate competency and understanding of the basic concepts found in physics.
- Helps to understand physics in engineering and how it is designed practically in seeking innovative careers in today's technological age.

Learning Outcomes: **Upon completion of the course, the student is familiar with :**

- Understanding important concepts of physics through involvement in the experiments by applying theoretical knowledge.
- Recognizing the ideas applied in physics.

Minimum of 8 Experiments to be Completed out of the following

1. AC Sonometer – Verification of Laws
2. Sensitive Galvonometer –Figure of merit
3. Photo tube-study o f V-I Characteristics,determination of work function
4. Torsional Pendulum-Rigidity modulus calculation
5. Variation of magnetic field along the axis of current-carrying circular coil
6. Fibre Optics-Numerical aperture calculation
7. Compound pendulum-Measurement of 'g'
8. Solar cell – Determination of Fill Factor
9. Losses in Optical Fibres
10. LCR circuit-Resonance
11. Newton's Rings-Radius of curvature of plano convex lens
12. Hall effect- Study of B & I Variation
13. Photovoltaic cell-Energy gap
14. Measurement of thickness of a foil using wedge method
15. Diffraction grating-Measurement of wavelength

Learning Resources:

Text books:

[1] Indu Prakash & Rama Krishna, *practical physics* vol. vol.1.
[2] D. K. M. J.C. Mohanty, *University practical physics*: Kalyani publishers, Delhi.

Reference Books
[3] D P Khandelwal, *A laboratory manual of Physics*: vani educational books, Delhi.
[4] D. K. V. R. Dr. Y.Aparna, *Laboratory manual of engineering Physics*: VGS Publications,Vijayawada.

Design Experiments:

Reflection and mirrors, Thermal Conductivity and Electromagnetic induction

FY2052
C PROGRAMMING LABORATORY

Lecture :	-	**Internal Assessment:**	25
Tutorial :	-	**Final Examination:**	50
Practical :	3 Hrs/week	**Credits:**	2

Objectives:

- Aims at learning fundamental concepts of C programming.
- Helps to motivate in programming aspect with more challenging aspects of pointers, arrays, structures and defined types.
- To provide basic idea in memory allocation.
- Enables to understand Standard C libraries as well as how to work with the GNU C compiler and debugger.
- Provides an understanding of high level language to meet business and technical requirements.

Learning Outcomes: **Upon completion of this course, the student will be familiar with to:**

- Usage and Implementation of variables.
- Listing and usage of C operators.
- Implementation of conditional statements, looping constructs.
- Creation and implementation of procedures.
- Modular programming.
- Error Handling.

List of Lab Exercises

Week 1

1. Write a C-Program to perform the simple arithmetic operations.
2. Write a C-Program to calculate area and circumference of the triangle and rectangle.
3. Write a C-Program to swap the two numbers without using third variable.

Week 2

1. Write a C-Program to find the biggest of the given three numbers.
2. Write a C-Program to find the roots of the given quadratic equation.
3. Write a C-Program to implement the calculator application (using switch)

Week 3

1. Write a C-program to convert given Decimal number to Binary number.
2. Write a C-Program to check the given number is Palindrome or not.
3. Write a C-Program to check the given Armstrong or not.

Week 4

1. Write a C-Program to find the sum first N natural numbers.

2. Write a C-Program to generate the Fibonacci series.

   Ex: 0,1,1,2,3,5,8,13,21,n^i , n^{i+1} , $n^i + n^{i+1}$

3. Write a C-Program to print the prime numbers between 1 to N.

Week 5

1. Write a C-Program to find the biggest and smallest numbers in the given array.

2. Write a C-Program to find the sum, mean and standard deviation by using arrays.

Week 6

1. Write a C-program to remove duplicate elements in the given array.

2. Write a C-program to insert an element at the specified location of the array.

3. Write a C-program to store the polynomial using arrays and differentiate it.

Week 7

1. Write a C-Program to perform the Matrix addition, subtraction and multiplication using arrays.

2. Write a C-Program to print the transpose of the given Matrix without using the second matrix.

Week 8

1. Write a C-Program to find the given element is existing in the given list or not.

2. Write a C-Program to arrange the given elements in the ascending order.

Week 9

1. Write a C-Program to check the given string is Palindrome or not.

2. Write a C-Program to perform the following operations with and without using String handling functions

   i) Length of the string

   ii) ii) Reverse the given string

   iii) Concatenate the two strings

   iv) iv) Compare the two strings

Week 10

1. Write a C-Program to swap the two number using call by value and call by reference.

2. Write a C-Program to find the factorial of the given number using recursion.

3. Write a Program to find NCR using functions.

4. W rite a Program to find Mean and standard deviation of a given set of numbers.(Define functions for mean and standard deviation)

Week 11

1. Write a 'C' program to read name of the student, roll number and marks obtained in subjects from keyboard and print name of the student, roll number, marks in 3 subjects, and total marks by using structures concept.

2. Write a C-program to count number of characters, spaces, words and lines in given file.

3. Write a 'C' Program to copy the contents of one file into another file.

Text Book:

[1] Balagurusamy, *Programming in ANSI C* 4ed.: TMH, 2009.

Reference Books:

[2] B. Gottfried, *Programming with C (Schaum's Outlines)* Tata Mcgraw-Hill.
[3] Kernighan and Ritchie, *The C programming language*: Prentice Hall.
[4] Venugopal, *et al., Programming with C*: TMH.

Design Experiment :

To design an UNIX compiler in C language

IT 3001
ENGINEERING MATHEMATICS – III

Lecture :	4 hrs/ Week	**Internal Assessment:**	30
Tutorial :	1 hr/ Week	**Final Examination:**	70
Practical :	-	**Credits:**	4

Objectives:

- To determine the Laplace transforms in function of time.
- To understand Inverse Laplace transformation.
- To understand convolution theorem and to solve differential equations.

Learning Outcomes: **Upon completion of this course, the student will be familiar with**

- Solve initial value problems using Laplace Transforms.
- Fourier series expansions of a function given analytically, numerically, graphically.
- Compute Fourier transforms and their inverse transforms for given functions. Evaluate improper integrals and solve integral equations.
- Solve algebraic and transcendental equations numerically. Solve system of equations.
- Differentiate and integrate the functions given numerically.
- Solve boundary value problems.

UNIT I

Laplace Transforms: Definition and basic theory – Linearity property – condition for existence of Laplace transform. First & Second Shifting properties, Laplace Transform of derivatives and integrals; Unit step functions, Dirac delta-function. Differentiation and Integration of transforms, Convolution Theorem, Inversion. Periodic functions. Evaluation of integrals by Laplace Transform. Transforms of periodic function. Unit impulse function (Dirac delta function). Convolution and Duahamel formulae. Applications to differential equations with constant coefficients, variable coefficients, simultaneous equations.

UNIT II

Fourier Series: Introduction, Euler's Formulae, Conditions for a Fourier expansion, Functions having points of discontinuity, change of interval, odd and even functions, Expansions of odd and even periodic functions, Half - range series, Parseval's formula, complex form of Fourier series, Practical harmonic analysis.

UNIT III

Fourier Transforms: Introduction, Definition, Fourier integrals, Fourier sine and cosine integrals - complex form of Fourier integrals. Fourier transforms, Fourier sine and cosine transforms - Finite Fourier sine and cosine transforms, Fourier transforms of the derivatives of a function.

Numerical Methods: Solution of Algebraic and Transcendental Equations : Introduction, Bisection method, Method of false position, Newton - Raphson method, Solution of simultaneous linear equations - Gauss - Seidel iterative method.

UNIT IV:

Numerical Differentiation and Integration: Finding first and second order differentials using Newton's formulae. Trapezoidal rule, Simpson's rule, Numerical solutions of ordinary and partial differential equations, Euler's method, Taylor's series method, Picard's method. Runge - Kutta method of 4th order (for first order equations only). Boundary value problems, Solution of Laplace's and Poisson's equations by iteration.

Content Beyond the syllabus:

Learning Resources:

Text Book:

[1] Dr.B.S.Grewal**,** Higher Engineering Mathematics**,** 40th Edition ed.: Khanna Publishers.

Reference Books:

[2] Krezig, Advanced Engineering Mathematics 8th Edition ed.: John Wiley & Sons (Asia), 2001.

IT 3002
BASIC ELECTRICAL ENGINEERING

Lecture :	4 hrs/ Week	**Internal Assessment:**	30
Tutorial :	-	**Final Examination:**	70
Practical :	-	**Credits:**	4

Objectives:

- To give the basic fundamentals of the electrical engineering.
- To enhance the theoretical knowledge about basics of electrical engineering for the student.
- To provide the knowledge to write and coding the program for controlling electrical elements like motors and power plants (power generating stations).

Learning Outcomes:

Up on completion of this course students will be familiar with:

- Identify the basic elements of the electric engineering.
- Explain the Basic characteristics of deferent electrical elements each method.
- Explain about different parts of typical electrical machines.
- Implement the software programming and coding for controlling the electrical elements.

UNIT I

Introduction to Electrical Engineering: Essence of electricity, Electric field; electric current, potential and potential difference, electromotive force, electric power, ohm's law, basic circuit components, electromagnetism related laws, Magnetic field due to electric current flow, force on a current carrying conductor placed in a magnetic field, Faradays laws of electromagnetic induction. Types of induced e.m.f, Kirchhoff's laws. Simple problems.

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

UNIT II

Magnetic Circuits: Basic definitions, analogy between electric and magnetic circuits, Magnetization characteristics of Ferro magnetic materials, self inductance and mutual inductance, energy in linear magnetic systems, coils connected in series, attracting force of electromagnets.

Alternating Quantities: Principle of ac voltages, waveforms and basic definitions, Relationship between frequency, speed and number of poles, root mean square and Average values of alternating currents and voltage form factor and peak factor, phasor Representation of alternating quantities, the J operator and phasor algebra, analysis of Ac circuits with single basic network element, single phase series circuits, single phase Parallel circuits, single phase series parallel circuits, power in ac circuits.

UNIT III

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

Direct current machines: Principle of operation of dc machines, armature windings, E.m.f equation in a dc machine, Torque production in a dc machine, Operation of a dc Machine as a generator, operation of a dc machine as a motor.

UNIT IV

A.C Machines: Three phase induction motor, principle of operation, slip and rotor Frequency, torque (simple problems). **Synchronous Machines:** Principle of operation, E.m.f. equation (Simple problems on e.m.f.).

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

Content Beyond the syllabus:

Learning Resources:

Text Book:

[1] T. K. Nagasarkar and M. S. Sukhija, Basic Electrical Engineering Oxford University Press.
[2] U. A. Bakshi and U. V. Bakshi, Basic Electrical Engineering.
[3] M.S.Naidu and S. Kamakshiah, Basic Electrical Engineering TMH.
[4] V. K. MEHTA Principles of electronics, 11 ed.: S.CHAND.

Reference Books:

[5] Kothari, et al., Theory and solutions of Basic Electrical Engineering PHI.
[6] B. L. Thereja, Electrical Technology
[7] J. B. Guptha, Theory of Electrical machines
[8] V. David, et al., Essentials of Electrical and Computer Engineering Irwin Pearson.

Web Resources:

[9] N. K. De Electrical Engineering web course NPTEL. http://nptel.iitm.ac.in/courses/Webcoursecontents/IIT%20Kharagpur/Basic%20Electrical%20Technology/New_index1.html
[10] T.S.Natarajan. Basic Electronics lectures.

IT 3003
DISCRETE MATHEMATICAL STRUCTURES

Lecture :	3hrs/ Week	**Internal Assessment:**	30
Tutorial :	1hr/week	**Final Examination:**	70
Practical :	-	**Credits:**	3

Objectives:

- Determine the given inference pattern is valid or not.
- Describe the properties of summations and products.
- Construct Hasse diagrams for partially ordered sets.
- Determine whether a graph contains an Euler path or circuit.

Learning Outcomes: **Upon completion of this course the student will be able to:**

- Write a correct formal proof.
- Apply set identities, relations and properties to prove mathematical statements.
- Find equivalence classes of a given relation on a set.
- Distinguishing between correct an incorrect operations.
- Use ordinary generating functions to count unordered selections with restrictions.
- Find the transitive closure of a relation by using Warshall's algorithm.
- Identify isomorphism invariants of graphs.

UNIT I:

Fundamentals of Logic: Propositions, Connectives, Propositional functions, Truth tables, Tautology, Contradiction, Logical equivalences, Normal forms, Logical inferences, Methods of proof of an implication.

UNIT II:

Basics of Counting: Sum and Product rules, indirect counting, One to One correspondence, Combinations and Permutations, Enumerating Combinations and Permutations with and without repetitions.

Advanced Counting Techniques: Generating function of Sequences, Recurrence relations, Solving recurrence relations-Substitution-Generating functions-The method of Characteristic roots, Solution of In-homogeneous recurrence relations.

UNIT III:

Relations and Directed graphs, Special properties of binary relations, Equivalence relation, Partially ordered sets, Hasse diagrams, Lattices, Operations on relations, Paths and Closures, Directed graphs and Adjacency matrices, Warshall's algorithm- Transitive closure.

UNIT – IV:

Basic concepts, Sum of degrees theorem, Isomorphism and sub graphs, Planar graphs, Euler's formula, Multi graphs and Euler circuits, Hamiltonian graphs, Grin-bergs theorem, Graph coloring, Chromatic numbers.

Content beyond the syllabus:

Predicate Calculus, Algebraic Structures, Boolean Algebra and Logic Gates, Graph Theory, Algorithms, Posets and Network etc.

Learning Resources

Text Books:

[1] Mott, et al., Discrete Mathematics for Computer Scientists & Mathematicians: PHI, 2003.

[2] Trembly and Manohar, Discrete Mathematical Structures with Applications to Computer Science: TMH, 1997.

Reference Books:

[3] Rosen, Discrete Mathematics and Its Applications, 4 ed.: WCB, McGraw-Hill, Boston, Massachusetts, 1999.

[4] E. A. Bender and S. G. W. Dover, A Short Course in Discrete Mathematics, 2005.

[5] Bogart, et al., Discrete Mathematics for Computer Science: Key College Publishing, Emeryville, California, 2006., 2006

Web Resources:

[6] (20 January). lecture videos and notes from the University of Colorado. Available: http://cmes.uccs.edu/Fall2008/Math215/archive.php

[7] Prof. Kamala Krithivasan. 21 January). Lectures. Available

IT 3004
DATA STRUCTURES

Lecture	**:**	4 hrs/ Week	**Internal Assessment:**	30
Tutorial	**:**	1 Hr/Week	**Final Examination:**	70
Practical	**:**	-	**Credits:**	4

Objectives: The objective of the course is to introduce the fundamentals of Data Structures, Data Abstract concepts and how these concepts are useful in problem solving.

- To learn the process of abstraction using a programming language.
- To analyze step by step and develop algorithms to solve real world problems. Implementing various data structures viz. Stacks, Queues, Linked Lists, Trees and Graphs.
- To learn various searching and sorting techniques.
- To be able to carry out the Analysis of various Algorithms for mainly Time and Space Complexity.

Learning Outcomes: **Up on completion of this course, students will be familiar with**

- Comprehend the terms "abstract data type", and "data structures", and how data structures and algorithms have to be blended carefully to obtain efficient implementations.
- Implementation of stacks, queues and linked lists, trees, Graphs and their applications.
- Ability to decide the appropriate data type and data structure for a given problem.
- Ability to select the best algorithm to solve a problem by considering various problem characteristics such as the data size, the type of operations, etc.

UNIT I:

Introduction: Basic Concepts, Algorithm Specification Data Abstraction, Performance Analysis-Time complexity, Space complexity.

Stacks: Definition and examples, Representing stacks, Examples: Infix, Postfix, and Prefix, Recursion, Towers of Hanoi problem.

Queues: Queue and Its Sequential Representation, Queue as an abstract data type, implementation of queues, insert operation, circular queue, implementation and operations.

Linked lists: Singly Linked Lists and Chains, Representing Chains, linked stacks and queues, polynomials, additional list operations sparse matrices, Doubly Linked List, Circularly Linked List, Operations on a Circular Linked List. Insertion, deletion, traversal.

UNIT II:

Trees:

Introduction: Terminology, Representation of Trees

Binary Trees: Properties of binary trees, binary tree representation, Complete Binary Tree, Expression trees construction and evaluation.

Binary Tree Traversals: Inorder, Preorder and Postorder – recursive and non-recursive.

Binary Search Trees: Definition, searching a Binary Search Trees (BST), Insertion into a binary search tree, Deletion from a binary search tree, joining and splitting.

UNIT III:

Graphs: Terminology, Graph Representations Adjacency Matrices, Adjacency List, Adjacency Multi list.

Elementary Graph Operations: Depth First Search and Breadth First Search, Connected Component. **Spanning Trees**: Prims and Kruskals algorithms.

Shortest Paths and Transitive Closure: Single Source/All Destination: General weights, All pairs shortest paths, transitive closure.

UNIT IV

Efficient Binary and Multi Search Trees: AVL trees- rotations, insertion and deletion, Introduction to m-way Search Trees, B Trees-insertion and deletion.

Searching: Sequential search, Binary Search, Comparison and analysis.

Sorting: Insertion Sort, Selection Sort, Bubble Sort, Heap Sort, Radix Sort, Practical consideration for Internal Sorting.

Hashing: Hash Function, Collision Resolution Strategies.

Content Beyond Syllabus:

External sorting algorithms, red black trees

Learning resources

Text Book:

IT 3005
COMPUTER ORGANIZATION

Lecture :	4 hrs/ Week	**Internal Assessment:**	30
Tutorial :	-	**Final Examination:**	70
Practical :	-	**Credits:**	4

Objectives:

- To get knowledge on working of digital computer.
- To design modern digital computers.
- To learn the applications of processing Registers.
- To learn memory hierarchy concepts.
- To implement the fixed point and floating point arithmetic operations.

Learning Outcomes: **Upon completion of this course, the Student is familiar with**

- Gain knowledge on Hardware and System Design.
- Be able to write assembly language programming by making use of Instruction set.
- Be able to design micro program control unit.
- Be able identify various hardware and software interrupts and various data transferring modes.

UNIT I:

Digital Logic Circuits: Logic Gates, Boolean Algebra, Map Simplification, Combinational Circuits, Flip-Flops, Sequential circuits.

Digital Components: Decoders, Multiplexers, Registers, Counters.

Data Representation: Data Types, Complements, Fixed Point Representation, Floating Point Representation, Error Detection Codes.

UNIT II:

Register Transfer and Micro-Operations: Register Transfer Language, Register Transfer, Bus and memory Transfers, Arithmetic Micro-operations, Logic Micro-operations, Shift Micro-operations, Arithmetic Logic Shift Unit.

Basic Computer Organization and Design: Instruction codes, Computer Registers, Computer Instructions, Timing and Control, Instruction cycle, Memory-Reference Instruction, Input-Output and Interrupt, Design of Basic Computer.

UNIT III:

Micro Programmed Control: Control Memory, Address Sequencing, Micro-Program example, Design of Control Unit.

Central Processing Unit: General register Organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control.

UNIT IV:

Computer Arithmetic: Addition and Subtraction, Multiplication Algorithms, Division Algorithms, Floating-point Arithmetic operations.

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

Input-Output Organization: Peripheral Devices, Input-output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, Direct Memory Access (DMA).

Content Beyond the syllabus:

Reduced Instruction Set Computer-RISC Characteristics, CISC Characteristics.

Learning Resources:

Text Book:

[1] M. Moris. Mano, Computer Systems Architecture, 3rd edition ed.: ,Prentice Hall India, 2007.

Reference Books:

[2] V. Carl Hamachar, Computer Organization: McGraw Hill.
[3] J. P. Hayes, Computer Architecture and Organization: TMH.

Web Resources:

[4] P. S. Raman. Computer Organization. Available
[5] P. S. Raman. Lecture Series on Computer Organization Availab

IT 3006
PRINCIPLES OF OPERATING SYSTEMS

Lecture:	4 hrs/ Week	**Internal Assessment:**	30
Tutorial :	-	**Final Examination:**	70
Practical :	-	**Credits:**	4

Objectives:

- To provides basics of different types of operating systems.
- To cover fundamental operating system abstractions such as Processes, Threads, Files and Semaphores etc.
- To provide knowledge of basic resource managemen
- t techniques (scheduling/ time management, space management) and how they can be implemented.
- To learn the principles of concurrency control methods and synchronization techniques.
- To learn various techniques of memory management.

Learning Outcomes: **Upon completion of this course the student will be able to:**

- Understand and analyze theory and implementation of processes, Resource control.
- Recognize operating system types and structure.
- Learns OS support for processes and threads.
- Understands CPU Scheduling, synchronization and deadlock.
- Know the OS support for virtual memory, disk scheduling, and I/O.

UNIT I:

Introduction: What Operating Systems Do Computer-System Architecture, Operating-System Structure, Operating-System Operations Process Management, Memory Management, Storage Management, Protection and Security, Distributed Systems, Open-Source Operating Systems. **Operating-System Structures**: Operating-System Services, User Operating-System Interface, System Calls, Types of System Calls, System Programs, Operating-System Structure, Virtual Machines, Operating-System Generation. **Processes:** Process Concept, Process Scheduling, Operations on Processes, Inter Process Communication, Examples of IPC Systems.

UNIT II:

Threads: Overview, Multithreading Models, Thread Libraries, Threading Issues. Operating-System Examples. **CPU Scheduling:** Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Thread Scheduling, Multiple-Processor Scheduling, Operating System Examples. **Process Synchronization:** Background, The Critical-Section Problem, Peterson's Solution, Synchronization Hardware, Semaphores, Classic Problems of Synchronization, Monitors, Synchronization Examples.

UNIT III:

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

Memory Management: Background, Swapping, Contiguous Memory Allocation, Paging, Structure of the Page Table, Segmentation. **Virtual Memory:** Background, Demand Paging, Copy-on-Write, Page Replacement, Allocation of Frames, Thrashing.

UNIT IV

File-System Interface: File Concept, Access Methods, Directory and Disk Structure, File System Mounting, File Sharing, Protection. **File-System Implementation:** File-System Structure, File-System Implementation, Directory Implementation, Allocation Methods, Free-Space Management. **I/O Systems:** Overview, I/O Hardware, Application I/O Interface, Kernel I/O Subsystem, Transforming I/O Requests to Hardware Operations, Streams.

Content beyond syllabus

Protection and Security, Multimedia Systems.

Learning Resources:

Text Books:

[1] Abraham Silberschatz, et al., Operating System Concepts, 8 ed.: John Wiley.

Reference Books:

[2] P. Chandra and Bhatt, An Introduction to Operating Systems Concepts and Practice: PHI.

[3] C. Crowley, Operating Systems : A Design-Oriented Approach: Tata McGraw HillCo, 1998.

[4] Stallings and Operating Systems'- Internal and Design Principles, 5 ed.: PHI, 2005.

Web Resources :

[5] C.Surendar. Introduction to OS. Professor of Computer Science, UNITed States. . Available:

[6] P. J. K . . . and U. Berkeley. 20 January). Deadlock/CPU Scheduling. Available: http://freevideolectures.com/Course/2398/Operating-Systems-and-System-Programming-Fall-2009/10#

[7] C. Franklin and D. Coustan. 20 January). Memory Management. Available: http://computer.howstuffworks.com/operating-system7.htm

IT 3051
DATA STRUCTURES LAB

Lecture :	-	**Internal Assessment:**	25
Tutorial :	-	**Final Examination:**	50
Practical :	3 Hrs/Week	**Credits:**	2

Objectives:

- To provide an in-depth knowledge in problem solving techniques and data structures.
- To teach the student to write programs in C to solve the data structure problems.
- To introduce the student to simple linear and non linear data structures such as lists, stacks, queues, trees and graphs.

Learning Outcomes: **Up on completion of this course, students will be familiar with:**

- Familiar to map real world problems into the Programming language.
- Can solve the problems in systematic way.
- Efficiently implement linear, non linear data structures and various searching and sorting techniques.

LIST OF PROGRAMS

Week 1:

1. Write a program to implement the operations on stacks.
2. Write a program for converting a given infix expression to postfix form
3. Write a program for evaluating a given postfix expression

Week 2:

1. Write a program to implement the operations on queues
2. Write a program to implement the operations on circular queues

Week 3:

1. Write a program to implement stack operations using singly linked list.
2. Write a program to implement the operations on doubly linked list.
3. Write a program to implement the operations on circular linked list.
4. Write a program for the representation of polynomials using circular linked list and for the addition of two such polynomials.

Week 4:

Write a program to implement searching techniques.

Week 5:

Write a program to create a binary search tree operations and also implementing the tree traversal techniques using recursion.

Week 6:

Write a program to perform B-tree operations: Insertion into a B-tree and Deletion from a B-tree.

Week 7:

Write a program to perform the following operations: Insertion into an AVL-tree and Deletion from an AVL-tree.

Week 8:

Write a program for finding the Depth First Search of a graph and Breadth First Search of a graph.

Week 9:

Write a program for finding the shortest path from a given source to any vertex in a digraph using Dijkstra's algorithm

Week 10:

Write a program to implement all sorting techniques

- Bubble sort
- Selection sort
- Insertion sort
- Heap sort

Design Experiments:

Applications of Linked List, Dynamic storage management, Generalized list, Garbage Collection and Compaction.

Learning Resources:

Text Book:

[1] Horowitz and Sahni, *Fundamentals of Data Structures in C*, 2 ed.: University Press, 2007.

IT 3052
COMMUNICATION SKILLS LAB

Lecture :	-	**Internal Assessment:**	25
Tutorial :	-	**Final Examination:**	50
Practical :	3 Hrs/week	**Credits:**	1

LIST OF PROGRAMS

1. A Student has to give 3 seminars on the topics given by instructor.
2. A Student has to participate in at least 3 Group Discussions.
3. A Student has to give 3 power point presentations on the topic given by instructor.
4. A Student has to submit Library report on the topic given by Instructor. The guidelines to prepare the library topic are given by the instructor.
5. Pros and Cons extempore talk on two given topics

Learning Resources:

Text Books & Reference Books:

1. Effective Technical Communication, M. Ashraf Rizvi, Tata Mc. Graw-Hill
2. PublishingCompanyLtd.
   A Course in English communication by Madhavi Apte, Prentice-Hall of India, 2007.
3. Communication Skills by Leena Sen, Prentice-Hall of India, 2005
4. Academic Writing- A Practical guide for students by Stephen Bailey, Rontledge, Falmer, London& New York, 2004.
5. English Language Communication : A Reader cum Lab Manual Dr A Ramakrishna Rao
6. Dr GNatanam & Prof SA Sankaranarayanan, Anuradha Publications, Chennai
7. Body Language- Your Success Mantra by Dr. Shalini Verma, S. Chand, 2006.
8. DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice, New Age International (P) Ltd., Publishers, New Delhi.
9. Books on TOEFL/GRE/GMAT/CAT by Barron's/cup
10. IELTS series with CDs by Cambridge University Press.
11. Technical Report Writing Today by Daniel G. Riordan & Steven E. Pauley, Biztantra Publishers 2005.
12. Basic Communication Skills for Technology by Andra J. Rutherford, 2nd Edition, Pearson Education, 2007.
13. Communication Skills for Engineers by Sunita Mishra & C. Muralikrishna, Pearson Education, 2007.
14. Objective English by Edgar Thorpe & Showick Thorpe, 2nd edition, Pearson Education, 2007
15. Cambridge Preparation for the TOEFL Test by Jolene Gear & Robert Gear, 4th Edition.
16. Technical Communication by Meenakshi Raman & Sangeeta Sharma, Oxford University Press.

Design Experiments

Technical Report writing – Types of formats and styles, subject matter – organization, clarity, coherence and style, planning, data-collection, tools, analysis.

IT 4001
PROBABILITY AND STATISTICS

Lecture :	4 hrs/ Week	**Internal Assessment:**	30
Tutorial :	1 hr/ week	**Final Examination:**	70
Practical :	-	**Credits:**	4

Objectives:

- To summarize and present data.
- To describe probability distributions and compute probabilities.
- To conduct point and interval estimation.
- To make inference about populations.
- To apply these concepts in practice with emphasis on engineering applications, design and decision making.

Learning Outcomes: **Upon completion of this course, students will be familiar with**

- Various types of distributions like discrete, continuous, sampling and Inferences concerning means, variances and proportions. The statistical content of Quality Improvement.
- Calculating probabilities of events and expectations of random variables for elementary problems such as games of chance.
- Recognizing situations in which it is appropriate to consider the relevance of the Normal distribution and/or Exponential distribution.
- Recognizing situations in which different approaches to sampling are relevant.

UNIT I

Discrete Distributions: Random variables (discrete and continuous), Expectation, variance and standard deviation of discrete random variable, binomial distribution, poisson distribution.

Continuous Distributions: Expectations, variance and standard deviation of continuous random variable, Normal distribution, Normal approximation to the Binomial distribution, other probability densities, Uniform distribution, log normal distribution, Gamma distribution, Beta distribution and Weitall distribution.

Sampling Distributions: Populations and samples, Sampling distribution of the mean (SD known), Sampling distribution of the mean (SD unknown), Sampling distribution of the variance, Hamilton theorem (without proof). Inverse of a matrix by using Cayley-Hamilton theorem.

UNIT II

Inferences Concerning Means: Point Estimation, Interval Estimation, Bayesian Estimation, Test of Hypothesis, Null Hypothesis and significance tests, Hypothesis concerning one mean, Relation between tests and confidence internals, Operating characteristic curves, Inferences concerning two means.

UNIT III

Inferences Concerning Variances: Estimation of variances, Hypothesis concerning one variance, Hypothesis concerning two variances.

Inferences Concerning Proportions: Estimation of Proportions, Hypothesis concerning one Proportions, Hypothesis concerning several Proportions, The Analysis of r x c Tables, Goodness of fit.

UNIT IV

The Statistical Content of Quality Improvement Programs: Quality Control, Control Charts for Measurements, Control Charts for Attributes.

Applications to Reliability and Life Testing: Reliability, Failure, Time Distributions, The Exponential Model in Reliability.

Content beyond syllabus:

Typographical conventions in mathematical formulae.

Learning Resources:

Text Book:

[1] Richard and Johnson, Probability and Statistics for Engineers: Prentice Hall of India.

Reference Books:

[2] Walpole, et al., Probability & Statistics for Engineers & Scientist, 6 ed.: , Prentice Hall of India/Pearson Education.

[3] P. Chandra and Biswal, Probability and Statistics: Pearson Education/ Prentice Hall of India 2007.

Web Resources:

[4] A. Gupta. Probability and statistics.

[5] Prof. M. Chakraborty Introduction to the Theory of Probability

[6] P. B. K. Dey. Probability and Random Processes

IT 4002
DATABASE MANAGEMENT SYSTEMS

Lecture :	4 hrs/ Week	**Internal Assessment:**	30
Tutorial :	-	**Final Examination:**	70
Practical :	-	**Credits:**	4

Objectives:

- To learn the fundamentals of data models and to conceptualize and depict a database system using ER Model.
- To provide a general introduction to relational model.
- To make a study of SQL and relational database design.
- To know the fundamental concepts of transaction processing- concurrency control techniques and recovery procedure.

Learning Outcomes: **Upon completion of this course, students will be able to:**

- Understand and describe the functional characteristics of a DBMS.
- Design the Databases for different applications.
- Use SQL to create, modify and retrieve relational database.
- Understand the concepts of transaction processing concurrency control techniques and recovery procedures.

UNIT I

Overview of Data base systems: File systems vs DBMS, advantages of a DBMS, Describing and storing data in a DBMS, structure of a DBMS, People who work with databases.

Relational Algebra : Selection and projection set operations, renaming ,Joins, Division Examples of Algebra overviews, Relational calculus, Tuple relational Calculus,Domain relational calculus ,Expressive Power of Algebra and calculus.

SQL : Form of Basic SQL Query, Examples of Basic SQL Queries, Introduction to Nested Queries, Correlated Nested Queries Set, Comparison Operators, Aggregative Operators, NULL values , Comparison using Null values , Logical connectivity's, AND, OR and NOT, Impact on SQL Constructs, Outer Joins, Disallowing NULL values, Complex Integrity Constraints in SQL Triggers and Active Data bases.

UNIT II

Introduction to Database Design: Database Design and ER Diagrams, Entities, attributes, and Entity sets, Relationships and relationship sets, additional features of the ER Model, Conceptual design with ER Model

The Relational Model: Introduction to the Relational model, Integrity constraints over relations, Enforcing Integrity constraints ,Querying relational data, Logical data base Design Introduction to Views ,Destroying /altering Tables and Views.

UNIT III

Schema refinement and Normal Forms: Problems Caused by redundancy Decompositions, Problem related to decomposition, Function Dependencies, reasoning about FDS ,FIRST, SECOND, THIRD Normal forms ,BCNF ,Lossless join Decomposition , Dependency preserving Decomposition , Normalization, Schema refinement in Data base Design, Multi valued Dependencies ,FORTH and FIFTH Normal Form.

UNIT IV

Transaction Management : Transaction Concept, Transaction State, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation, Testing for serializability

Concurrency Control : Lock Based Protocols, Timestamp Based Protocols, Validation-Based Protocols, Multiple Granularity, Deadlock Handling.

Contents Beyond the Syllabus:

Overview of Storage and Indexing:

- Storing Data
- Tree Structured Indexing
- Hash Based Indexing
- Security

Learning Resources:

Text Book:

[1] R. Ramakrishnan, Database Management Systems: Tata McGraw Hill, 2003.
[2] Data base System Concepts, Silberschatz, Korth, McGraw hill, V edition.

Reference Books:

[2] C. J. Date., An Introduction to Database Systems 8ed.: Pearson Education, 2003.
[3] Elmasri and Navathe, Fundamentals of Database Systems, 3 ed.: Addison Wesley, Pearson Education, 2000.
[4] A. S. Henry, et al., Database System Concepts: Tata McGraw-Hill Publications

Web Resources:

[5] S. Sharma. Introduction to DBMS.

[6] P. B. Mahanty. DBMS and RDBMS. http://nptel.iitm.ac.in/video.php?courseId=1128&v=7952RsbAx2w8
[7] R. A.Morelan. SQL. http://youtube.com/watch?v=FCRY-MZNSjA
[8] Prof.D.Janakiram. DBMS. Available: http://www.crazyengineers.com/forum/computer-science-engineering/30296-dbms-video-tutorial.html

IT 4003
Operating Systems: Use and Configuration

Lecture :	3 hrs/ Week	**Internal Assessment:**	30
Tutorial :	2 hrs/ Week	**Final Examination:**	70
Practical :	-	**Credits:**	4

Objectives:

- To write simple shell scripts to perform typical administrative tasks and simple applications.
- To perform the various tasks of user management such as creating shell accounts, user accounts, restricted user accounts, software accounts, group user accounts, etc.
- To perform the various tasks of file system management, package management dealing with compressed files.
- To navigate GNOME and KDE to make the initial settings of the OS.
- To perform GUI management, configure the GUI components, X server etc.
- To configure networking on Linux, Internet mail services, Apache Web server for use.

Learning Outcomes: **Upon completion of the course, the students will be familiar with**

- Demonstrate an ability to identify, formulate and solve problems.
- Demonstrate an ability to design a system, component or process as per needs and specifications.
- Demonstrate skills to use modern engineering tools, softwares and equipment to analyze problems.
- Participate and succeed in competitive examinations.

UNIT I:

Introducing the Windows, Windows Interface, Organizing and Finding Files, Saving, Sharing and Playing Digital Media and Networking.

Tweaking and Tuning and Troubleshooting: Establishing and Monitoring Performance Baseline, Basic strategies for improving performance.

Performing Routine Maintenance: Introducing Action center, Keeping your system secure with Windows update, Checking Disks for Errors, Defragmentation Disks for Better Performance, Managing Disk space.

UNIT II:

Linux Installation: Introduction to Linux, Linux distributions, partitioning, user account creation, Logging in, virtual console creation and permissions.

The Linux Shell and File Structure: The Shell, The Shell Scripts and Programming, Shell Configuration, Linux Files, Directories and Archives.

UNIT III:

GNOME: GNOME 2.x Features, Interface, components and Configuration. KDE: Configuration and Administration Access, KDE Desktop, KDE Menus, Quitting KDE, Accessing System Resources from the File Manager Configuring Your Desktop, Desktop Link Files and URL Locations, KDE Windows, Virtual Desktops, KDE Desktop Pager, KDE Panel.

System Administration and Maintenance: Managing user accounts, file systems, and devices, backup, scheduling jobs, and managing files and directories.

UNIT IV

FTP Servers: Available Servers, FTP Users, Anonymous FTP, FTP User Account, FTP Group, Creating New FTP Users, Anonymous FTP Server Directories, Anonymous FTP Files, Using and Accessing FTP Sites, Configuring Server, Mirroring, Secure FTP Server, Running Configuring, Access Controls, Virtual Hosts, Virtual Users . Professional FTP Daemon: Install and Startup, Authentication, Anonymous Access, Virtual FTP Servers.

Apache Web server: Linux Apache Installations, Apache Multiprocessing Modules, Starting and Stopping the Web Server Apache Configuration Files, Apache Configuration and Directives, Global Configuration, Server Configuration, Directory-Level Configuration, Access Control, URL Pathnames MIME Types, CGI Files, Automatic Directory Indexing, Authentication,. Log Files, Virtual Hosting on Apache, IP-Based Virtual Hosting, Name-Based Virtual Hosting, Dynamic Virtual Hosting.

Content Beyond Syllabus

Windows File Management, Backup Restore and Recovery, Sharing and Synchronizing digital media, Windows Registry, Managing user accounts, passwords and logins, Security and Networking, Troubleshooting Windows Errors and Crashes.

Learning Resources:

Text Book:

[1] C. S. EdBott and C. Sfinson, Windows 7 INSIDE OUT: Microsoft Press, 2010.
[2] R. Petersen, The Complete Reference Linux Sixth Edition: Tata McGraw-Hill, 2008.

Reference Books:

[3] C. Simmons, Windows : A beginner's guide.
[4] N. Wells, Guide to Linux Installation and Administration: Vikas Publishing House, 2000.

Web Resources:

IT 4004

OBJECT ORIENTED PROGRAMMING

Lecture :	4 hrs/ Week	**Internal Assessment:**	30
Tutorial :	1 hr/ week	**Final Examination:**	70
Practical :	-	**Credits:**	4

Objectives:

- To design algorithmic solutions to problems.
- To translate a specified algorithm into correct self-documented C++ code using generally accepted programming style.
- To acquire an understanding of basic object-oriented concepts and the issues involved in effective class design.
- To Write C++ programs that use arrays, structures, pointers, object-oriented concepts such as information hiding, constructors, destructors, inheritance.

Learning Outcomes: **Up on completion of this course, the student should be able to**

- Discuss the fundamentals of C++ and Java object oriented programming languages (OOP).
- Explain classes and abstract classes and objects, abstraction and encapsulation, inheritance, polymorphism, constructors, access control and overloading.
- Solve a given application problem by going through the basic steps of program specifications, analysis, design, implementation and testing within the context of the object-oriented paradigm.

UNIT I

Introduction to OOPS: Need for OOP, differences between OOP and Procedure oriented programming. **Overview of OOP features:** Abstraction, Encapsulation, Inheritance and Polymorphism.

C++ Basics: Introduction to C++, Differences between C and C++, Structure of a C++ program, Data types, Declaration of variables, Expressions, Operators, Operator Precedence, Evaluation of expressions, Type conversions, Pointers, Arrays, Pointers to arrays, Strings, Structures, References. Flow control statements. Functions-Scope of variables, Parameter passing, Default arguments, inline functions, Dynamic memory allocation and de-allocation Operators-new and delete, Preprocessor directives.

UNIT II

C++ Classes and Data Abstraction: Class definition, objects, Class scope, this pointer, Friend functions and classes, Static data members and member functions, Constructors and destructors, Dynamic creation and destruction of objects, Data abstraction and information hiding.

Polymorphism and Inheritance: Function overloading, Operator overloading, Defining a class hierarchy, Different forms of inheritance, access specifiers, Defining the Base and Derived classes, Base and Derived class constructors, Destructors, Virtual base class, Static and Dynamic bindings, Abstract classes, virtual functions, Pure virtual functions, Virtual destructors

UNIT III

The C++ I/O Class Library: C++ streams, The C++ Stream classes, Creating your own inserter and extractors, Formatting I/O, Creating your own manipulator functions, File I/O, Unformatted and Binary I/O.

Miscellaneous C++ Topics: Const member functions and mutable, volatile member functions, Using the asm keyword, linkage specification, The * and ->* operators, Creating conversion functions, Granting access, namespaces, Explicit constructors, type name and export.

UNIT IV

Templates: Generic Functions, Generic classes, ADT.

Exception Handling: Benefits of exception handling, Throwing an exception, The try block, Catching an exception, Exception objects, Exception specifications, Stack unwinding, Re-throwing an exception, Catching all exceptions, Design issues in exception handling.

The standard Template Library: An overview of the STL.

Contents Beyond the Syllabus:

Standard Template Library: List, Vector, Map, Set, Stack and Queue. Several applications of stack queue and tree.

Learning Resources:

Text Books:

[1] H. Schildt, The Complete Reference C++ 4ed.: Tata McGraw-Hill.
[2] Balaguruswamy, Object Oriented Programming in C++ 4ed.: Tata McGraw-Hill.

Reference Books:

[3] H. M. Deitel and P. J. Deitel, C++ How to Program,: Prentice-Hall, 2000.
[4] Nicolai and Josuttis, The C++ Standard Libary - A Tutorial and Reference: Addison-Wesley, 1999.

Web Resources:

[5] C++ language tutorial
http://www.cplusplus.com/doc/tutorial/
[6] P. Muller Introduction to Object-Oriented Programming Using C++.
http://www.desy.de/gna/html/cc/Tutorial/tutorial.html
[7] C++ Programming Language.
http://www.indy.cc.ks.us/pierson/C++/cprogram.htm

IT 4005
BASIC ELECTRONICS

Lecture :	4 hrs/ Week	**Internal Assessment:**	30
Tutorial :	-	**Final Examination:**	70
Practical :	-	**Credits:**	4

Objectives:

- Introduces electronic devices and their applications.
- To understand studies diodes, transistors, unipolar devices, optical devices, feedback and oscillator circuits, power amplifiers, operational amplifier.
- To understand Integrated Circuits and voltage regulators.

Learning Outcomes **Upon completion of this course, the student will be familiar with**

- Basic atomic structure of semi-conductors.
- Construction and characteristics of diodes, bipolar junction transistors (BJTs), field-effect transistors (FETs) and optical devices.
- Operation of basic biasing circuits.
- Analyze, design and describe the operating characteristics of feedback amplifiers oscillators and power appliers.
- Ideal and non-ideal characteristics of operational amplifiers.
- Operation of inverting and non-inverting amplifiers.
- Importance of IC's and their applications.
- Circuit operation of different types of voltage regulation circuits, including series.

UNIT I:

Semi Conductor Diodes: Semiconductor Diode, Resistance levels, Diode Equivalent circuits, Zener diodes, Load line Analysis, Series diode configurations with D.C Inputs, Half-Wave rectification, Full-Wave rectification

Bipolar Junction Transistor: Transistor construction, Transistor operation, Common base configuration. Transistor amplifying action, Common emitter configuration, Common collector configuration, Operating Point, Fixed Bias circuit, Emitter Stabilized Bias circuit, Voltage divider Bias.

UNIT II:

Unipolar Devices: Construction and characteristics of JFETs, Transfer characteristics. Depletion type MOSFETs, Enhancement type MOSFETs, Fixed bias configuration, Self-bias configuration, Uni junction Transistor. **Optical Devices:** Light Emitting Diodes, Liquid Crystal Display, Photo Diodes, Photo Conductive Cells, Solar Cells, Principles of Cathode Ray Tube.

UNIT III:

Feedback and Oscillator Circuits: Feedback concepts. Feedback -Connection types, Barkhaussen Criteria, Phase-Shift Oscillator, Wien Bridge Oscillator, Harteley Oscillator, Colpitts Oscillator.

UNIT – IV:

Operational Amplifiers: Differential and Common Mode operation, Op-Amp basics. Op-Amp specifications, Voltage Summing, Voltage Buffer, Differentiator and Integrator. **Linear I.C's** - Timer IC unit operation. Voltage Controlled Oscillator.
Voltage Regulators: I.C. Voltage regulators.

Learning Resources:

Text Book:

[1] R. Boylestad and L. Nashelsky, Electronic Devices and Circuit Theory, 9 ed.: PHI.

Reference Books:

[2] Milliman and Halkies, Integrated Electronics: Tata McGraw Hill.
[3] S.Salivahanan and Vallavaraj, Electronic Devices and Circuits: Tata McGraw Hill.
[4] N. Bhargava and Kulasresta, Basic Electronics: Tata McGraw Hill
[5] S. Gupta, Electronic devices and circuits: Dhanpat Rai Publications.
[6] V. K. MEHTA Principles of electronics, 11 ed.: S.CHAND.

Web resource:

[7] T.S.Natarajan. 22 January). Basic Electronics lectures. Available:

IT 4051
DATABASE MANAGEMENT SYSTEMS LAB

Lecture :	-	**Internal Assessment:**	25
Tutorial :	-	**Final Examination:**	50
Practical :	3 hr/week	**Credits:**	2

Objectives:

- To understand the concepts of relational model and its applications.
- To gives a comprehensive understanding of using procedural and nonprocedural query language.
- To design databases.
- To practice on DDL,DML,DCL commands
- To program PL/SQL.
- To design forms.

Learning Outcomes: **Upon completion of this course, the student will be able to**

- Understand how to create and place constraints on databases.
- Write simple queries to retrieve data.
- Summarize data by means of group by operation and arranging the records using order by operation.
- Use database privilege operations.
- Write PL/SQL programs for small applications

Week 1:

Data Definition Language (DDL) commands in RDBMS
Data Manipulation Language (DML) and Data Control Language (DCL).

Week 2:

Simple queries: selection, projection, sorting on a simple table.
Small-large number of attributes.
Distinct output values.
Renaming attributes.
Computed attributes
Simple-complex conditions (AND, OR, NOT).

Week 3:

Partial Matching operators (LIKE, %, _, *?).
ASC-DESC ordering combinations.
Checking for Nulls.

Week 4:

Multi-table queries (JOIN OPERATIONS).
Simple joins (no INNER JOIN).
Aliasing tables – Full/Partial name qualification.
Inner-joins (two and more (different) tables).
Inner-recursive-joins (joining to itself).
Outer-joins (restrictions as part of the WHERE and ON clauses).
Using where & having clauses.

Week 5:

Nested queries.
In, Not In.
Exists, Not Exists.
Dynamic relations (as part of SELECT, FROM, and WHERE clauses)

Week 6:

Set Oriented Operations.
Union.
Difference.
Intersection.
Division.

Week 7:

PL/SQL Programming I
Programs using named and unnamed blocks.
Programs using Cursors, Cursor loops and records.

Week 8:

PL/SQL Programming II
Creating stored procedures, functions.

Week 9:

Packages
Exception handling

Week 10:

Triggers and auditing triggers

Content Beyond the Syllabus:
Forms design

Learning Resources:

Text Books :

[1] K. Loney, *Oracle Database 10g The Complete Reference*: Tata McGraw-Hill Publishing Company Limited.
[2] c. Urman, *Oracle 9i PL/SQL Programming*: Tata McGraw-Hill Publishing Company Limited.
[3] P. Bhatia, *et al.*, *Simplified Approach to Oracle*: Kalyani Publishers.

Design Experiments:

IT 4052
OBJECT ORIENTED PROGRAMMING LAB

Lecture :	-	**Internal Assessment:**	25
Tutorial :	-	**Final Examination:**	50
Practical :	3 hr/week	**Credits:**	2

Objectives:

- To provide fundamental knowledge and skills to become proficient in C++ programming.
- To model objects, their behaviors and their relationships.
- To gain programming experience on object oriented programming concepts like encapsulation, inheritance, overloading, polymorphism, Exception Handling, templates.

Learning Outcomes: **Upon completion of this course, the student will be able to:**

- Implements fundamental constructs of OOP-classes, objects and inline functions.
- Understands friend functions to access the private data of a class.
- Implements different forms of Inheritance.
- Virtual functions to realize runtime polymorphism.
- Executes error handling models

List of Lab Programs:

Week 1

a) Write a C++ program to exchange the contents of two variables using a call by value and call by reference.
b) inline functions

Week 2

Define the matrix ADT using a class. The operations supported by this ADT are:
i) Reading a matrix. ii) Printing a matrix. iii) Addition of matrices.
iv) Subtraction of matrices. v) Multiplication of matrices.

Week 3

Design an application for the maintenance of library information system using Static data Members, Static member function, Friend function & Dynamic memory allocation.

Week 4

a) Write a C++ program to generate a Fibonacci series by Operator overloading of (i) Prefix operator (ii) Postfix operator.
b) Write a C++ Program to implement function Overloading.

Week 5

Write a C++ program to implement.
(i) Inserter and extractors (ii) Formatting I/O (iii) File I/O (iv) Unformatted and Binary I/O.

Week 6
Write a C++ program to implement
(i) Single Inheritance (ii) Multiple Inheritance (iii) Hybrid Inheritance

Week 7
Write programs to demonstrate
(i) Virtual functions (ii) Virtual constructor (iii) Abstract base class.
(iv) Pure virtual functions (v) virtual destructor

Week 8
a) Write a C++ program to implement sorting using function templates.
b) Write a C++ program to implement linked list using Class Templates.

Week 9
a) Write a C++ program to implement Queue using Exception Handling
b) Write a C++ program to implement Stack using Exception Handling.

Week 10

Write C++ programs to demonstrate command line arguments
a) Copies one file to another.
b) Counts the characters, lines and words in the Text file.

Learning Resources:

Text Books :
[1] R. Lafore, *Object-Oriented Programming in C++*, 4 ed.: sams publishers

Reference Books:
[2] Savitch, *Problem solving with C++*, 4 ed.: Pearson education.
[3] Dietel and Dietel, *C++ - How to Program*, 4 ed.: Pearson Education.
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Design Experiments

IT 4053

OPERATING SYSTEM LAB

Lecture :	-	**Internal Assessment:**	25
Tutorial :	-	**Final Examination:**	50
Practical :	3 hr/week	**Credits:**	2

Objectives:

- To provides basics of different types of operating systems.
- To provide knowledge of basic resource management techniques (scheduling/ time management, space management) and how they can be implemented.
- To learn various techniques of memory management

Learning Outcomes: **Upon completion of this course the student will be able to:**

- Understand the implementation of different operating systems.
- Understands CPU Scheduling, synchronization
- Know the OS support for I/O.

LIST OF PROGRAMS

Week 1
Administration of Windows 2000(including DNS, LDAP, Directory Services)

Week 2
Administration of LINUX Operating System

Week 3
Program to implement FCFS scheduling algorithm.

Week 4
Program to implement SJF scheduling algorithm.

Week 5
Program to implement Round Robin scheduling algorithm.

Week 6
Program to implement Dining Philosophers Problem using Semaphores.

Week 7
Program to implement Producer Consumer Problem using Semaphores.

Week 8

Program to implement Page Replacement algorithms.

a) FIFO b)LRU c)Optimal

Week 9

Program to implement for shared variables using Monitors.

Week 10

Implement some memory management schemes

for eg:

Free space is maintained as a linked list of nodes with each node having the starting byte address and the ending byte address of a free block. Each memory request consists of the process-id and the amount of storage space required in bytes. Allocated memory space is again maintained as a linked list of nodes with each node having the process-id, starting byte address and the ending byte address of the allocated space.

Learning Resources:

Text Books:

[1] Abraham Silberschatz, et al., Operating System Concepts, 8 ed.: John Wiley.

Reference Books:

[2] P. Chandra and Bhatt, An Introduction to Operating Systems Concepts and Practice: PHI.

[3] C. Crowley, Operating Systems : A Design-Oriented Approach: Tata McGraw HillCo, 1998.

[4] Stallings and Operating Systems'- Internal and Design Principles, 5 ed.: PHI, 2005.

Design Experiments:

IT 5001
DESIGN AND ANALYSIS OF ALGORITHMS

Lecture :	3 hrs/ Week	**Internal Assessment:**	30
Tutorial :	1 hr/ week	**Final Examination:**	70
Practical :	-	**Credits:**	3

Objectives:

- To introduce basic concepts of algorithms.
- To introduce mathematical aspects and analysis of algorithms.
- To introduce sorting and searching algorithms.
- To introduce various algorithmic techniques.
- To introduce algorithm design methods.

Learning Outcomes: **Up on completion of this course, students will be familiar with**

- Good principles of algorithm design,
- Analysing algorithms and estimate their worst-case, average-case and best-case behaviour.
- Variety of Greedy algorithms; basic ingredients of a greedy algorithm approach and arguing the correctness of algorithms.
- Dynamic-programming algorithms, how to apply them via both memorization and tables and recognize when a dynamic programming approach might yield a good solution to a problem.
- Backtracking, Branch and Bound technique, solution of n queen problems and traveling sales problem.
- Some standard NP-Complete problems and know the basics of an NP-hardness

UNIT I

Introduction: Algorithm, Pseudo code for expressing algorithms, Performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big oh notation, Omega notation, Theta notation and Little oh notation, Probabilistic analysis, Amortized analysis. Disjoint Sets, disjoint set operations, union and find algorithms, spanning trees, connected components and biconnected components.

UNIT II

Divide and conquer: General method, applications-Binary search, Quick sort, Merge sort, Strassen's matrix multiplication.
Greedy method: General method, applications-Job sequencing with deadlines, knapsack problem, Minimum cost spanning trees, Optimal storage on tapes, Optimal merge patterns, Single source shortest path problem.

UNIT III

Dynamic Programming: General method, applications-Matrix chain multiplication, Multi stage graph problem, Optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem, Traveling sales person problem.

Backtracking: General method, applications-n-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles, 0/1 knapsack problem.

UNIT IV
Branch and Bound: General method, applications - Traveling sales person problem, 0/1 knapsack problem- LC Branch and Bound solution, FIFO Branch and Bound solution.
NP-Hard and NP-Complete problems: Basic concepts, non deterministic algorithms, NP Hard and NP Complete classes and Cook's theorem.

Content Beyond Syllabus:

Learning Resources:

Text Book:

[1] E. Horowitz*, et al.*, *Fundamentals of Computer Algorithms*: Galgotia Publications Pvt. Ltd.

Reference Books:

[2] M.T.Goodrich and R.Tomassia, *Algorithm Design: Foundations, Analysis and Internet examples*: John Wiley and sons.
[3] T.H.Cormen*, et al.*, *Introduction to Algorithms*, 2 ed.: PHI Pvt. Ltd. / Pearson Education.
[4] A. Weiss, *Data structures and Algorithm Analysis in C++* vol. 2: Pearson Education.

Web Resources

[5] Abhiram.Lecture videos on algorithms
http://nptel.iitm.ac.in/video.php?courseId=1065
[6] Charles. Lecture on Algorithms MIT
http://academicearth.org/courses/introduction-to-algorithms

IT 5002
ADVANCED DATABASE MANAGEMENT SYSTEMS

Lecture	**:**	3 hrs/ Week	**Internal Assessment:**	30
Tutorial	**:**	2 hr/ Week	**Final Examination:**	70
Practical	**:**	-	**Credits:**	4

Objectives:

- To inculcate depth knowledge of indexes.
- To understand Query evaluation plans and estimation of cost.
- To study Advanced database architectures like Distributed, Object Oriented and Parallel databases.
- To analyze various Issues in Database systems performance tuning to improve application speed

Learning Outcomes: **Upon completion of this course the students will be able to understand:**

- Indexed Sequential Access Method (ISAM), B+ tree indices, also understands the impact of index implementation.
- Generate a good evaluation plan for a given query among many alternative plans.
- Transaction management in Parallel, Distributed and Object Oriented Databases.
- Benchmarks to measure commercial database system performance.

UNIT I

Overview of Storage and Indexing : Data on external storage, File Organizations and Indexing, Index Data structures, Indexes and Performance tuning

Storing Data : Disks and Files : Memory Hierarchy, Redundant arrays of independent disks

Tree Structured Indexing : Intuition for tree indexes, Indexed Sequential access method, B+ trees, Search, insert, delete

Hash Based Indexing : Static hashing, Extendible hashing, Linear hashing, Extendible vs Linear hashing

UNIT II

Overview of Query Evaluation : The System catalog, Introduction to operator evaluation, Algorithms for relational operations, introduction to query optimization

Evaluating Relational Operators : The Selection Operation, General Selection Conditions, The Projection Operation, The Join Operation, The Set operations, Aggregate Operations

A Typical Relational Query Optimizer : Translating SQL Queries into Algebra, Relational Algebra Equivalences, Enumeration of Alternative Plans, Nested Subqueries

UNIT III

Recovery System : Failure Classification, Storage structure, Recovery and Atomicity, Log-based Recovery, Recovery with Concurrent Transactions, Buffer Management

Parallel and Distributed Databases : Introduction, Architectures for Parallel Databases, Parallel query evaluation, Parallel query optimization, Introduction to distributed databases, Distributed DBMS Architectures, Storing data in a Distributed DBMS, Distributed Catalog Management, Distributed Query Processing

Object Database Systems : Motivating Example, Structured Data types, Operations on structured data, Encapsulation and ADTs, Inheritance, Objects, OIDs and Reference types, Database design for an ORDBMS, OODBMS, Comparing RDBMS, OODBMS and ORDBMS

UNIT IV

Security and Authorization : Introduction to Database Security, Access Control, Discretionary Access control, Mandatory Access control, Additional issues related to Security

Database Application Development : Accessing databases from applications, an introduction to JDBC, JDBC classes and interfaces, SQLJ, Stored procedures

Internet Applications : Introduction, Internet concepts, HTML documents, XML documents, The three-tier application architecture

Content Beyond Syllabus

Learning Resources:

Text Book:

[1] Raghuramakrishnan, *Database Management Systems,* 5 ed.: TMH.

[2] A. S. Henry F.Korth and S.Sudarshan, *Database System Concepts,* 5 ed.: Tata McGraw-Hill Publications

Reference Books:

[3] Silberschatz, Korth, and Sudarshan, *Database System Concepts*. Sixth ed. 2010: McGraw Hill.

Web Resources

[4] V.k.Jain. (20 January). *Advanced DBMS.* Available: http://media-express-downloads.com/access.php

[5] Z. Ahmer:.(20 January). . *Lecture slides in ADBMS.Data Models* Available: http://www.scribd.com/doc/7235614/Lecture-2-Database-Database-Systems-DBMS

IT 5003
SOFTWARE ENGINEERING

Lecture :	3 hrs/ Week	**Internal Assessment:**	30
Tutorial :	1 hr/ Week	**Final Examination:**	70
Practical :	-	**Credits:**	4

Objectives:

- This course is about problems we face when constructing large software systems. Students will learn about various methodologies used in all parts of the software development life cycle.
- This course explores the principles and practices of software engineering.

Learning Outcomes: **Upon completion of this course the students will be able to understand:**

- It gives an understanding of various process models.
- Talks about various metrics used.
- Talks about phases in software development.
- Discuss about different testings strategies.

UNIT I

Introduction to Software Engineering: The Evolving Role of Software, Software, The Changing Nature of Software, Legacy Software, Software Myths.

A Generic View of Process: Software Engineering - A Layered Technology, A Process Framework, The CMMI, Process Patterns, Process Assessment, Personal and Team Process Models, Process Technology, Product and Process.

Process Models: Prescriptive Models, The Waterfall Model, Incremental Process Models, Evolutionary Models, Specialized Process Models, The Unified Process.

An Agile View of Process: What Is Agility? , What Is an Agile Process? , Agile Process Models.

UNIT II

Software Engineering Practice: Software Engineering Practice, Communication Practices, Planning Practices, Modeling Practices, Construction Practice, Deployment.

Requirements Engineering: A Bridge To Design and Construction, Requirements Engineering Tasks, Initiating the Requirements Engineering Process, Eliciting Requirements, Developing Use-cases, Building the Analysis Model, Negotiating Requirements, Validating Requirements.

Building the Analysis Model: Requirements Analysis, Analysis Modeling Approaches, Data Modeling Concepts, Flow-Oriented Modeling, Creating a Behavioral Model.

UNIT III

Design Engineering: Design within the Context of Software Engineering, Design Process and Design Quality, Design Concepts, The Design Model, Pattern-Based Software Design.

Creating an Architectural Design: Software Architecture, Data Design, Architectural Styles and Patterns, Architectural Design, Assessing Alternative Architectural Designs, Mapping Data Flow into Software Architecture.

Modeling Component-Level Design: What Is a Component? , Designing Class-Based Components, Conducting Component-Level Design, Designing Conventional Components.

Performing User Interface Design: The Golden Rules, User Interface Analysis and Design, Interface Analysis, Interface Design Steps, Design Evaluation.

UNIT IV

Testing Strategies: A Strategic Approach to Software Testing, Strategic Issues, Test Strategies for Conventional Software, Test Strategies for Object-Oriented Software, Validation testing, System testing, The art of debugging.

Testing Tactics: Software Testing Fundamentals, Black-Box and White-Box Testing, White-Box Testing, Basis Path Testing, Control Structure Testing, Black-Box Testing, Object-Oriented Testing Methods, Testing Methods Applicable at the Class Level, Interclass Test Case Design, Testing for Specialized Environments, Architectures and Applications**,** Testing Patterns**.**

Estimation: Observations on estimation, The project planning process, Software project estimation, Decomposition techniques, Empirical estimation models, Estimation for OO Projects, Specialized Estimation techniques, The make/buy decision.

Content Beyond Syllabus:

- Modeling real world systems using different diagrams.
- More detailed study over component and deployment levels of software development.

Learning Resources:

Text Book:

[1] R. S.Pressman, *Software Engineering- A Practitioner's Approach*, 6 ed.: Tata McGraw-Hill International.

Reference Books:

[2] I. Somerville, *Software Engineering'*, 6 ed.: Pearson Education.
[3] C. Ghezzi, *et al.*, *Fundamentals of Software Engineering*, 2 ed.: PHI.
[4] RajibMall, *Fundamentals of Software Engineering*, 2 ed.: PHI.

Web Resources:

[5] 20 January). *Software engineering NPTEL*. Available: http://nptel.iitm.ac.in/video.php?courseId=1076
[6] 15 December). *Soft ware engineering MIT Videos*. Available: http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-912-introduction-to-copyright-law-january-iap-2006/video-lectures/lecture-4-software-licensing

IT 5004
JAVA PROGRAMMING

Lecture	**:**	4 hrs/ Week	**Internal Assessment:**	30
Tutorial	**:**	1 hr/ Week	**Final Examination:**	70
Practical	**:**	-	**Credits:**	4

Objectives:

- Learn the Java programming language: its syntax, idioms, patterns and styles.
- Become comfortable with object oriented programming: Learn to think in objects.
- Learn the essentials of the Java class library, and learn how to learn about other parts of the library when you need them.
- Introduce event driven Graphical User Interface (GUI) programming.

Learning Outcomes:

Upon completion of this course the students will be able to understand

- Compile and run a Java application.
- Understand the role of the Java Virtual Machine in achieving platform independence.
- Navigate through the API docs.
- Use the Object Oriented paradigm in Java programs.
- Understand the division of classes into Java packages.
- Use Exceptions to handle run time errors.
- Select the proper I/O class among those provided by the JDK.
- Use threads in order to create more efficient Java programs.

UNIT I

Introduction: Introduction to Java, Features of Java, Comparison with C++, Keywords, Constants, Variables, Data types, Type conversion, arrays. **Classes and Objects:** Concepts, Methods, Constructors, Usage of static, access control, this keyword, garbage collection, overloading, parameter passing mechanisms, nested classes and inner classes, wrapper classes. **Inheritance:** Basic concepts, access specifiers, usage of super key word, method overriding, final methods and classes, abstract classes, dynamic method dispatch, object class. **Interfaces and Packages:** Defining and Implementing interfaces, creating a package, setting CLASSPATH, Access control protection, importing packages. **Strings:** Exploring the String class, String buffer class, String tokenizer.

UNIT II

Exception Handling: Concepts of Exception handling, types of Exceptions, usage of try, catch, throw, throws and finally keywords, built-in exceptions, creating own exception sub classes. **Multithreading:** Concepts of multithreading, differences between process and thread, thread life cycle, thread class, runnable interface, creating multiple threads, synchronization, thread priorities, Daemon threads. **I/O Streams:** Streams, byte streams, character streams, file class, file streams. **Applets:** Concepts of applets, life cycle of an applet, creating applets, passing parameters to applets, color class and graphics class, handling image, animation.

UNIT III

Event Handling and AWT: AWT Components lay out managers, Events, Event source, Event Classes, Event Listeners, Delegation event model, handling events, file dialog boxes, adapter classes, menu and menu bar. **Swing:** Swing introduction, JApplet, JFrame and JComponent, Icons and Labels, text fields, **Buttons** – the JButton Class, check boxes, Radio buttons, combo boxes, tabbed panes, scroll panes, trees, and tables.

UNIT IV

JDBC Connectivity: JDBC Connectivity, types of JDBC drivers, connecting to the database, JDBC statements, JDBC exceptions, Manipulations on the database, metadata. **Networking:** Basics of Networking, I-net-Address, URL, URL Connection, TCP/IP Sockets, Data-grams, java.net package, Introduction to RMI.

Content Beyond Syllabus

Javax.sql.*, java.io.*, java.lang.* packages, Core java concepts like introspection, persistence.

Learning Resources:

Text Books:

[1] H. Schildt, *The Complete Reference java J2SE,* 7th Edition ed.: TMH Publishing company Ltd, New Delhi.

References:

[2] H. M. D. a. P. J. Diete, *Java How to program,* sixth edition ed.: Pearson education/PHI.
[3] C. S. H. a. G. Cornell, *Core java 2,* Seventh Edition ed.: Pearson Education.
[4] C. S. H. a. G. Cornell, *Core java2,* Seventh edition ed.: Pearson education.
[5] C. Horstmann, *Big Java,* 2nd Edition ed.: john Wiley and Sons, Pearson Edu

Web Resources:

IT 5005
COMPUTER NETWORKS

Lecture :	4 hrs/ Week	**Internal Assessment:**	30
Tutorial :	-	**Final Examination:**	70
Practical :	-	**Credits:**	4

Objectives:

- Learn basic network design problems, and standard computer network architectures.
- Learn simple local area network, metropolitan area network and wide area network technologies.
- Study the basic flow control and error control protocols.
- Study the standard Ethernet LAN technologies.
- Study the basic network routing, control and transport protocols.

Learning Outcomes: **Upon the completion of the course the students will be able to:**

- Understand various standard network models.
- Implement the basic data flow and error control methods.
- Implement the routing protocols.
- Understand different applications in Application layer**.**

UNIT I

Introduction: Uses of Computer Networks, Network Hardware, LANs, MANs, WANs, Network Software**. Reference Models:** The OSI Reference Model, TCP/IP Reference Model, the comparison of OSI, and TCP/IP reference models. **The Physical Layer: Guided transmission media:** Magnetic Media, Twisted Pair, Coaxial Cable and Fiber Optics.

UNIT II

The data link layer: Data link layer design issues, Error detection and correction, Elementary data link protocols and Sliding window protocols**. The Medium Access Control Sub layer:** The channel allocation problem, Multiple access protocols, ETHERNET and Wireless LANs.

UNIT III

The Network Layer: Network Layer Design Issues, **Routing Algorithms:** Shortest Path, Flooding, DVR and Link State routing algorithm, Congestion Control Algorithms and Quality of Service.

UNIT IV

The Transport Layer: The Transport Service, Elements of Transport Protocols, and the Internet Transport Protocols TCP and UDP. **Application Layer:** The Domain Name System (DNS) and E-Mail.

Content beyond Syllabus

Traffic Management: Telephony nets, ATM Networks, Bluetooth, Broadcast Routing, SNMP

Learning Resources:

Text Book:

[1] A. S. Tanenbaum, Computer Networks, 4th Edition ed.: Pearson Education / PHI.

Reference Books

[2] K. Ross, *Computer networks – A Top-down Approach Featuring the Internet*: Pearson Education .

[3] B. A.Forouzan, *Data Communications and Networking* 4th Edition ed.: TATA McGraw Hill

[3] N. F.Mir, *Computer and Communication Networks*: PHI.

[4] S. Kasera, *Atm Networks Concepts and Protocols*: TATA McGraw Hill – Networking Series.

Web Resources:

[5] Lecture Series on Computer networks by Prof. Sujoy Ghosh ,Department of Computer Science And Engineering, IIT NPTEL course,Kharagpur. http://freevideolectures.com/Course/2276/Computer-Networks# accessed on 24/01/2011.

[6] Lecture on Computer Networks by Khurram Khazi,Engineering and computer sciences,Newyork Institue of technology.http://www.iris.nyit.edu accessed on 24/01/2011.

[7] Computer networks by Dheeraj Sanghi,Professor,Computer Sciences,Indian Institute of technology,Kanpur.http://www.cse.iitk.ac.in/users/dheeraj/cs425/ accessed on 24/01/2011.

IT 5006
DISTRIBUTED SYSTEMS

Lecture	4 hrs/ Week	**Internal Assessment:**	30
Tutorial	-	**Final Examination:**	70
Practical	-	**Credits:**	3

Objectives:
- To learn about the distributed computing environment
- To find the problems in distributed systems and the theoretical solutions
- To understand the issues involves in studying data and design distributed algorithms
- To understand in detail the system level and support required

Learning Outcomes: **Upon completion of this course the student will be able to:**
- Understand the concepts of distributed systems
- Understand the complexity of distributed systems environment
- Realize the importance of synchronization, consistency and fault tolerance

UNIT I

Communication in Distributed Environment:
Introduction, Client–Server Paradigm, Threads in Distributed Systems, Remote Procedure Call, Remote Object Invocation, Message-oriented communication, Persistence and Synchronicity in Communication, Message-Oriented Transient Communication, Message-Oriented Persistent Communication, Unicasting Group Communication, Reliable and Unreliable Multicasting.

UNIT II

Distributed Operating Systems: Issues in Distributed Operating System, Clock synchronization, Physical Clocks, Clock Synchronization Algorithms, Use of Synchronized Clocks, Lamport's Logical Clock, Vector Clock, Causal Ordering, Global States, Election Algorithms, Distributed Mutual Exclusion, Distributed Transactions, Distributed Deadlock, Agreement Protocol.

UNIT III

Distributed Shared Memory: Introduction, Data-centric consistency models, Strict Consistency, Linearizability and Sequential Consistency, Causal Consistency, FIFO Consistency, Weak Consistency, Release Consistency, Entry Consistency, Summary of Consistency Models, Client-centric consistency models, Eventual Consistency, Monotonic Reads, Monotonic Writes, Read Your Writes, Writes Follow Reads, Atomic Transaction.

UNIT IV

Fault Tolerance and Distributed File Systems: Introduction to fault tolerance, Basic Concepts Failure Models, Failure Masking by Redundancy, Process resilience, Design Issues, Failure Masking and Replication, Agreement in Faulty Systems, Distributed Commit

Protocol, Distributed File System Architecture, Issues in Distributed File Systems, NFS.

Content Beyond the Syllabus:
An introduction to Grid Computing, Mobile and Ubiquitous Computing, Other Learning Material:

Learning Resources:

Text Book:

[1] Tanenbaum, A.S. and M.V. Steen, *Distributed Systems*. 2004: Pearson Education.

Reference Books:

[2] Coulouris, G., J. Dollimore, and T. Kindberg, *Distributed Systems Concepts and Design*. Third ed. 2002: Pearson Education Asia.

[3] Singhal, M., *Advanced Concepts In Operating Systems*. 1994: McGraw Hill Series in Computer Science.

[4] Liu, M.L., *Distributed Computing Principles and Applications*. 2004: Pearson Addison Wesley.

Web Resources:

[5] Tanenbaum, A.S. and M.V. Steen. *Distributed Systems: Principles and Paradigms*. [cited 2011 20-01]; Available from: http://www.cs.vu.nl/~ast/books/ds1/.

[6] *Distributed Computer System Engineering*. 2006 [cited 2011 20.01]; Available from: http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-824-distributed-computer-systems-engineering-spring-2006/lecture-notes/.

[7] Bellur, P.U. *CS 451 Distributed Systems*. [cited 2011 20.01]; Available from: http://www.cse.iitb.ac.in/~cs451/.

[8] *Computer Science 244b*. [cited 2011 20.01]; Available from: http://www.stanford.edu/class/cs244b/.

IT 5051
JAVA PROGRAMMING LAB

Lecture :		**Internal Assessment:**	25
Tutorial :		**Final Examination:**	50
Practical :	3 hr/ Week	**Credits:**	2

Objectives:

- The Object Oriented concepts like Inheritance, Overloading etc.
- To learn & practice Interfaces and Packages
- To learn &practice Java applet programming, Swings and AWT

Learning Outcomes:

Upon completion of this course the student will be able to:

- Learning outcomes.
- At the end of the course the participant will.
- Implement Object Oriented Programming Concepts.
- Use and create packages and interfaces in a Java program.
- Use graphical user interface in Java programs.
- Create Applets.
- Implement exception handling in Java.
- Implement Multithreading.
- Use Input/Output Streams.
- Handle security implementations in Java.

List of Experiments:

Week 1:

a) Write a Java program that prompts the user for an integer and then prints out all prime numbers up to that Integer.

b) Write a Java program that checks whether a given string is a palindrome or not. Ex: MADAM is a palindrome.

c) Write a Java program for sorting a given list of names in ascending order.

Week 2:

a) Write a Java program to multiply two given matrices.

b) Write a Java program that displays the number of characters, lines and words in a text file.

Week 3:

Write a Java Program, which illustrates the implementation of multiple inheritance using, interfaces in Java.

Week 4:

Write a java program that illustrates the following:
a) Creation of simple package.
b) Accessing a package.

Week 5:

Write a java program that illustrates the following
a) Handling predefined exceptions
b) Handling user defined exceptions

Week 6:

Write a Java program for creating multiple threads by
a) Extending the Thread Class
b) Implementing the Runnable interface.

Week 7:

a) Write an applet that displays a simple message.

b) Write a Java program that allows the user to draw lines, rectangles, polygons.

Week 8:

Write a Java program for handling mouse events and Key events.

Week 9:

Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the + - X % operations. Add a text field to display the result.

Week 10:

Write a Java program that lets users create Pie charts. Design your own user interface (with Swings & AWT).

Learning Resources

Text Books:

[1] H. Schildt, *The Complete Reference java J2SE*, 7th Edition ed.: TMH Publishing company Ltd, New Delhi.

Reference Books:

[2] H. M. D. a. P. J. Diete, *Java How to program*, sixth edition ed.: Pearson education/PHI.

[3] C. S. H. a. G. Cornell, *Core java 2*, Seventh Edition ed.: Pearson Education.
[4] C. S. H. a. G. Cornell, *Core java2*, Seventh edition ed.: Pearson education.
[5] C. Horstmann, *Big Java*, 2nd Edition ed.: john Wiley and Sons, Pearson Edu.

Design Experiments

IT 5052

NETWORKING LAB

Lecture :	-	**Internal Assessment:**	25
Tutorial :	-	**Final Examination:**	50
Practical :	3 hrs/ Week	**Credits:**	2

Objectives:

- Different framing methods in data link layer
- Different error detection and correction mechanisms
- Flow control algorithms
- Various routing algorithms
- Client server applications

Learning Outcomes: **Upon completion of this course the student will be able to:**

- Demonstrate techniques to correct and detect errors during transmission.
- Demonstrate understanding of how computers communicate with each other and the routing algorithms employed to assure that the communication is reliable.
- Implementation of client server applications with protocols TCP and UDP.

LIST OF PROGRAMS

Week 1:

Implement the data link layer framing methods: character stuffing and bit stuffing.

Week 2:

Write a program to implement stop and wait protocol.

Write a program to implement go-back-n sliding window protocol.

Week 3:

Implement on a data set of characters the three CRC polynomials- CRC12, CRC16.

Week 4:

Implement error detection method using checksum algorithm

Week 5:

Implement error correction method using Hamming distance method

Week 6:

Compute shortest route using Dijkstra's algorithm.

Week 7:

Implement distance vector routing algorithm.

Week 8:

Construct a routing table at each node using link state routing algorithm.

Week 9:

Construct broad cast tree for a subnet of hosts.

Week 10:

Implement Client Server application using UDP

Implement socket programming for chat application using TCP

Learning Resources:

Text Books :

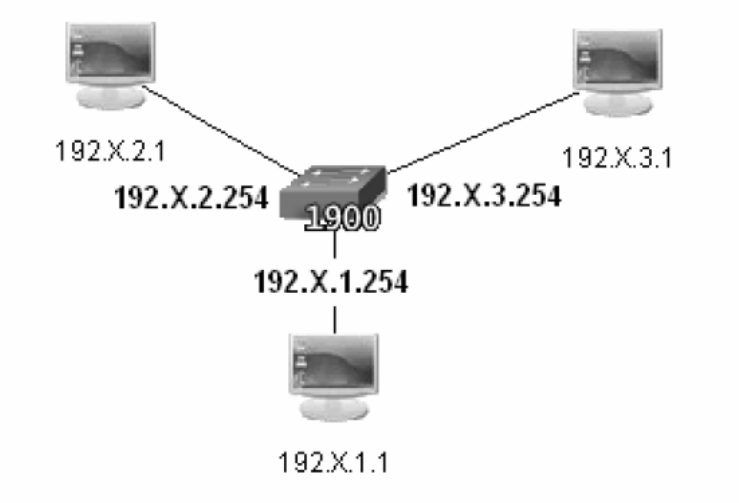
[1] Silberschatz, et al., Database System Concepts, Sixth ed.: McGraw Hill, 2010.

Reference Books:

[2] B. A.Forouzan, *Data Communications and Networking*, 4th Edition ed.: TATA McGraw Hill, .

Experimental Design:

- A company has two LANs, one in Chennai with 300 hosts and another one in Madurai with 150 hosts. Could it be possible to connect those networks to the Internet using only one Class C network addresses? Justify the answer. If the answer is positive, create a network layout, assign IP addresses to every router and to one host in the network, and specify the routing tables of all routers and the specified host.
- You have 3 computers belonging to different networks. Configure them to be able to access each other. Note: Use at least three routers, one for each internal network. Change the IP Address to match the diagram below. Take note that you will need a fourth network (a new network address!) for all the routers so that they can communicate with one another .You can also use switches.


192.X.2.1
192.X.3.1
192.X.2.254
1900
192.X.3.254
192.X.1.254
192.X.1.1

IT 6001
FUNDAMENTALS OF COMPUTER VISION

Lecture	4 hrs/ Week	**Internal Assessment:**	30
Tutorial		**Final Examination:**	70
Practical	-	**Credits:**	4

Objectives:

- To introduce students to basic concepts and techniques in computer vision.
- To make computers understand and interpret visual information.
- To familiarize students with principles, algorithms and systems in Computer Vision with a view to make them aware of principal applications

Learning Outcomes:

Upon completion of this course the student will be able to:

- Understand the potential and limitations of Computer Vision.
- Evaluate the usefulness and performance of Computer Vision methods. understand models of the human visual system know the fundamental techniques for computer vision

UNIT I:

Introduction: Image Formation & Image Models: Introduction to computer vision, Pinhole camera's. **Geometric camera models**:- Elements of analytical geometry, camera parameters & perspective projections. **Geometric camera calibration:-**Least squares parameter estimation:-Linear least square methods, a linear approach to camera calibration**. Radiometry:** Light in space, Light at surfaces. Important special cases: Radio city, Directional hemispheric reflectance. **Sources, Shadows and Shading**: Radiometric Properties of Light Sources, Qualitative Radiometry. Sources and their Effects, Local Shading Models. **Color**: The Physics of Color, Human Color Perception, Representing Color.

UNIT II:

Linear filters: Linear Filters and Convolution, Shift invariant linear systems, Spatial Frequency and Fourier Transforms, Sampling and Aliasing. **Edge Detection**: Estimating Derivatives with Finite Differences, Noise, Edges and Gradient-based Edge Detectors. **Texture**: Representing Texture, Analysis (and Synthesis) Using Oriented Pyramids. **The Geometry of Multiple Views**: Two Views, Three Views. **Stereopsis**: Reconstruction, Binocular Fusion.

UNIT III:

Segmentation using Clustering: Human vision, Applications: Shot Boundary Detection, Background Subtraction. Image Segmentation by Clustering Pixels, Segmentation by Graph-Theoretic Clustering. **Fitting:** The Hough Transform, Fitting Lines, Fitting Curves. **Segmentation and Fitting using Probabilistic Methods:** Missing Data

Problems, Fitting and Segmentation. **Tracking:** Tracking with Linear Dynamic Models.`

UNIT – IV

Correspondence and pose consistency: Initial Assumptions, Obtaining Hypotheses by Pose Consistency, Obtaining Hypotheses by Pose Clustering, Obtaining Hypotheses Using Invariants, Verification. **Finding Templates Using Classifiers**: Classifiers, Building Classifiers from Class Histograms, Feature Selection. **Recognition by Relations between Templates**: Finding Objects by Voting on Relations between Templates, Relational reasoning using probabilistic model and search. **Aspect Graphs**: Differential Geometry and Visual Events, Computing the Aspect Graph.

Content Beyond the Syllabus:

Video representation, transmission, Image Compression, Content Based Image Retrieval.

Learning Resources:

Text Book:

[1]. Forsyth and Ponce, *Computer Vision A Modern Approach*: PHI- Eastern Economy Edition.

Reference Books:

[2]. Shah, M., *Fundamentals of Computer Vision*.
[3]. Dyer, C.R., *Volumetric scene reconstruction from multiple views, in Foundations of Image Understanding*. 2001, Boston.
[4]. Shapiro, L.G. and G.C. Stockman, *Computer Vision*. First ed. 2001: Prentice Hall.
[5]. Hartley, R. and A. Zisserman, *Multiple View Geometry in Computer Vision*. Second ed. 2004: Cambridge University Press.
[6]. Ballard, D.H. and C.M. Brown, *Computer vision* First ed. 1982: Prentice Hall
[7]. Sonka, M., V. Hlavac, and R. Boyle, *Image processing, analysis and machine vision*. Third ed. 2007: CL-Engineering.

Web Resources:

[8]. Williams, A.V. *Fundamentals of Computer Vision*. CMSC 828D 2000 [cited 2011 20.01]; Available from: http://www.umiacs.umd.edu/~ramani/cmsc828.html.
[9]. Siddiqi, K. *Centre for Intelligent Machines*.[cited 2011 20.01]; Available from: http://www.cim.mcgill.ca/~siddiqi/558b.html.
[10]. Duraiswami, R. *Computer Vision*. Spring 2005 [cited 2011 20.01]; Available from: http://www.umiacs.umd.edu/~ramani/cmsc426/index.html.
[11]. *Digital Image Processing*. 2008 [cited 2011 20.01]; Available from: http://www.icaen.uiowa.edu/~dip/syllabus.html

IT 6002
DATA WAREHOUSING

Lecture :	4 hrs/ Week	**Internal Assessment:**	30
Tutorial :	-	**Final Examination:**	70
Practical :	-	**Credits:**	4

Objectives:

- Provide a solid introduction to the topic of Data Warehousing.
- To study different methods of preprocessing data.
- Design and implement a simple data warehouse.
- Show the difference between database and data warehousing.
- Design and implement simple data cubes and OLAP operations.
- Introduce the ETL Model.
- Use the Star Schema to design a Data Warehouse.
- Be able to efficiently design and manage data storages using data Warehousing.

Learning Outcomes:

Upon completion of this course the student will be familiar with:

- Designing a data warehouse or data mart to present information needed by management in a form that is usable for management clients.
- Implementation of a high quality data warehouse or data mart.
- Effectiveness in administering a corporate data resource in such a way that it will truly meet management's needs.
- Evaluation of standards and new technologies to determine their potential impact on your information resource.

UNIT I:

Introduction to Data Warehousing : Need for Data Warehousing, Differences between Data Warehouse and DBMS, Historical developments of data warehousing

Architecture aspects of Data Warehousing : Data Warehouse Architectural Components, Architecting the Data, Enterprise Data Model and its Benefits, Granularity of Data in Data Warehouse, Role of Metadata

UNIT II:

Data Modeling for Data Warehouse : Need for Dimensional Modeling, Differences between ER Modeling and Dimensional modeling, Basic concepts of Dimensional Modeling, Visualization of Dimension model , Star, snowflake and other advanced models, Aggregated Fact tables , Relational DBMS Support for Dimensional Modeling

Advanced Topics in Dimensional Modeling, Selecting a Modeling Tool ,Population Data Warehouse.

UNIT III:

Data Pre-processing Techniques : Why Data Pre-Processing? ETL Overview, Data Cleaning Methods, Descriptive Data Summarization Methods , Data Reduction

Data Discretization and Concept hierarchy Generation

UNIT IV:

Data Analysis Techniques Online Analytical Processing : OLAP, differences between OLAP and OLTP systems, Multi Dimensional Data Model , OLAP operators, Relational DBMS support for OLAP, Data Cube Demonstration using SQL , Various Categories of OLAP Tools , Efficient processing of OLAP queries

Content Beyond Syllabus:
Comparing the two data warehouse methodologies, Data Warehouse database design.

Learning Resources:

Text Book:

[1] **Data Modeling Techniques for Data Warehousing** by *Chuck Ballard, Dirk* Herreman, Don Schau, Rhonda Bell,Eunsaeng Kim, Ann Valencic, 1998.

Reference Book:

[2] B. W. H. InmonWiley, *Building the Data Warehouses*: Dreamtech.
[3] S.A.Dennis and Murray, *Data Warehousing in the Real World*: Pearson Edn Asia.
[4] Paulraj and Ponniah, *Data Warehousing Fundamentals*: John Wiley & Sons, 2001.

Web Resources:

[5] Dr.S.Srinath. *Introduction to Data Warehousing and OLAP*.

IT 6003
ENGINEERING ECONOMICS AND MANAGEMENT

Lecture :	3 hrs/ Week	**Internal Assessment:**	30
Tutorial :	1 hr/ Week	**Final Examination:**	70
Practical :	-	**Credits:**	3

Objectives:

- To understand different types of business organization and the various scientific principles used in different departments like Personnel department, Financial Department, Marketing Department etc. To understand basic engineering economic principles and strategies.
- To rigorously formalize the decisions inherent to his technical work.
- To justify and to defend the elections he propose.
- To include in his analytical framework economic concepts as inflation, taxation, depreciation, financial planning, economic optimization.
- To analyze and discuss the selections made by others.

Learning Outcomes: **Upon completion of this course the student will be able to**
The student will be ready to apply the different scientific methods used in various departments of any organization like Finance department, marketing department, and Personnel department. He will also be aware of the basic economic concepts.

UNIT I:

General management: Principles of scientific management, Henri Fayol's principles of management. Brief treatment of managerial functions: planning, organizing, staffing, directing, coordinating and controlling etc. Forms **of Business Organization**: Salient features of sole proprietorship, partnership, Joint Stock Company: private limited and public limited companies. **Personnel management**: The personnel function, functions of a personnel management, Job Evaluation – Methods

UNIT II:

Managerial Economics: Introduction, Basic Economic concepts, Supply and Demand Law of diminishing utility, Marginal utility and Total utility, Demand Analysis , Elasticity of Demand, Elastic and Inelastic Demand, Isoquants (Equal product curves, Cost output relationship (Theory of Cost) .Relationship between ATC and MC , Relationship between AC and MC. Theory of Firm Profit maximization under perfect maximization, Returns to scale.

UNIT III:

Work study: Introduction, Management techniques to reduce work content and ineffective time. Method Study: Procedure, **Tools for recording information**: charts and diagrams, use of fundamental hand motions (Therbligs), principles of motion economy, SIMO chart, cycle graph and chromo cycle graph. **Work Measurement**: Objectives and techniques, time study methods and rating systems. **Allowances**: Standard time.

UNIT – IV

Marketing Management: Concept of selling and marketing – differences, functions of marketing, market research, advertising and sales promotion, break-even analysis, distribution channels – types, product life cycle. **Financial Management**: Functions of financial management, simple and compound interest, Methods of evaluating alternatives-Present Worth method. Future worth Method, Annual equivalent method. Depreciation, common methods of depreciation: straight line method, declining balance method, sum of year's digits method

Content Beyond the syllabus:

Business economics, Personnel economics, Management science.

Learning Resources:

Text Book:

[1] ILO, *Introduction to work study*, 3 ed.: Oxford & IBH Publishing Company Pvt. Ltd. .
[2] MarthandT and Telsang, *Industrial& business management*.
[3] Edward, *et al.*, *Engineering Economic Análisis*, 9 ed.: Oxford University Press Published, 2004.

Reference Books:

[4] W. sullivan, *et al.*, *Engineering economy*, 13 ed.: Prentice-Hall, 2005.
[5] Blank, *Engineering Economy*, 6 ed.: Mc Graw Hill, 2004.
[6] Thuesen, *Engineering Economy*: Prentice Hall 1993.
[7] Sullivan, *Engineering Economy*, 13 ed.: Pearson, 2005.

Web resources:

[8] A. Dube. *A video lecture series on Fundamentals of Economics Department of Economics, Indiana University*. http://www.learnerstv.com/lectures.php?course=ltv325&cat=Economics&page=1
[9] A.M Clausing. *Lecture notes*. http:/www.mechse.illinois.edu/EngEconNotes_2004.doc

IT 6004
Web Technologies

Lecture :	4 hrs/ Week	**Internal Assessment:**	30
Tutorial :	1 hr/ Week	**Final Examination:**	70
Practical :	-	**Credits:**	4

Objectives:

- The study of Web technologies course is fundamental to Computer Science and Engineering. This course enables students to understand web page site planning, management and maintenance.
- The main objective behind introduction of this course is also to develop web sites which are secure and dynamic in nature and writing scripts which get executed on server as well.
- To study the actual advanced Web methodologies, specifications and techniques and to provide students with the skills necessary to design, implement and deploy complex Web sites and applications

Learning Outcomes:

Upon completion of this course the student will be able to:

- Upon completion of this course the student will be able to:
- Describe and explain the relationship among HTML, XHTML, CSS, JavaScript, XML and other web technologies;
- get familiar with W3C standards and recommendations;
- create and publish a basic web page using HTML and its many tags;
- describe limitations of creating interactivity including browser support and differences;
- describe the difference between Java and JavaScript;
- understand and use JavaScript variables, control structures, functions, arrays, and objects;
- learn and modify CSS properties using JavaScript;
- find out what are XML syntax, elements, attributes, validation etc. ;
- utilize HTML, XHTML, CSS, XML, and JavaScript to develop an interactive web site.

Course Contents:

UNIT I:

Introduction to web technology:-Web pages-types and issues, tiers, the concept of a tier, web pages, static web pages, plug-ins, introduction to HTML, common tags, the need for dynamic web pages. **Java Script**: Introduction to scripting, Control Structures-I, Control Structures-II, Functions, Arrays, Objects. **DHTML:** Cascading style sheets, Object model and collections, Event Model, Filters and Transitions.

UNIT II

Extensible Markup Language:-Standard generalized markup language (SGML), basics of XML, XML parsers, The need for the standard. **Web Servers**: PWS, IIS, Tomcat, Apache, Jigsaw Web Servers. **Java based Web Technologies**: JAVA Servlets: Introduction to Java Servlets, Servlet Life Cycle, Http Servlet Class, Http Servlet Request

& Response interfaces, Deploying a web application, Session Tracking, Cookies, Using JDBC from a Servlet

UNIT III

Java based Web Technologies: Java Server Pages(JSP).Introduction to JSP, JSP elements, JSP Directives: Page Directive, Include Directive, Introduction to Java Beans, Action Elements: Use Bean Element, Custom Tag Libraries, Accessing database from a JSP Page.

UNIT IV

ASP: Common gateway interface (CGI), Microsoft ASP, Basics of ASP technology, ASP example, ASP trends. **Content Management Systems:** Introduction to content Management Systems, need and benefits of CMS, Case study using CMS Tools: Silver light, Joomla. Introduction to web development tools:

Content Beyond Syllabus:

Java server faces technology, Ruby concepts, Ajax.

Learning Resources:

Text Book:

[1] Dietel and Nieto, *Internet & World wide Web How to Program* 4ed.: PHI/Pearson Education Asia.

Reference Books:

[2] H. Schild, *'The Complete Reference JAVA2*, 5 ed.: Tata McGraw Hill.
[3] B. Boiko, *Content Management Bible*.
[4] S. M. Grath, *XML by Example*, 5 ed.: Prentice Hall of India/Pearson Education. .
[5] C. Bates, *Web Programming building Internet Applications*, 2 ed.: WILLEY Dream Tech.

Web Resources:

[6] *XML in 10 point*. http://www.w3.org/XML/1999/XML-in-10-points
[7] *Cascading Style Sheets from W3*. http://www.w3.org/Style/CSS/
[8] *Java Programming* http://www.apl.jhu.edu/~hall/java/

IT 6005
Network Security

Lecture :	4 hrs/ Week	**Internal Assessment:**	30
Tutorial :	1 hrs/ Week	**Final Examination:**	70
Practical :	-	**Credits:**	4

Objectives:

- The Aim of the Course is to survey the principles and practice of network security.
- The emphasis of the course is on the underlying principles and techniques of network security with examples of how they are applied in practice.
- The course covers fundamental aspects of security in a modern networked environment with the focus on system design aspects and cryptography in the specific context of network / internet security.
- It also dwells into basics of cryptographic techniques, algorithms and protocols required to achieve these properties; computational issues in implementing cryptographic protocols and algorithms, and system/application design issues in building secure networked systems.

Learning Outcomes: **Upon completion of this course the student will be able to:**

- Understand the concepts related to applied cryptography, including plaintext, cipher text, symmetric cryptography, asymmetric cryptography, and digital signatures.
- Understand the common network vulnerabilities and attacks, defense mechanisms against network attacks, and cryptographic protection mechanisms.
- Outline the requirements and mechanisms for identification and authentication. Identify the possible threats to each mechanism and ways to protect against these threats.
- Understand the requirements of real-time communication security and issues related to the security of web services.
- Understand the requirements of non-real-time security (email security) and ways to provide privacy, source authentication, message integrity, non-repudiation, proof of submission, proof of delivery, message flow confidentiality, and anonymity.

Course Contents:

UNIT I:

Security Attacks: Interruption, Interception, Modification and Fabrication, Security Services: Confidentiality, Authentication, Integrity, Non-repudiation, access Control and Availability and Mechanisms, A model for Internet work security, Internet Standards. Conventional Encryption Principles, Conventional encryption algorithms, cipher block modes of operation, location of encryption devices, key distribution Approaches of Message Authentication, Secure Hash Functions and HMAC.

UNIT II

Public key cryptography principles and algorithms, digital signatures, digital Certificates, Certificate Authority and key management Kerberos, X.509 Directory Authentication Service. **Email privacy**: Pretty Good Privacy (PGP) and S/MIME

UNIT III

IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management. Web Security Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET).

UNIT IV

Basic concepts of snmp, snmpv1 community facility and snmpv3. intruders, viruses and related threats. firewall design principles, trusted systems. intrusion detection systems.

Content Beyond Syllabus:

Introduction to cryptanalysis Steganography

Learning Resources:

Text Book:

[1] W. Stalligs, *Cryptography and network security: principles and practice*, 4 ed.: Pearson education, 2007.

[2] M. Burgess and JohnWiley, *Principles of network and systems administration*, 2 ed., 2000.

Reference Books:

[3] W. Stallings, Network Security Essentials (Applications and Standards), 3 ed.: Pearson Education, 2006.

Web Resources:

[4] Mark Dermot Ryan. 20 January). *Network Security lecture notes* Available: http://www.cs.bham.ac.uk/~mdr/teaching/modules06/netsec/

[5] Xiang and Y. Li. *Lecture*. Available: http://www.cs.iit.edu/~cs549/

IT 6051
COMPUTER VISION LAB

Lecture :	--	**Internal Assessment:**	25
Tutorial :	-	**Final Examination:**	50
Practical :	3 hrs/ Week	**Credits:**	2

Objectives: **Provide a solid introduction to the Computer vision**:.

- This laboratory course gives a thorough understanding of the concepts of computer vision and its applications.
- It also gives an understanding of various applications using different vision algorithms.
- To learn and Practice the basics of OPENCV to Implement Vision algorithms.

Learning Outcomes: **Upon completion of this course the student will be able to:**

- Capture digital images, and master low-level, mid-level and high-level computer vision techniques, such as noise cleaning, feature extraction, object recognition.
- Become proficient with computer skills for the analysis of digital images.

LIST OF PROGRAMS

Week 1:

Basics of OPENCV& adding libraries to project

Week 2:

Display an image in the environment

Display text in an image

Week 3:

Displaying video Display the pixel matrix of an image

Week 4:

Basic operations I: Conversions: Gray scale, binary and Reshape, Repeat, Flip, CvtPixToPlane, CvtPlaneToPix,ConvertScale,ConvertScaleAbs

Week 5:

Basic Operations II:Add, Adds, Sub, Subs, SubRS, Mull, Div, And, Ands, Or, OrS, Xor, XorS, Not

Week 6:

Contour detection

Week 7:

Edge detection: Sobel, Canny

Week 8:

Morphology Operations : Erosion, dilation,open,close operations

Week 9:

Histogram construction

Week 10:

Contrast enhancement

Week 11:

Programs on texture identification and analysis

Week 12:

Object recognition

Text Books :

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IT 6052
DATA WAREHOUSING LAB

Lecture :	--	**Internal Assessment:**	25
Tutorial :	-	**Final Examination:**	50
Practical :	3 hrs/ Week	**Credits:**	2

Objectives:
- Provide a solid introduction to the topic of Data Warehousing.
- Show the difference between database and data warehousing
- Introduce the ETL Model.
- Use the Star Schema to design a Data Warehouse.

Learning Outcomes: Upon completion of this course the student will be able to
- After completing this course, the student should demonstrate the knowledge and ability to:
- Design and implement a simple data warehouse.
- Design and implement simple data cubes and OLAP operations
- Design a data warehouse or data mart to present information needed by Management in a form that is usable for management clients.
- Implement a high quality data warehouse or data mart.
- Effectively administer a corporate data resource in such a way that it Will truly meet management's needs.
- Evaluate standards and new technologies to determine their potential impact on your information resource.

LIST OF PROGRAMS

Week 1:

To perform various commands in PL/SQL in Oracle (for brushing up)

Week 2:

Analyzing data with ROLAP, CUBE.

Week 3:

Cube slicing – come up with 2-D view of data.

Week 4:

Drill-down or Roll-down- going from summary to more detailed data.

Week 5:

Roll up – summarize data along a dimension hierarchy.

Dicing – projecting 2-D view of data.

Week 6:

Building dimensions.

Create and populate FACT table.

Week 7:

Creating Star Schema/Snowflake Schema.

Week 8:

Creating Fact constellation Schema

Week 9:

ETL: Extraction Options

Full extraction

Incremental extraction

Change Data Capture(CDC)

Week 10:

ETL: Transformation Options
1. Transformation: during extraction, in staging area, during load, etc.
2. Multi-state transformation
3. Pipelined transformation

Week 11:

ETL: DW Load options
Loader: SQL (DML)
Data Pump

Week 12:

To implement data preprocessing Techniques using WEKA

Learning Resources:

Text Books :

1. Oracle 10G & 9i Oracle Press Manual.
2. www.waikato.ac.in

IT 6053
WEB TECHNOLOGIES LAB

Lecture	**:**	-	**Internal Assessment:**	25
Tutorial	**:**	-	**Final Examination:**	50
Practical	**:**	2 hr/week	**Credits:**	2

Objectives:

- The main objective is to introduce the students to web designing concepts.
- This course addresses the high level programming aspects related to web designing using different technologies.
- This course enables students to understand web page site planning, management and maintenance.
- The main objective behind introduction of this course is also to develop web sites which are secure and dynamic in nature and writing scripts which get executed on server as well.
- To study the actual advanced Web methodologies, specifications and techniques and to provide students with the skills necessary to design, implement and deploy complex Web sites and applications

Learning Outcomes:

- To create a web document.
- To study hypertext markup language, specialized commands and tags for WWW documents that allow one to specify hyperlinks , lists ,paragraph and attributes.
- To design web pages for applications such as railway ticket reservation, hotel management etc.

List of Experiments:

Week 1:

Develop a static web page that demonstrates basic HTML tags.

Week 2:

Develop a web page to demonstrate different types of CSS.

Week 3:

Develop a web application using Java script to perform the following tasks:

a) Registration validation

b) User login

c) User profile and credit card payment.

Week 4:

Design an XML document to structure the student data and validate using DTD.

Week 5:

Design an XML document to structure and display the data using an XSL.

Week 6:

Implement a simple Hello world program using Java Servlets.

Implement User Management application using Java Servlets.

Week 7:

Implement a simple JSP page to perform simple functions.

Implement User Management application using JSP.

Week 8:

Implement session Tracking and cookie Management in JSP.

Week 9:

Develop a simple application to create a custom tag using JSP.

Week 10:

Implement User Management application in ASP.

IT 6054
TERM PAPER

Lecture :	-	**Internal Assessment:**	75*
Tutorial :	1 hrs / week	**Final Examination:**	-
Practical :	-	**Credits:**	1

Objectives:

- Analyze real world problems
- Learns to identify domains in specific area of interest
- Prepare document for publishing

Learning Outcomes: **Upon completion of the course the students will be familiar with :**

- Identification of real world problems
- Awareness of current trends in specific area of interest
- Technical report writing

The following guidelines should be fulfilled:

1. Students shall be grouped into teams not exceeding three per team for pursuing minor project work.
2. Each team shall identify real life problem pertaining to their area of interest
3. The team should put in a combined effort and submit their report. However, the reports should reflect the contributions of individuals.
4. The team will be encouraged to submit papers for Conferences / Journals
5. The team shall follow the guidelines specified by the Head of the Department while preparing their Project Report.

* Marks are not included for Internal Assessment.

IT 7001
OPERATIONS RESEARCH

Lecture	3 hrs/ Week	**Internal Assessment:**	30
Tutorial	1 hrs/ Week	**Final Examination:**	70
Practical	-	**Credits:**	3

Objectives:

- Introduce the methods of Operations Research.
- Emphasize the mathematical procedures of Linear and nonlinear programming search techniques.
- Introduce the advanced topics such as probabilistic models (Markov chain & queuing theory) and dynamic programming.
- Relate the course material to research activities.

Learning Outcomes: **Upon completion of this course the students will be familiar with**

- Methods of Operations Research.
- Linear and Nonlinear programming search techniques.
- Probabilistic models and dynamic programming.
- Relate this course to research activities.

UNIT I:

Introduction to Operations Research: Introduction, Modeling in Operations Research, Phases of OR study, Scope of OR, Limitations of OR.

Linear Programming and its Applications: Linear Programming Problem – Formulation of LPP, Graphical solution of LP Problem. Simplex method, Artificial Variable Techniques (Big-M and Two-Phase Method), Dual Simplex method.

UNIT II:

Transportation and Assignment models: Introduction – Methods of basic feasible solution (NWC, Least Cost and VAM) Optimality test, Degeneracy in transportation problem, unbalanced transportation Problem, Hungarian method for assignment problem.

Sequencing and Scheduling: Introduction-Flow Shop Scheduling, Johnson's algorithm, Problems with n jobs and two machines, n jobs and m machines.

UNIT III

Theory of Games: Introduction, to solve the rectangular two person zero sum games, solution of rectangular games in terms of mixed strategies, solution of 2x2 games without saddle point, solution of a two person zero sum 2Xn game, Graphical method for 2Xn and nX2 games.

Queuing Theory: Queuing systems and their characteristics. M/M/1 : FCFS/ ∞ / ∞ and M/M/1 : FCFS/ ∞ / N models.

UNIT IV

Project Management by PERT/CPM: Introduction, Basic steps in PERT/CPM techniques, Network diagram presentation, Rules of drawing network diagram, Fulkerson's rule, Time estimates and Critical path in network analysis, Project Evaluation and Review Technique, Application areas of PERT/CPM. Crashing Cost consideration in CPM/PERT.

Contents beyond the syllabus:

Personnel staffing, automation, optimal routing, Decision analysis.

Learning Resources:

Text Book:

[1] S. Sharma, *et al., Operations Research.*
[2] S. Kalavathy, *Operations Research*: Vikas Publishing House Pvt Ltd-New Delhi.
[3] R. Pannerselvam, *Operations Research*: Pentice Hall of India Pvt Ltd-New Delhi.

Reference Books:

[4] L. S. Srinath, *PERT and CPM Principles and Applications*: Affiliated East West Press Pvt Ltd-New Delhi.
[5] Hamdy and Taha, *Operations Research*: Pearson Education Pvt Ltd-New Delhi.

Web Resources:

[6] G. Srinivasan *Fundamentals of Operations Research NPTEL*. http://nptel.iitm.ac.in/video.php?courseId=1110

IT 7002
DATA MINING

Lecture	**:**	4 hrs/ Week	**Internal Assessment:**	30
Tutorial	**:**	-	**Final Examination:**	70
Practical	**:**	-	**Credits:**	4

Objectives:

- Aims the nature and purpose of data mining.
- Describe the theoretical constructs and core processes of data mining.
- Identifies the role of data mining in institutional research.
- Helps the basic statistical concepts related to data mining.
- Describe the predictive modeling functions of data mining.
- Can understand the types and characteristics of predictive models.
- Describe the potential applications of data mining in higher education like decision support, assessment, accountability, resource allocation, enrollment management, and quality improvement initiatives.

Learning Outcomes: **Up on completion of this course students will be familiar with**

- Fundamentals and functionalities of data mining.
- Issues and challenges in Data Mining.
- Preprocessing of data for making data consistent and easy retrieval of data by knowing methods like data cleaning and Reduction etc.
- Data Generalization and Summarization-Based Characterization, Analytical Characterization: Analysis of Attribute Relevance, Mining Class Comparisons: Discriminating between Different Classes, Mining Descriptive Statistical Measures in Large Databases.
- The various algorithms to find association rules.
- the principles, methods, techniques, and tools that underpin successful data mining applications.
- Issues Regarding Classification and Prediction.
- Different clustering techniques.
- the fundamentals of Outlier Analysis.

UNIT I:

Data Mining – Introduction, importance of Data Mining, on what kind of Data, Data Mining Functionalities, Classification of Data Mining Systems, Data Mining task Primitives, Major issues in Data Mining, Integration of a Data Mining system with a Database or Data warehouse system.

Data Preprocessing – Need for the process of the data, Data cleaning, Data Integration & Transformation, Data Reduction, Data Discretization & Concept Hierarchy Generation.

UNIT II:

Mining Frequent Patterns, Associations, and Correlations – Basic Concepts, Efficient

and Scalable Frequent Itemset Mining Methods, Mining various kinds of Association Rules, From Association Mining to Correlation Analysis, Constraint-Based Association Mining

UNIT III:

Classification & Prediction – Introduction, Classification by Decision tree induction, Bayesian Classification, Rule-Based Classification, Classification by Backpropagation, Support Vector Machines, Associative Classification, Lazy Learners, Other Classification Methods, Prediction, Accuracy and Error measures, Evaluating the accuracy of a Classifier or a Predictor, Ensemble Methods

UNIT IV

Cluster Analysis: Introduction, Types of data in Cluster analysis, A categorization of major clustering methods, partitioning methods, Hierarchical methods, Density-Based Methods: DBSCAN, Grid-based Method: STING; Model-based Clustering Method: Statistical approach, Outlier analysis.

Content Beyond Syllabus:

Mining Stream, Time-Series, and Sequence Data, Graph Mining, Social Network Analysis, and Multi relational Data Mining, Mining object, Spatial, Multimedia, Text, and Web Data Applications and Trends in Data Mining.

Learning Resources:

Text Book:

[1] J. Han and M. Kamber, *Data Mining Concepts and Techniques*, 2 ed.: Elseiver publishers.
[2] Introduction to Data Mining – Pang-Ning Tan, Michael Steinbach and Vipin Kumar, Pearson Education.

Reference Books:

[3] Margaret H Dunham and *Data Mining Introductory and advanced topics* Pearson Education.
[4] A. K. PUJARI, *Data Mining Techniques*: University Press.
[5] Insight into Data Mining, K.P.Soman, S.Diwakar,V.Ajay, PHI,2008.
[6] Data Mining Introductory and advanced topics, Margaret H Dunham, Pearson Education
[7] Data Mining, V.Pudi and P.Radha Krishna, Oxford University Press.
[8] Data Mining: Methods and Techniques, A.B.M Shawkat Ali and S.A.Wasimi, Cengage

Web Resources:

[9] Dr.S.Srinath. *Data Mining and Knowledge Discovery*
[10] S. Chakrabarti *Bridging the Structured, Unstructured Gap* http://videolectures.net/wsdm2010_chakrabarti_bsus/
[11] QiLu *Data mining Lecture*.http://videolectures.net/kdd2010-lu-dmosi/

IT 7003
OBJECT ORIENTED ANALYSIS AND DESIGN

Lecture	3 hrs/ Week	**Internal Assessment:**	30
Tutorial	2 hr/ Week	**Final Examination:**	70
Practical	-	**Credits:**	4

Objectives:

- Aims the value of object- oriented analysis and design (OOAD).
- Helps to understand how software development has evolved.
- Describes the process flow and data flow diagrams.

Learning Outcomes: **Upon completion of this course the student will be familiar with:**

- the benefits of Object Oriented Software Engineering.
- Design their own projects with aids of UML Diagrams.
- Know how to use inheritance in an effective way – in particular – in how they are espoused in design patterns.
- Have improved the object-oriented analysis skills.
- Be able to identify classes in their problem domain with a technique much better than finding nouns and verbs.
- Be able to read basic UML diagrams.
- code qualities which are essential for writing maintainable code.

UNIT I:

Object Oriented Design Fundamentals: The Object Model – Overview of Object Oriented system Development – Object Basic – Object – Oriented Systems Development Life Cycle.

Object Oriented Methodologies: Methodologies - Shaler / Meller, Coad / Yourdon, RumBaugh et al.'s Object Modeling Technique; The Booch Methodology; The Jacobsonet al. Methodologies; Patterns; Frameworks; The Unified Approach.

Object Oriented Analysis Process: Identifying use cases: Introduction; Why Analysis is a Difficult Activity; Business Object Analysis: Understanding the Business Layer.

Use-Case Driven Object-Oriented Analysis: The Unified Approach; Business Process Modeling; Use-Case Model; Developing Effective Documentation.

UNIT II:

Unified Modeling Language (UML): Introduction; Static and Dynamic Models; Why Modeling; Introduction to the Unified Modeling Language; UML Diagrams.

Static Modeling: UML Use Case Diagram- Use case descriptions- Actors and actor descriptions - Use case relationships: communication association, include, extend and Generalization, System Boundary; case study ViaNet Bank ATM. Object Analysis (Classification): Introduction; classifications Theory; Approaches for Identifying Classes; Naming Classes; Identifying Object Relationships, Attributes and Methods: Introduction; Associations; Super-Sub Class Relationships; A-Part-of Relationships-Aggregation; Class Responsibility: Identifying Attributes and Methods; Class Responsibility: Defining Attributes by Analyzing Use Cases and Other UML Diagrams; Object Responsibility: Methods and Messages. Static Modeling: UML Class Diagram: Class, interface, package, Relationships

between classes and other Notations of Class Diagram; case study ViaNet Bank ATM.

UNIT III:

Dynamic Modeling (Behavioral Diagram):- UML Interaction Diagrams – **UML Sequence Diagram*:*** object, life line, Activation Bar, Types of Messages;

UML Collaboration Diagram*:* object, object Connection, Message with sequence numbers, case study ViaNet Bank ATM.

UML State-Chart Diagram: object State, Initial/Final State, Simple/Complex Transitions.

UML Activity Diagram: Activity State, Transition, Swim Lane, Initial state, Final State, Synchronization Bar, Branching, case study ViaNet Bank ATM.

UNIT IV

Implementation Diagrams – Component Diagram: Component, Dependency and Interface; Deployment Diagram: Node, Communication Association, case study ViaNet Bank ATM; Model Management: Packages and Model Organization; UML Extensibility; UML Meta-Model.

Object Oriented Design Process and Design Axioms: Introduction; The Object-Oriented Design Process; Object-Oriented Design Axioms; Corollaries.

Designing Classes: Introduction; The Object-Oriented Design Philosophy; UML Object Constraint Language; Designing Classes: The Process; Class Visibility: Designing Well-Defined Public, Private, and Protected Protocols; Designing Classes: Refining Attributes; Designing Methods and Protocols; Packages and Managing Classes, case study ViaNet Bank ATM.

View Layer: Designing Interface Objects*:* Introduction; User Interface Design as a Creative Process; Designing View Layer Classes; Macro-Level Process: Identifying View Classes by Analyzing Use Cases; Micro-Level Process.

Learning Resources:

Textbooks:

[1] Ali Bahrami, *Object Oriented Systems Development – Using the Unified Modeling Language*: Tata McGraw Hill International Editions.

Reference Books:

[2] G. Booch, 2 ed.: Pearson Education, 1999.
[3] J. Rumbaugh, *et al.*, *Unified Modeling Language Reference Manual*: PHI.
[4] T. P. . *UML Bible*: John Wiley & Sons.

Web Resources:

[5 *Video Lessons NPTEL*. http://rationale.csail.mit.edu/project_natural_sketch_recognition_in_UML_class_diagram
[6] *Video series*.http://www.scribd.com/doc/7072876/Ooad-With-Uml-Question-Bank

IT 7004
WIRELESS NETWORKS

Lecture	4 hrs/ Week	**Internal Assessment:**	30
Tutorial	-	**Final Examination:**	70
Practical	-	**Credits:**	4

Objectives:

- Identifies the basics of Wireless voice and data communications technologies.
- To build knowledge on various Mobile networks.
- To study the working principles of wireless LAN and its standards.
- To build knowledge on various Mobile Computing algorithms.
- To build skills in working with Wireless application Protocols to develop mobile content applications.

Learning Outcomes: **Upon completion of this course the student will be familiar with:**

- The basics of Wireless voice and data communications technologies.
- Familiarize with the working of Mobile Networks.
- the principles of Wireless Networks and Standards.
- Acquires Knowledge of various Mobile Computing algorithms.
- Development of content applications for Mobile devices using acquired skills in Wireless application protocols.

UNIT I:

Introduction to Wireless Networks : Evolution of Wireless Networks, Early Mobile Telephony, Analog Cellular, Telephony, Digital Cellular Telephony, Cordless Phones, Wireless Data Systems, Fixed Wireless Links, Satellite Communication Systems, Third Generation Cellular Systems and Beyond Challenges: Wireless Medium, Unreliability, Spectrum Use, Power Management, Security, location/Routing, Interfacing with Wired Networks, Health Concerns, Multiple Access for Wireless Systems, Frequency Division Multiple Access, FDMA, Time Division Multiple Access, Code Division Multiple Access (CDMA), ALOHA-Carrier Sense Multiple Access (CSMA), Polling Protocols, Performance Increasing Techniques for Wireless Networks, Diversity Techniques, Coding, Equalization, Power Control, Multi sub carrier Modulation**.**

UNIT II:

Fixed Wireless Access Systems: Wireless Local Loop versus Wired Access, Wireless Local Loop, Multichannel Multipoint Distribution Service (MMDS), Local Multipoint Distribution Service (LMDS), Wireless Local Loop Subscriber Terminals (WLL), Wireless Local Loop Interfaces to the PSTN, IEEE 802.16 Standards.

Wireless Local Area Networks: Introduction, Benefits of Wireless LANs, Wireless LAN Applications, Wireless LAN Concerns, Scope of the Chapter, Wireless LAN Topologies, Wireless LAN Requirements, The Physical Layer, The Infrared Physical Layer, Microwave-based Physical Layer Alternatives, The Medium Access Control (MAC) Layer The

HIPERLAN 1 MAC Sub layer, The IEEE 802.11 MAC Sub layer, Latest Developments, 802.11a, 802.11b, 802.11g, Other Ongoing Activities within Working Group 802.11.

UNIT III:

Personal Area Networks (PANs): Introduction to PAN Technology and Applications, Historical Overview, PAN Concerns, PAN Applications, Commercial Alternatives: Bluetooth, The Bluetooth Specification, The Bluetooth Radio Channel, Piconets and Scatternets, Inquiry, Paging and Link Establishment, Packet Format, Link Types, Power Management, Security, Commercial Alternatives: HomeRF, HomeRF Network Topology. The HomeRF Physical Layer, The HomeRF MAC Layer. Security Issues in Wireless Systems: The Need for Wireless Network Security, Attacks on Wireless Networks, Security Services, Wired Equivalent Privacy (WEP) Protocol , Mobile IP, Weaknesses in the WEP Scheme, Virtual Private Network (VPN), Point-to-Point Tunneling Protocol (PPTP), Layer-2 Transport Protocol (L2TP), Internet Protocol Security (IPSec).

UNIT IV

cdmaOne (IS-95): cdmaOne Protocol Architecture, Network Architecture-Radio Transmission, Channels, Network Operations,**GSM:** Network Architecture, Speech Coding, Radio Transmission Characteristics, Channels, Network Operations,GSM Authentication and Security. **Data Operations:** CDPD, HCSD, GPRS, D-AMPS, cdmaTwo (IS-95b), TCP/IP on Wireless-Mobile IP, WAP. Third Generation (3G) Cellular Systems :Introduction, 3G Concerns , 3G Spectrum Allocation, Spectrum Requirements, Enabling Technologies, Third Generation Service Classes and Applications.

Learning Resources:

Text Book:

[1] J. Schiller, *Mobile Communications,* Second ed.: PHI/Pearson Education.

References:

[2] W. Stallings, *Wireless Communications and Networks*: PHI/Pearson Education.
[3] K. Pahlavan and P. Krishnamoorthy, *Principles of Wireless Networks*: PHI/Pearson Education.
[4] U. Hansmann, *et al., Principles of Mobile Computing*. New York: Springer.
[5] H. Wesolowshi, *Mobile Communication Systems*: John Wiley and Sons Ltd.

Web Resources

IT 7005 A
INDUSTRY NEED BASED ELECTIVE

Lecture	4 hrs/ Week	**Internal Assessment:**	30
Tutorial	-	**Final Examination:**	70
Practical	-	**Credits:**	3

IT 7005 B
VIRTUAL REALITY

Lecture	4 hrs/ Week	**Internal Assessment:**	30
Tutorial	-	**Final Examination:**	70
Practical	-	**Credits:**	3

Objectives:

- Helps to know the fundamental terminology, technology and components of virtual reality.
- Describes the various input and output devices and types of modeling.
- Explains various applications of VR, Programming concepts in Virtual Reality.

Learning Outcomes: **Upon completion of this course the student will be familiar with:**

- various input and output devices (Trackers, Navigation, and Gesture Interfaces, Graphics displays, sound displays & haptic feedback)
- the three I's of virtual reality, commercial VR technology and the five classic components of a VR system.
- Design aspects of virtual reality systems.
- various kinds of modeling
- the basic components of a VR system.
- programming implementation in Virtual Reality.

UNIT I:

Introduction: The three I's of Virtual Reality, early commercial VR technology and the five classic components of a VR system. Input Devices: Trackers, Navigation, and Gesture Interfaces: Three-dimensional position trackers, Navigation and Manipulation interfaces, Gesture interfaces.

UNIT II:

Output Devices: Graphics Displays, Sound Displays & Hap tic feedback.
Modeling: Geometric modeling, kinematics modeling, physical modeling, behavior modeling, model management.

UNIT III:

Human Factors: Methodology and terminology, user performance studies, VR health and safety issues. **Computing Architectures for VR:** The Rendering Pipeline, PC Graphics Architecture, Workstation-Based Architectures, Distributed VR Architectures.

UNIT IV

Traditional & Emerging VR Applications: Medical applications of VR, Military VR applications, VR Applications in manufacturing, Applications of VR in Robotics.
VR Programming: Toolkits and Scene Graphs, WorldToolKit, Java3D, General Haptics

Open Software Toolkit, PeopleShop.

Contents Beyond the Syllabus

Object oriented nature of VRML programming - Prototypes, nodes, fields. Structure of a VR Object. Creating Prototypes and Objects. Interface declaration semantics. Definition semantics. Rules for mapping. Scoping rules. External prototype semantics. Static and dynamic instantiation. Examples.

Learning Resources:

Text Books:

[1] G. C. B. P. Coiffet, Virtual Reality Technology, Second Edition ed.: John Wiley & Sons, Inc.,2003.
[2] A. Davison, Killer Game Programming in Java: Oreilly-SPD, 2005.

References Books:

[3] A. Davison, Killer Game Programming in Java: Oreilly-SPD, 2005.
[4] E. M. K. Bill Fleming, 3D Modeling and surfacing.
[5] E. David H.Eberly, 3D Game Engine Design, edition 2 ed.
[6] S. Diehl, Distributed Virtual Worlds : Foundations and Implementation

Web Resources:

[7] J. C. Lee. January 25). Lecture Series on Virtual Reality Available:
[8] P. Slavík. Jan 26th). Video lecture on Virtual reality for VE. Available: http://videolectures.net/ess07_slavik_vrv/
[9] P. Young. Jan 26th). 3D Graphics and Virtual Reality. Available: http://vrg.dur.ac.uk/misc/PeterYoung/cg-notes/default.htm

IT 7005 C
SOFTWARE PROJECT MANAGEMENT

Lecture :	4 hrs/ Week	**Internal Assessment:**	30
Tutorial :	-	**Final Examination:**	70
Practical :	-	**Credits:**	3

Objectives:

- Helps in Project planning and management.
- Describes Managing risks and quality assurance & configuration management.
- To study the Tracking defects and controlling them
- To build the knowledge in Project Development life cycle.

Learning Outcomes: **Upon completion of this course the student will be familiar with**

- how to manage projects
- Selection of appropriate techniques for use in the stages of a project, Justify the appropriateness of these techniques, and apply them to practical situations
- the project approach in developing information/software systems

UNIT I:

Software Project Management Renaissance: Conventional Software Management, Evolution of Software Economics, Improving Software Economics, The old way and the new way.

Managing Software Projects: Project Management and the CMM, Project Management and CMMI, Project Management Process Framework.

UNIT II:

Project Planning: Software Life Cycle Models, Project Organizations and Responsibilities, Artifacts of the Project Management Process, Cost and Scheduling estimation, Establishing Project Environment, Risk Management, Quality Assurance and Configuration Management.

UNIT III:

Project Tracking and Control: Defect Tracking, Issue Tracking, Status Reports, Milestone Analysis, Defect Analysis and Prevention Methods, Process monitoring and audit, Reviews, Inspections and Walkthroughs, Seven Core Metrics, Management indicators, Quality Indicators.

UNIT IV

Project Closure: Project Closure Analysis, Role of Closure Analysis in a project, Performing Closure Analysis, Closure Future Software Project Management Practices, Modern Project Profiles, Next-Generation software Economics, Modern Process Transitions.

Content Beyond the syllabus:

System Test Process: Test specifications, Black box and white box testing, Test scripts, Unit and integration testing, Acceptance test specifications, Test tools, Final Phases & Other Issues Project Recovery: Documentation, Cutover/Migration, Post Project Reviews , Closing.

Learning Resources:

Text Books:

[1] W. Royce, *Software Project Management*: Pearson Education, 1998.

Reference Books:

[2] Watts and Humphrey, *An Introduction to the Team Software Process,*, 5 ed.: Pearson Education, Addison-Wesley, 2000.
[3] Watts and Humphrey. (1995, *A Discipline for Software Engineering*.

Web Resources:

[4] Prof.N.L. Sarda, *et al.* 20 January). *Lecture series on project management IIT BOMBAY*. Available:

7005D
GRID COMPUTING

Lecture :	4 hrs/ Week	**Internal Assessment:**	30
Tutorial :	-	**Final Examination:**	70
Practical :	-	**Credits:**	3

Objectives:

- Overview of the basic concepts of Cluster and Grid Computing;
- To study the Integrating task parallelism with data parallelism
- Describes the Parallel programming model on CORBA.
- Design and implement a parallel computing model on Grids called Sneha-Samuham.
- Implementing Simulation algorithms
- Designing a combination of Genetic and Simulated Annealing algorithms.

Learning Outcomes:

Upon completion of this course the student will familiar with

- the basic concepts of Cluster Computing, Grid Computing and Mobile Grid Models.
- Integrating Task parallelism with Data Parallelism.
- parallel Computing Model over Grids.
- simulation algorithms for job shop scheduling etc

UNIT I:

Introduction: Cluster to grid computing:-Cluster computing models, Grid models, Mobile grid models, Applications. **Parset: System independent parallel programming on distributed systems:**Motivation and introduction, Semantics of the parset construct, Expressing parallelism through parsets, Implementing parsets on a loosely coupled distributed system. **Anonymous remote computing model:-**Introduction, Issues in parallel computing on interconnected workstations, Existing distributed programming approaches, The arc model of computation, The two-tired arc language constructs, Implementation.

UNIT II:

Integrating task parallelism with data parallelism:-Introduction and motivation, A model for integrating task parallelism into data parallel programming platforms, Integration of the model into ARC, Design and implementation applications, performance analysis, guidelines for composing user programs, related work. **Anonymous remote computing and communication model:-**Introduction, Location-independent inter task communication with DP, DP model of iterative grid computations, Design and implementation of distributed pipes, Case study, and Performance analysis. **Parallel programming model on CORBA:-**Introduction, Existing works, notion of concurrency, system support implementation performance, stability of CORBA: introspection.

UNIT III:

Sneha-samuham: grid computing model:-Introduction, Sneha-samuham: a parallel computing model over grids, Design and implementation of the model, Performance studies, Related work. **Introducing mobility into anonymous remote computing and communication model:** Introduction, issues in mobile clusters and parallel computing on mobile clusters, moset overview, moset computation model, implementation, performance.

UNIT IV

Distributed simulating annealing algorithms for job shop scheduling:-Introduction, overview, distributed algorithms for job shop scheduling, implementation, results and observation. **Parallel Simulated Annealing algorithms:-**Introduction, Simulated annealing (SA) Technique, Clustering algorithm for simulated annealing (SA), Combination of genetic algorithm and simulated annealing (SA) algorithm.

Learning Resources:

Text Book:

[1] D.Janakiram, GRID COMPUTING-A Research Monograph: TMH, 2005..

Reference Books:

[2] Grid Computing: A Practical Guide to technology and Applications: Ahmar Abbas,publishers:Charles River media, 2004.

[3] J. Joseph and C. Fellenstein, Grid Computing: Pearson Education, 2009.

Web References:

[4] 20 January). OracleWebVideos Lecture series on Clearview:Grid Computing Oracle videos. Available:

[5] 20 January). Gonium Lecture series on Grid Computing Available:

IT 7005 E
NETWORK MANAGEMENT SYSTEMS

Lecture :	4 hrs/ Week	**Internal Assessment:**	30
Tutorial :	-	**Final Examination:**	70
Practical :	-	**Credits:**	3

Objectives:

- To learn the basics of network management protocols.
- To build knowledge on various networks.
- To study the models, tools about various networks.
- To build knowledge on ATM networks.
- To build skills in working with the applications of network management systems.

Learning Outcomes:

Upon completion of this course the student will familiar with

- the basic network management models
- working of SNMP.
- Knowledge of broadband network management systems.
- Development of content applications for Mobile devices using acquired skills in Wireless application protocols

UNIT I:

BASIC FOUNDATIONS, STANDARDS & MODELS: Network management standards, Network management model, information model, communication model, Functional model.

SNMPv1 Network Management: Organization & Information model, The SNMP model, The Organization model, system overview, the Information model. Communications and Functional models; The SNMP communication model, Functional model.

UNIT II:

SNMP management SNMPv2: Major changes in SNMPv2, SNMPv2 structure of management information, The SNMPv2 management information Base, SNMPv2 protocol, compatibility with SNMPv1. **SNMPv3**: SNMPv3 documentation and Architecure. **RMON**: RMON SMI and MIB, RMON1, RMON2, ATM Remote monitoring.

UNIT III:

BROADBAND NETWORK MANAGEMENT ATM Networks: Broadband networks and services, ATM Technology, ATM network management.

Broadband Access control and technologies, HFC technology, Data over cable Reference architecture, HFC management, DSL technology

UNIT IV

Management Tools, systems and Applications: Network management Tools and systems, Network Statistics measurement systems. Network management Applications, Configurations management, fault management, performance management, Event

correlation techniques, security management, Accounting management, Report management, Policy-Based management, Service level management.

Content beyond the syllabus:
CICSO networking, Management building blocks, Management Communication Pattern and Protocols, Service level metrics

Learning Resources:

Text Book:

[1] M. Subramanian, Network management : Principles and Practices Addison Wesley Longman.

Reference Books:

[2] A. Clem, *Network management fundamentals*, 1 ed.: CICSOP PRESS., 2006.
[3] H T Kung, *Traffic management for high speed networks ,Fourth Lecture Series.*: National Academy press, Washington D.C 1997.

Web References:

[4] Prof.S.Ghosh. *Lecture series on Computer Networks Department of Computer Science & Engineering, I.I.T.,Kharagpur*. Availabl
[5] P. T. Anderson. (2008, 20 January). *Network management University of Washington Online Course*. Available: http://freevideolectures.com/Course/2829/CSEP-561-Network-Systems#
[6] Prof.T.K.Basu. *Introduction to Network Elements and Sources Department of Electrical Engineering, IIT,Karagpur*. Available:

IT 7006 A
INDUSTRY BASED ELECTIVE

Lecture	4 hrs/ Week	**Internal Assessment:**	30
Tutorial	-	**Final Examination:**	70
Practical	-	**Credits:**	3

IT- 7006 B
REAL TIME SYSTEMS

Lecture :	4 hrs/ Week	**Internal Assessment:**	30
Tutorial :	-	**Final Examination:**	70
Practical :	-	**Credits:**	3

Objectives:

- Helps to know the Concepts and characteristics of real-time systems.
- To study the concepts of Characterize, model, analyze, and design real time systems.
- Programming for real time systems, methods, tools, and the critical aspects of a modern software development life cycle.

Learning Outcomes: **Upon completion of this course the student will be familiar with :**

- Concepts of real-time systems and recognize the characteristics of a real-time system.
- Basics of designing and/or choosing hardware and software for simple and advanced real-time systems.
- Current practical issues in real-time systems.
- Techniques and results for theoretical analysis of real-time scheduling algorithms.
- Architectural design of a real-time system.
- Software engineering principles for real-time system development.

UNIT I:

Typical Real-Time systems: Digital control, High-Level controls, Signal Processing, Other real time applications. **Hard versus soft Real-Time systems:** Jobs and Processors, Hard Real-Time systems, Soft Real-Time systems. **A reference model of Real-Time Systems:** Processors and Resources, Temporal parameters of real-time workload, Periodic task model, Functional parameters, Scheduling Hierarchy.

UNIT II:

Commonly used approaches to Real-Time scheduling: Clock-Driven approach, Weighted Round-robin approach, Priority Driven approach, Dynamic vs Static systems , Off-line vs. On-line scheduling.

Clock-Driven scheduling: General structure of cyclic schedules, Scheduling sporadic jobs, Algorithm for constructing static schedules, Pros and Cons of Clock-driven scheduling.

UNIT III:

Priority-Driven scheduling of Periodic tasks: Static Assumption, Fixed-Priority versus Dynamic-Priority algorithms, Optimality of the RM and DM algorithms, A schedulability test for Fixed-Priority tasks with short response times and arbitrary response times, sufficient schedulability conditions for the RM and DM algorithms.

Scheduling Periodic and sporadic jobs in Priority-Driven systems: Deferrable Servers, Sporadic Servers, Constant Utilization, Total Bandwidth and weighted Fair-Queuing Servers, Scheduling of sporadic Jobs.

UNIT IV

Resources and Resources Access Control: Assumptions on Resources and their usage, Nonpreemptive critical sections, Basic priority-Inheritance protocol, Basic Priority-Ceiling Protocol, Preemption-Ceiling Protocol. **Scheduling Flexible computations and tasks with temporal distance Constraints:** Flexible Applications, Tasks with Temporal Distance Constraints.

Learning Resources:

Text Book:

[1] J. W.S.Liu, *Real-Time Systems*, 3 ed.: Pearson Education, 2002.

Reference Book:

[2] C.M.Krishna and G.Shin. (1997, *Real-Time Systems*

Web-Sources:

[3] R. Bettati. 22 January). *Lecture Series on RTS*. Available: http://faculty.cs.tamu.edu/bettati/Courses/663/Video/presentation.html

[4] P. M. Wickert. 24 January). *Lecture Series on RTS*. Available: http://freevideolectures.com/Course/2637/Real-Time-DSP#

IT 7006 C
DESIGN PATTERNS

Lecture :	4 hrs/ Week	**Internal Assessment:**	30
Tutorial :	-	**Final Examination:**	70
Practical :	-	**Credits:**	3

Objectives:

- To study the design principles in the design of object oriented systems.
- Demonstrate an understanding of a range of design patterns.
- Be able to select and apply suitable patterns in specific contexts. Be able to critically analyse these applications and assess tradeoffs associated with pattern implementations
- To study and apply refactoring techniques in the context of design patterns.
- To study the broader scope addressed by Architectural Styles, relating design patterns to these styles.

Learning Outcomes: **Upon completion of this course the student will be familiar with**

- Knowledge of UML and reusable objects
- design and apply existing software patterns
- analysis of software problem and applying design patterns

UNIT I

Introduction: What Is a Design Pattern?, Design Patterns in Smalltalk MVC, Describing Design Patterns, The Catalog of Design Patterns, Organizing the Catalog, How Design Patterns Solve Design Problems, How to Select a Design Pattern, How to Use a Design Pattern. **Creational Patterns:** Abstract Factory, Builder, Factory Method, Prototype, Singleton, Discussion of Creational Patterns.

UNIT II

Structural Patterns : Adapter, Bridge, Composite, Decorator, Façade, Flyweight, Proxy Patterns

UNIT III

Behavioral Patterns -I : Chain of Responsibility , Command, Interpreter, Iterator, Mediator Patterns

UNIT IV

Behavioral Patterns-II: Memento, Observer, State, Strategy, Template Method ,Visitor, Discussion of Behavioral Patterns.

Content Beyond the syllabus:

A Case Study: Designing a Document Editor : Design Problems, Document Structure, Formatting, Embellishing the User Interface, Supporting Multiple Look-and-Feel Standards, Supporting Multiple Window Systems, User Operations Spelling Checking and Hyphenation

Learning Resources:

Text Book:

[1] E. Gamma, *et al.*, *Design Patterns: Elements of Reusable Object-Oriented Software*, 2 ed., 1994.

Reference Books:

[2] A. Shalloway, *Design Patterns Expalined*: Pearson Education, 2002.
[3] B. Hughes and M. CotterelI, *Software Project Management*, 5 ed.: Tata McGraw-Hill, 1968.
[4] M. Grand and Wiley, *Paterns in JAVA* vol. 1: Dream Tech.

Web Reference:

[5] K. Shaik and 22 January). *Lecture Series on Design Patterns Youtube*. Availabl
[6] P. R. K. Joshi. 20 January). *Lecture Series on Design Patterns*. Availabl

IT 7006 D
INTRODUCTION TO MAIN-FRAME SYSTEMS

Lecture	**:**	4 hrs/ Week	**Internal Assessment:**	30
Tutorial	**:**	-	**Final Examination:**	70
Practical	**:**	-	**Credits:**	3

Objectives:

- Exposes engineering students to Mainframe Systems domain.
- To study the core modules of mainframe, evolution, Overview of JCL and Z/OS and its features.

Learning Outcomes:

UNIT I

Evolution of Mainframe hardware. Overview of Computer Architecture -Classification of Computers - micro, mini, mainframes and super computer - Mainframe computer - key features - benefits - Evolution of Mainframes - Different hardware systems.

UNIT II

Mainframes OS and Terminology

Operating systems on mainframes, Batch processing vs. online processing – mainframe operating system. - evolution - concepts of Address space, Buffer management - Virtual storage - paging - swapping - Dataset management in mainframes.

UNIT III

Z/OS and its features

Z-operating system (Z/OS) - Virtual storage - Paging process - storage Managers - Program execution modes - Address space - Multiple virtual system(MVS), MVS address space, Z/OS address space - Dataset - sequential and partial dataset - Direct access storage device(DASD) -Access methods - Record formats - Introduction to virtual storage access methods(VSAM) - Catalog – VTOC.

UNIT IV

Introduction – History, evolution and Features, COBOL program Structure, steps in executing COBOL Language Fundamentals – Divisions, sections, paragraphs, sections, sentences and statements, character set, literals, words, figurative constants, rules for forming user defined words, COBOL coding sheet. Mainframe Application Development guidelines COBOL coding standards, relation between a COBOL file handling program and JCL, Different types of ABEND codes, COBOL-DB2 program pre-compilation, DBRM (Database Request Module), Application plan/packages, program execution methods (EDIT JCL, foreground and background modes).

Learning Resources

Textbooks:

[1] D. Lowe and M. Murach, *MVS JCL*, 2 ed.: Douglowe.

[2] G. D. Brown, *JCL Programming Bible (with z/OS)*, 5 ed.: Wiley India Dream Tech, 2001.

References:

[3] *COBOL - Language Reference*, 3 ed.: IBM Redbook.
[4] *COBOL - Programming Guide*, 3 ed.: IBM Redbook.

Web-Sources:

[5] T. Bergin. 20 January). *Lecture Series on Main Frame PPTs*. Available: http://www.computinghistorymuseum.org/teaching/lectures/pptlectures/9-MainframeComputers.ppt.
[6] A. Hatfield-Mihelic. 20 January). *Lecture Series on Main Frame PPTs* Available: http://www.fspgroup.ca/docs/FSP20021108_01.ppt
[7] P. A. Basu and P. S. Sarkar. 22 December). *Lecture Series on Main Frame NPTEL*. Available: http://nptel.iitm.ac.in/video.php?courseId=1080.
[8] Prof.p.dasgipta. 20 December). *Lecture Series on Main Frame* Available: http://nptel.iitm.ac.in/video.php?courseId=1041.

IT 7006 E
ARTIFICIAL INTELLIGENCE

Lecture :	4 hrs/ Week	**Internal Assessment:**	30
Tutorial :	-	**Final Examination:**	70
Practical :	-	**Credits:**	3

Objectives:

- To study the achievements of AI and the theory underlying those achievements.
- Helps in engineering design issues of AI systems.
- Describes the basic issues of knowledge representation and heuristic search, Mini max, resolution that play an important role in AI programs.
- To study the Rule based programming language.

Learning Outcomes:

Upon completion of this course the student will familiar with

- Various Ideas in AI.
- Various Types of Expert systems.
- Issues of the Knowledge Representation.
- Knowledge in writing Prolog programs.

UNIT I:

Introduction: AI problems, foundation of AI and history of AI intelligent agents: Agents and Environments, the concept of rationality, the nature of environments, structure of agents, problem solving agents, problem formulation.

Searching: Searching for solutions, uniformed search strategies – Breadth first search, depth first search, Depth limited search, Iterative deepening depth first search bi-direction search - comparison. Search with partial information (Heuristic search) Greedy best first search, A* search, Memory bounded heuristic search, Heuristic functions.

UNIT II:

Local search Algorithms, Hill climbing, simulated, annealing search, local beam search, genetical algorithms.

Constrain satisfaction problems : Backtracking search for CSPs local search for constraint satisfaction problems.

Game Playing: Adversial search, Games, minimax, algorithm, optimal decisions in multiplayer games, Alpha-Beta pruning, Evaluation functions, cutting of search.

UNIT III:

Knowledge Representation & Reasons logical Agents, Knowledge – Based Agents, the Wumpus world, logic, propositional logic, Resolution patterns in propos ional logic, Resolution, Forward & Backward. Chaining.

First order logic. Inference in first order logic, propositional Vs. first order inference, unification & lifts forward chaining, Backward chaining, Resolution.

UNIT IV

Planning: Classical planning problem, Language of planning problems, Expressiveness and extension, planning with state – space search, Forward states spare search, Backward states space search, Heuristics for stats space search. Planning search, planning with state space search, partial order planning Graphs.

Learning: Forms of learning, Induction learning, Learning Decision Tree, Statistical learning methods, learning with complex data, learning with Hidden variables – The EM Algorithm, Instance Based learning, Neural Networks.

Learning Resources:

Text Book:

[1] Russel and Norvig, Artificial Intelligence- A Modern Approach., Prentice Hall of India/Pearson Education, 2003.

.

Reference Books:

[2] P. H. Winston, Artificial Intelligence, 2 ed.: Pearson Education/Prentice Hall of India., 1984.

[3] E. Rich and K. Knight, Artificial Intelligence, 2 ed.: Tata McGraw Hill Edition, 1994

[4] Giarratano, Expert Systems :Principles and Programming: Cengage Publications

Web Resources:

[5] A. Basu and S. Sarkar.(22 January). Lecture Series on Artificial Intelligence Available: http://nptel.iitm.ac.in/video.php?courseId=1080

[6] P. P. Dasgupta. (22 January). Lecture Series on Artificial Intelligence. Available: http://www.learnerstv.com/lectures.php?course=ltv067&cat=Computers

IT 7051
DATA MINING LAB

Lecture :	-	**Internal Assessment:**	25
Tutorial :	-	**Final Examination:**	50
Practical :	3 hrs/ Week	**Credits:**	2

Objectives:

- To introduce students to the basic concepts and techniques of Data Mining.
- To develop skills of using recent data mining software for solving practical problems.
- To gain experience of doing independent study and research.

Learning Outcomes: **Upon completion of this course the student will be familiar with**

- different methods of preprocessing data.
- the main concepts of data mining.

- USING ORACLE 9i & 10g, ORACLE OWB/WEKA/ or any other Data Mining tools
- Weka is a set of software for machine learning and data mining developed.
- Weka is open source software issued under the GNU General Public License. http://www.cs.waikato.ac.nz/ml/weka/

LIST OF PROGRAMS

Week 1:

Implement association rule mining for a sample dataset.

Week 2:

For a given dataset, list all candidate item sets by candidate generation method.
Find the frequent, maximal, and closed itemsets in a given transaction data.

Week 3:

Implement Predictive Modeling Using Decision Trees

Week 4:

Find all frequent itemsets using the FP-growth algorithm

Week 5:

Implement classification techniques

Week 6:

Introduction to the WEKA Machine Learning Tool

Week 7:

Association rule analysis in WEKA

Week 8:

Performinig Data Preprocessing for Data Mining in WEKA

Week 9:

Performing clustering in WEKA

Week 10:

Classification using the WEKA Tool Kit

Learning Resources:

Text Book :

[1] J. Han and M. Kamber, *Data Mining Concepts and Techniques*, 2 ed.: Elseiver publishers.

Reference Book :

[2] A. K. PUJARI, *Data Mining Techniques*: University Press

Web References:

[3] **Weka** is a set of software for machine learning and data mining developed. Weka is open source software issued under the GNU General Public License. http://www.cs.waikato.ac.nz/ml/weka/

IT 7052
WIRELESS NETWORKING LAB

Lecture :	-	**Internal Assessment:**	30
Tutorial :	-	**Final Examination:**	70
Practical :	3 Hrs/Week	**Credits:**	2

Objectives:

- To learn and Practice the basics of J2ME for implementation of wireless applications.
- To Create a basic GUI form in an Mobile Application.
- To Create a Networking Application of Sending an SMS & E-mail.
- To learn the Methodology involved in developing a Bluetooth Application.

Learning Outcomes: **Upon completion of this course the student will be familiar with**

- Applications for various mobile technologies.
- Applications for Bluetooth and Wi-Fi Technologies.

List of Experiments:

Week 1:

Write a J2ME Program to develop an MIDLET Application
Write a J2ME Program to Create a Form in an MIDLET Application

Week 2:

Write a J2ME Program to create Soft Keys in the Form
Write a J2ME Program to create Menu items on the GUI Application

Week 3:

Write a J2ME Program to Create an Mobile Information Device Profile (MIDP) Application
Write a J2ME Program to Send an SMS Using Networking Applications.

Week 4:

Write a J2ME Program to send an E-mail using Networking Applications.

Week 5:

Write a J2ME Program to Create an Mobile Media API Application

Week 6:

Write a J2ME Program to Create an Wireless Messaging API.

Week 7:

Write a J2ME Application to Create Bluetooth Wireless Technology Application Using JAVA APIs

Week 8:

Write a J2ME Program to Create Web Services APIs

Week 9:

Write a J2ME Program to Create Mobile 3D Graphics.

Week 10:

Write a J2ME Program to Create an Animation MIDLET.

Learning Resources:

Text Book:

[1] J. Schiller, *Mobile Communications*, Second ed.: PHI/Pearson Education.

IT 7053
MINI PROJECT

Lecture :	-	**Internal Assessment:**	50
Tutorial :	1 hrs / week	**Final Examination:**	-
Practical :	2 hrs / week	**Credits:**	1

Objectives:

- Analyze real world problems
- Learns to implement design methodologies based on the requirements
- Learns latest and advanced techniques in problem solving

Learning Outcomes: **Upon completion of the course the students will be familiar with :**

- Identification of real world problems
- Awareness of design methodologies & its implementation
- Advanced programming techniques
- Technical report writing

The following guidelines should be fulfilled:

1. Students shall be grouped into teams not exceeding three per team for pursuing minor project work.

2. Each team shall identify real life problem pertaining to a manufacturing /Service/Trading System and offer a Solution in the form of a Computer –Based System.

3. The team should put in a combined effort of 135 student hours (i.e, 3 students *45 hours per student) and submit their combined report. However, the reports should reflect the contributions of individuals.

4. The students shall select appropriate.

    - Analysis and Design Methodologies for the development of Computer Based Systems.
    - Operating System Platform, Programming Languages / Front – End and Back End Tools / Packages for implementation.
    - Software Testing Strategies and Techniques for testing the software.

5. The team shall follow the guidelines specified by the Head of the Department while preparing their Project Report.

The evaluation procedure will be as follows :

I Abstract of the project (Weightage of marks -10%)
It should be at least 500 words document with following milestones.

- Introduction
- Problem statement
- State of the art
- Objectives of the project
- Outcome

II PowerPoint presentation (Weightage of marks -25%)

- The presentation should be of maximum 12slides
- Slide agenda
- Introduction 1
- Problem statement/motivation1
- State of art 2-4 slides
- Implementation procedure4-6 slides
- Conclusion 1

III The students should submit Hard copy of complete report on their project with 15 pages (Weightage-25%)

IT 8001
SOFTWARE TESTING METHODOLOGIES

Lecture :	4 hrs/ Week	**Internal Assessment:**	30
Tutorial :	-	**Final Examination:**	70
Practical :	-	**Credits:**	4

Objectives:

- To learn to use the testing tools to carry out the functional testing, load/stress 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.
- The course will prepare students to be leaders in software testing.
- Identify the differences between various tools.

Learning Outcomes: **Upon completion of this course the student will be familiar with:**

- Applying different tools to test the application.
- To learn to use the following automated testing tools
  a) Win Runner/QTP for functional testing.
  b) Load Runner for Load/Stress testing
  c) Test Director for test management

UNIT I:

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

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

UNIT II:

Transaction Flow Testing:- Transaction flows, transaction flow testing techniques. Dataflow testing:- Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing.

Domain Testing: Domains and paths, Nice and Ugly domains, domain testing, domains and interfaces testing, domain and interface testing, domains and testability.

UNIT III:

Paths, path products and Regular expressions:-

Path products & Path expression, reduction procedure, applications, regular expressions and flow anomaly detection.

Logic Based Testing: Overview, decision tables, path expressions, kv charts, specifications.

UNIT – IV

State, State Graphs and Transition Testing:- State Graphs, good and bad state graphs, state testing, testability tips.

Graph matrices and Application:- Motivational overview, matrix of graph relations, power of a matrix, node reduction algorithm, building tools

Learning Resources:

Text Book:

[1] B. Beizer, *Software Testing Techniques*, second edition ed.: International Thomson Computer Press.
[2] B. Marick, *The craft of software testing*: Prentice Hall series in innovative technology.

Reference Books:

[3] Dr.K.V.K.K.Prasad, *Software Testing Tools*: Dreamtech.
[4] E. Kit, *Software Testing in the Real World*: Pearson.
[5] *Software Testing Techniques*: SPD(Oreille).

Web Resources

[6] jan 25). *Testing video NPTEL*. Available: http://nptel.iitm.ac.in/video.php?courseId=1076
[7] Jan 25). *software testing MIT*. Available: http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-912-introduction-to-copyright-law-january-iap-2006/video-lectures/lecture-4-software-licensing/

IT 8002 A
INDUSTRY BASED ELECTIVE

Lecture	**:**	4 hrs/ Week	**Internal Assessment:**	30
Tutorial	**:**	-	**Final Examination:**	70
Practical	**:**	-	**Credits:**	4

IT 8002 B
INFORMATION RETRIEVAL SYSTEMS

Lecture :	4 hrs/ Week	**Internal Assessment:**	30
Tutorial :	-	**Final Examination:**	70
Practical :	-	**Credits:**	4

Objectives:

- To study text processing techniques which are required to produce basic document retrieval systems.
- Helps to find features on commercial information retrieval systems through physical inspection.

Learning Outcomes: **Upon completion of this course students will be familiar with**

- Content-based retrieval approaches—Boolean, vector space, and probabilistic approaches.
- Search techniques for commercial, digital information access and retrieval systems.

UNIT I:

Introduction: Definition, Objectives, Functional Overview, Relationship to DBMS, Digital libraries and Data Warehouses.

Information Retrieval System Capabilities: Search, Browse, Miscellaneous.

UNIT II:

Cataloging and Indexing: Objectives, Indexing Process, Automatic Indexing, Information Extraction.

Data Structures: Introduction, Stemming Algorithms, Inverted file structures, N-gram data structure, PAT data structure, Signature file structure, Hypertext data structure.

UNIT III:

Automatic Indexing: Classes of automatic indexing, Statistical indexing, Natural language, Concept indexing, Hypertext linkages.

Document and Term Clustering: Introduction, Thesaurus generation, Item clustering, Hierarchy of clusters.

UNIT – IV

User Search Techniques: Search statements and binding, Similarity measures and ranking, Relevance feedback, Selective dissemination of information search, weighted searches of Boolean systems, Searching the Internet and hypertext. Information Visualization: Introduction, Cognition and perception, Information visualization technologies.

Text Search Algorithms: Introduction, Software text search algorithms, Hardware text search systems.

Information System Evaluation: Introduction, Measures used in system evaluation, Measurement example – TREC results.

Content beyond syllabus:

- Text categorization algorithms
- Information extraction and integration

Learning Resources:

Text Book:

[1] M. T. M. Gerald J Kowalski, Information Storage and Retrieval Systems: Springer International Edition,2005.

Reference Books:

[2] W. B. Frakes, Ricardo Baeza-Yates, *Information Retrieval Data Structures and Algorithms*: Prentice Hall PTR, 2000.
[3] R. Baeza-Yates, *Modern Information Retrival*: Pearson Education, 2000.
[4] R. Korfhage, *Information Storage & Retrieval*: John Wiley & Sons, 2006.

Web Resources

[5] G. Marchionini , Intersection of information retrieval and human-computer interaction Available:

IT8002 C
BIOINFORMATICS

Lecture :	4 hrs/ Week	**Internal Assessment:**	30
Tutorial :	-	**Final Examination:**	70
Practical :	-	**Credits:**	4

Objectives:

- Importance of Bioinformatics for computational learning.
- Basic biological databases , algorithms for proteomics and genomics analysis.
- Bioinformatics packages to solve the biological problems.

Learning Outcomes: **Upon completion of this course the student will be familiar with:**

- The differences between genomics and proteomics.
- To solve the biological problems using computational approach
- Internet packages of bioinformatics.

UNIT I:

Introduction and DNA Sequence analysis: Introduction to Bioinformatics: History of bioinformatics. Role of bioinformatics in biological sciences, Scope of bioinformatics, The Central dogma, DNA and Protein, Genetic code, Sequencing, Biological sequence/structure, Genome Projects, Pattern recognition an prediction, Folding problem, Sequence Analysis, Homology and Analogy.

UNIT II:

Data Bases in Bioinformatics:

Protein Information Resources: Biological databases, Primary sequence databases, Protein Sequence databases, Secondary databases, Protein pattern databases, and Structure classification databases.

Genome Information Resources: DNA sequence databases, specialized genomic resources

UNIT III:

Alignment Techniques:

Pair wise alignment techniques: Database searching, Alphabets and complexity, Algorithm and programs, Comparing two sequences, sub-sequences, Identity and similarity, The Dotplot, Local and global similarity, different alignment techniques, Dynamic Programming, Pair wise database searching.

Multiple sequence alignment: Definition and Goal, The consensus, computational complexity, Manual methods, Simultaneous methods, Progressive methods, Databases of Multiple alignments and searching.

UNIT – IV

Database Searching and Analysis Packages

Secondary database searching: Importance and need of secondary database searches,

secondary database structure and building a sequence search protocol
Analysis Packages: Analysis package structure, commercial databases, commercial software, comprehensive packages, packages specializing in DNA analysis, Intranet Packages, Internet Packages.

Content beyond the syllabus:
Sequence alignment
Patterns and sequence function relationships

Learning Resources:

Text Book:

[1] S. P. T. K Attwood & D J Parry-Smith, *Introduction to Bioinformatics*: Pearson Education Publications
[2] M. L. R. DanE K rane, Wright State University, *Fundamental concepts of*

Reference Books:

[3] C. N. Jean-Michel Claveriw, *Bioinformatics- A Beginner's Guide*: WILEY DreamTech -2003.
[4] S. M. D. Leon, *Sequence Analysis in A Nutshell*, 1 ed.: O'REILLY -2003.

Web Resources:

[5] Gauravreshu 24/01/2011). *Bioinformatics for better tomorrow*. Available:
[6] BakedMediacom. 24/01/2011). *Human Genone Project-3d animation*. Available:
[7] M. M.-. Berkely 24/01/2011). *Bioinfomatics*. Available: http://academicearth.org/lectures/bioinformatics

IT 8002 D
E-COMMERCE

Lecture :	4 hrs/ Week	**Internal Assessment:**	30
Tutorial :	-	**Final Examination:**	70
Practical :	-	**Credits:**	4

Objectives:

- To study the mechanism of business transactions through electronic media. and Payment transactions in a secured network.
- To learn different modes of E-Commerce like Electronic data interchange.
- Aims to web site establishment, electronic publishing and its importance.

Learning Outcomes: **Upon completion of this course the student will be familiar with:**

- Various components of e-commerce
- Dynamics of e-commerce.
- Internet technology and its utility in commercial activities.
- Methodology of online business dealings using e-commerce infrastructure.

UNIT I:

Electronic Commerce Environment and Opportunities: Background, The Electronic Commerce Environment, Electronic Marketplace Technologies. **Modes of Electronic Commerce:** Electronic Data Interchange, Migration to Open EDI, Electronic Commerce with www/Internet, Commerce Net Advocacy, web Commerce Going Forward. Approaches to Safe Electronic Commerce: Secure Transport Protocols, Secure Transactions, Secure Electronic Payment Protocol (SEPP), Secure Electronic Transaction (SET), Certificates for authentication Security on web Servers and Enterprise Networks.

UNIT II:

Electronic Cash and Electronic Payment Schemes: Internet Monetary Payment & Security Requirements. Payment and Purchase Order Process, On-line Electronic cash.**Internet/Intranet Security Issues and Solutions** : The need for Computer Security, Specific Intruder Approaches, Security Strategies, Security Tools, Encryption, Enterprise Networking and Access to the Internet, Antivirus Programs, Security Teams.

UNIT III:

Master Card/Visa Secure Electronic Transaction: Introduction, Business Requirements, Concepts, payment Processing. E-Mail and Secure E-mail Technologies for Electronic Commerce: Introduction, The Means of Distribution, A model for Message Handling, E-mail working, Multipurpose Internet Mail Extensions, Message Object Security Services, Comparisons of Security Methods, MIME and Related Facilities for EDI over the Internet.

UNIT – IV

Internet Resources for Commerce: Introduction, Technologies for web Servers, Internet

Tools Relevant to Commerce, Internet Applications for Commerce, Internet Charges, Internet Access and Architecture, Searching the Internet. Advertising on Internet: Issues and Technologies. Introduction, Advertising on the Web, Marketing creating web site, Electronic Publishing Issues, Approaches and Technologies: EP and web based EP.

Content Beyond Syllabus

- Definition and capabilities – limitation of agents – security – web based marketing – search engines and

- Directory registration – online advertisements – Portables and info mechanics – website design issues.

Learning Resources:

Text Book:

[1] E. M. Daniel Minoli, *Web Commerce Technology Handbook*: TATA McGraw-Hill-1999.

Reference Books:

[2] A. B. W. Ravi Kalakotar, *Frontiers of Electronic Commerce*: Pearson Education - 1996.
[3] A. S. G. a. A. Kahate, *Web Technologies TCP/IP to Internet Application Architectures* 2003Tata McGraw-Hill.
[4] P.Schneider, *Electronic Commerce* . , 8 ed.: Cengage Learning Technologies

Web resources:

.

[5] P. I. Senguptha. 24/01/2011). *e-commerce*

[6] P. I. Senguptha *Intranet, Extranet and Firewall.*
[7] P. I. Senguptha *E-mail*

IT 8002 E
ADVANCED COMPUTER ARCHITECTURE

Lecture :	4 hrs/ Week	**Internal Assessment:**	30
Tutorial :	-	**Final Examination:**	70
Practical :	-	**Credits:**	4

Objectives:

- Helps to know fundamental aspects of computer architecture design and analysis.
- To study Processor design, pipelining, superscalar, out-of-order execution, caches (memory hierarchies), virtual memory, storage systems, and simulation techniques.
- Describes the Models of Parallel computers and the fundamentals of parallelism concepts and network properties, Massively parallel computers, scalar processors.
- Design principles and operation of new (multi-)processor architectures, and evaluate them both qualitatively and quantitatively.
- To learn Principles of multithreading.

Learning Outcomes: **Upon completion of this course the student will be familiar with:**

- Principles of parallel processing.
- Issues in high performance processor design.
- Advanced processors, cache and memory technology and data dependencies.
- Parallel program development and Environments.
- Theory of parallelism, various hardware technologies, software for parallel programming.
- Pipelining techniques, parallel and scalable architectures

UNIT I:

Introduction to Parallel Processing: Trends towards parallel processing, Parallelism in uni-processer systems, Parallel computer structures, Architectural classification schemes, Parallel processing applications, memory hierarchy in parallel processing systems, addressing schemes.

Principles of Pipelining And Vector Processing: Pipelining, principles of linear pipelining, classification of pipeline processors, general principles and Reservation tables, interleaved memory organization, Instruction & arithmetic pipelines, Principles of designing pipeline processors, Vector processing Requirements.

UNIT II:

SIMD array processors, organization, masking and routing mechanisms, inter PE communications, SIMD interconnection networks, single stage and multi stage networks, mesh connected Iliac networks, parallel shifter, shuffle exchange and omega networks,

parallel algorithms for array processors, matrix multiplication, parallel sorting, fast Fourier transform computation, associative array processor.

UNIT III:

Multiprocessor architecture: Loosely coupled and tightly coupled multiprocessor systems, processor characteristics, interconnection networks, crossbar switch and multi port memories, multi stage networks, banyan and delta networks parallel memory organization, multiprocessing operating systems, classification and requirements, software requirements for MPS, language features to exploit parallelism, multi processor scheduling strategies, parallel algorithms.

UNIT – IV

Data flow computers: Control flow versus data flow, data flow computer architectures, data flow graphs, data flow languages, Dennis and Irvine machines, dataflow design alternatives, dependence driven and multi level event driven approaches, VLSI computing structures, systolic array architecture, VLSI matrix arithmetic processor.

Content Beyond Syllabus:

Symmetric and distributed shared memory architectures – Performance issues – Synchronization – Models of memory consistency – Multithreading.

Learning Resources:

Text Book:

[1] B. F. A. Hwang K, *Computer Architecture and parallel processing* Tata McGraw-Hill-1990.

Reference Books:

[2] Sima, *Advanced Computer Architecture: A Design Space Approach* Pearsoneducation-2009.

[3] K. A. Parthasarthy, *Advanced Computer Architecture* 2ed.: Vijay Nicole.

Web Resources:

[4] V. V. UNIVERSITY). *Advanced Computer Architecture* Available:

[5] P. A. Kuma. *Computer Architecture*. Available:

IT 8003 A
SOFT COMPUTING

Lecture :	4 hrs/ Week	**Internal Assessment:**	30
Tutorial :	-	**Final Examination:**	70
Practical :	-	**Credits:**	4

Objectives:
- This course introduces the basics of Neural Networks and essentials of Artificial Neural Networks.
- Learn how to apply soft computing techniques to practical problems

Learning Outcomes: **Upon completion of this course the students will be able to understand:**
- Understand the need and usage of Neural Networks in various areas.
- Know the steps involved in the development of Soft Computing.
- Design and implement computing systems by using appropriate Artificial Neural Networks.

UNIT I

Introduction:What is a Neural Net, |How are Neural Networks used. **Simple Neural Networks for Pattern Classification**: General Discussion: Architecture, Biases and Thresholds, Linear separability, Data Representation, **Hebb Net**: Algorithm, Application, **Perceptron**: Architecture, Algorithm, Application, Perceptron Learning Rule Convergence Theorem. **Adaline:** Architecture, Algorithm, Applications, Derivations, Madaline.

UNIT II

Discrete Hopfield Net, Hamming Net, **Kohonen Self-Organizing Maps**: Architecture, Algorithm **Learning Vector Quantization**: Architecture, Algorithm, Application, Variations,

UNIT III

Adaptive Resonance Theory: Introduction: Motivation, basic architecture, basic operation. **ART1:** Architecture, Algorithm, Application, Analysis **ART2:** Architecture, Algorithm, Application, Analysis.

UNIT IV

Standard Back Propagation Neural Net: Architecture, Algorithm, Applications**, Fixed Weight Nets for Constrained Optimization:**Gaussian Machine, Cauchy Machine Boltzmann Machine with Learning, Simple Recurrent Net.

Learning Resources:

Text Book:

[1] Fundamentals of Neural Networks – Laurence Fausett, Pearson Education.

Reference Books:

[2] Neural Networks – James A.Freeman/ David A.Skapura,Pearson Education.
[3] Neural Networks – Simon Haykin – 2nd edition, Pearson Education.

Web Resources

[4] (P Somnath Sengupta 20 January). *Lecture Series on Neural Networks NPTEL*. Available: http://nptel.iitm.ac.in/video.php?courseId=1114

IT 8003 B
BUSINESS INTELLIGENCE AND ITS APPLICATION

Lecture :	4 hrs/ Week	**Internal Assessment:**	30
Tutorial :	-	**Final Examination:**	70
Practical :	-	**Credits:**	4

Objectives:

- The course exposes engineering students to Business Intelligence domain.
- Gives introduction to BI terminologies and framework, basics of data integration (Extraction Transformation Loading), multi-dimensional data modeling, basics of enterprise reporting and application of the concepts using open source/Microsoft tools.

Learning Outcomes:

Upon completion of this course the student will be familiar with:

- Differentiate between Transaction Processing and Analytical applications and describe the need for Business Intelligence
- Demonstration and understanding of technology and processes associated with Business Intelligence framework
- Demonstrate understanding of Data Warehouse implementation methodology and project life cycle
- Functionalities for a given business scenario, identify the metrics, indicators and make recommendations to achieve the business goal
- Design an enterprise dashboard that depicts the key performance indicators which helps in decision making
- application of concepts in Microsoft BI suite

UNIT I:

Introduction to Business Intelligence:

Introduction to OLTP and OLAP, BI Definitions & Concepts, Business Applications of BI, BI Framework, Role of Data Warehousing in BI, BI Infrastructure Components – BI Process, BI Technology, BI Roles & Responsibilities

UNIT II:

Basics of Data Integration (Extraction Transformation Loading), Concepts of data integration need and advantages of using data integration, introduction to common data integration approaches, introduction to ETL using SSIS, Introduction to data quality, data profiling concepts and applications**.**

UNIT III:

Introduction to Multi-Dimensional Data Modeling:

Introduction to data and dimension modeling, multidimensional data model, ER Modeling

vs. multi dimensional modeling, concepts of dimensions, facts, cubes, attribute, hierarchies, star and snowflake schema, introduction to business metrics and KPIs, creating cubes using SSAS

UNIT – IV

Basics of Enterprise Reporting

Introduction to enterprise reporting, concepts of dashboards, balanced scorecards, introduction to SSRS Architecture, enterprise reporting using SSRS.

Content beyond the syllabus:

BI application areas, specification of these areas, BI in the company management, effects of BI applications

Learning Resources:

Text Books:

[1] D. Loshin, *Business Intelligence*: Morgan Kaufmann Publishers, 2003.

Reference Books:

[2] M. Biere, *Business intelligence for the enterprise*, 2 ed.: IBM Press, 2003.
[3] C. Howson, *Successful Business Intelligence: Secrets to making Killer BI Applications*, 1 ed.: McGraw-Hill 2007.
[4] L. Langit, *Foundations of SQL Server 2005*, 1 ed., 2007.

Web Resources:

[5] Angela Shen-Hsieh. 20 January). Available: http://www.techrepublic.com/videos/whiteboard/next-generation-of-business-intelligence/218297
[6] John O'Brien. 20 January). *Web Course CTO of Dataupia*. Available: http://www.techrepublic.com/videos/whiteboard/greening-the-data-center/177737?tag=mantle_skin;content

IT 8003 C
PRINCIPLES OF TCP/IP

Lecture :	4 hrs/ Week	**Internal Assessment:**	30
Tutorial :	-	**Final Examination:**	70
Practical :	-	**Credits:**	4

Objectives:

- Develop a solid conceptual understanding of the essentials and design issues underlying a wide spectrum of modern computer network technologies with focus on the TCP/IP model.
- Provide students with an opportunity to gain practical insights and hands-on experience on using networking hardware, software and tools.
- To learn the principles and architecture of TCP/IP.

Learning Outcomes: **Upon completion of this course the student will be familiar with:**

- Identification of various network services, characteristics, elements, standards and technologies.
- Describes the layered architecture of TCP/IP and the operation of main protocols in the TCP/IP model.
- routing between peers using RIP and OSPF.
- simple client-server applications using socket programming.
- the ability to setup a small network and properly configure network components including switches, routers and services (such as ARP, RARP, DNS, Web, DHCP, POP3).

UNIT I:

Introduction and Overview: The Motivation for Internetworking, The TCP/IP Internet, Internet Services History And Scope Of The Internet. The Socket Interface Introduction Adding Network I/O to UNIX, Socket Programming. Review Of Underlying Network Technologies Network Hardware Addresses, Ethernet Technology, Switched Ethernet Asynchronous Transfer Mode

UNIT II:

Protocol Layering:The Need for Multiple Protocols. TCP/IP 5-Layer Reference Model Layering in a TCP/IP Internet Environment, Two Important Boundaries In The TCP/IP Model The Basic Idea Behind Multiplexing and demultiplexing

UNIT III:

Routing Between Peers (BGP): Autonomous System Concept, Exterior Gateway Protocols and Reachability. BGP Routing algorithm, Routing within an Autonomous System (RIP, OSPF) Internet Multicasting IGMP, Multicast Routing Protocols IP Switching and MPLS

UNIT – IV

Mobile IP:Mobility, Routing, and Addressing Overview Of Mobile IP Operation Foreign Agent Discovery, Agent Registration Communication With A Foreign Agent Datagram Transmission And Reception Bootstrap and Auto configuration (DHCP) Network Management (SNMP) Internet Security And Firewall Design (IPsec, SSL) A Next Generation IP (IPv6)

Content beyond the syllabus:

Address Resolution protocols,IP Protocol

Learning Resources:

Text Books:

[1] Douglas and Comer, Internetworking with TCP/IP Principles, Protocols, and Architecture, 4 ed. vol. 1: PHI, 2000.

Reference Books:

[2] Behrouz and Forouzan, TCP/IP Protocol Suite, 2 ed.: Tata McGraw Hill publications, 2005.

[3] Gary, et al., TCP/IP Illustrated vol. 2: Pearson Education, 2002.

Web Resources:

[4] P. I. Sengupta and 20 January). Principles of TCP/IP NPTEL. Available: http://freevideolectures.com/Course/2308/Internet-Technology/5#

[5] S. Bowne and TCP/IP Concepts Review Course City College of San Francisco. Available: http://www.securitytube.net/TCP-IP-Concepts-Review-Lecture-by-Sam-Bowne-video.aspx

IT 8003 D
PATTERN RECOGNITION

Lecture :	4 hrs/ Week	**Internal Assessment:**	30
Tutorial :	-	**Final Examination:**	70
Practical :	-	**Credits:**	4

Objectives:

- The concept of patterns and the basic approach to the development of pattern recognition algorithms
- To study the methods for data preprocessing, feature extraction, and feature selection to multivariate data
- Describes supervised and unsupervised classification methods to detect and characterize patterns in real-world data
- Helps to know prototype for pattern recognition algorithms that can be used to study algorithm behavior and performance against real-world multivariate data.

Learning Outcomes:

Upon completion of this course the student will be familiar with:

- the underlying principles of pattern recognition and on the methods used to develop and deploy applications in the real world.
- the pattern recognition application development process, which includes problem identification, concept development, algorithm selection, system integration, and test and validation.
- the basic concepts and methods for the recognition of patterns in data.
- working knowledge of the pattern recognition application development process.

UNIT I:

Introduction: Machine perception, pattern recognition systems, the design cycle, learning and adaptation. Bayesian Decision Theory: Introduction, continuous features – two categories classifications, minimum error-rate classification- zero–one loss function, classifiers, discriminant functions, and decision surfaces.

UNIT II:

Normal density: Univariate and multivariate density, discriminant functions for the normal density different cases, Bayes decision theory – discrete features, compound Bayesian decision theory and context. Maximum likelihood and Bayesian parameter estimation: Introduction, maximum likelihood estimation, Bayesian estimation, Bayesian parameter estimation–Gaussian case.

UNIT III:
Problems of dimensionality: Accuracy, Dimension and Training Sample size, Computational Complexity, Overfitting. Component analyses and discriminants: Principal component analysis, Fisher Linear Discriminant, Multiple Discriminant Analysis. Hidden Markov Models: First- Order Markov Models, First- Order Hidden Markov Models, Hidden Markov Model computation, Evaluation, Decoding, Learning

UNIT – IV
Un-supervised learning and clustering: Introduction, mixture densities and identifiability, maximum likelihood estimates, application to normal mixtures, K-means clustering. Date description and clustering – similarity measures, criteria function for clustering.
Component analysis: Principal component analysis, Nonlinear component analysis; Low dimensional representations and multi dimensional scaling.

Contents beyond syallabus
Discrete Hidden Morkov Models, Continuous hidden Markov models

Learning Resources:

Text Book:
[1] Richard, *et al.*, *Pattern classifications,*, 2 ed.: Stroke. Wiley student edition, .
Reference Books:
[2] Earl Gose and Richard John baugh, *Pattern Recognition and Image Analysis*: PHI, 2004.
[3] B. H. Lawerence Rabiner, *Fundamentals of speech Recognition,*: Prentice Hall,United States ed edition, 1993.

Web Resources:

[4] P. S. N. Srihari and *Web course Department of Computer Science & Engineering, University of buffalo*. Available: http://www.cedar.buffalo.edu/~srihari/CSE555/
[5] P. U. Park. 20 January). *Web course Computer Science and Engineering Michigan State University* Available: http://www.cse.msu.edu/~cse802/#Schedule

IT 8003 E
MIDDLEWARE TECHNOLOGIES

Lecture :	4 hrs/ Week	**Internal Assessment:**	30
Tutorial :	-	**Final Examination:**	70
Practical :	-	**Credits:**	4

Objectives:

- To study of Client Server Computing is an advanced course for making the students aware of the latest technologies like Middleware and Enterprise Integration technologies.
- To know the technical as well as business/management aspects of modern distributed computing environments.
- To know the major building blocks of contemporary distributed applications, middleware services, Web Services, component-based architectures, and enterprise application integration

Learning Outcomes: **Upon completion of this course the student will be familiar with:**

- The benefits and architecture of Client Server Technology.
- The concepts of middle ware technologies like CORBA, RMI and .Net technologies.
- The building components of C# .Net applications.
- The architecture of CORBA and mapping the CORBA with existing Programming languages like Java.
- The integration of component based architectures with Enterprise applications.

UNIT I:

Introduction to Client Server Computing: Evolution of corporate computing models from centralized to distributed computing, client server models. Benefits of client server computing, pitfalls of client server programming.

Introduction to Middleware Technologies: CORBA with Java: Review of Java concept like RMI, RMI API, JDBC. Client/Server CORBA-style, The object web: CORBA with Java.

UNIT II:

Introducing C# and the .NET Platform; Understanding .NET Assemblies; Object – Oriented Programming with C#; Callback Interfaces, Delegates, and Events.

Building c# applications: Type Reflection, Late Binding, and Attribute-Based Programming; Object Serialization and the .NET Remoting Layer; Data Access with ADO.NET; XML Web Services.

UNIT III:

Core CORBA / Java: Two types of Client/ Server invocations-static, dynamic. The static CORBA, first CORBA program, ORBlets with Applets, Dynamic CORBA-The portable count, the dynamic count, multicount.

Existential CORBA: CORBA initialization protocol, CORBA activation services, CORBAIDL mapping CORBA java- to- IDL mapping, The introspective CORBA/Java object.

UNIT – IV

Java Bean Component Model: Events, properties, persistency, Introspection of beans, CORBA Beans. **EJBs and CORBA:** Object transaction monitors CORBA OTM's, EJB and CORBA OTM's, EJB container frame work, Session and Entity Beans, The EJB client/server development Process The EJB container protocol, support for transaction EJB packaging EJB design Guidelines.

Content Beyond Syllabus:

COM and .NET, Web Services Technologies

Learning Resources:

Text Books:

[1] R. Orfali and D. Harkey, *Client/Server programming with Java and CORBA*, 2 ed.: John Wiley & Sons ,SPD.

[2] G.Brose, *et al.*, *Java programming with CORBA*, 3 ed.: Wiley-dreamtech, India John wiley and sons.

Reference Books:

[3] M. L. L. , *Distributed Computing, Principles and applications*: Pearson Education.

[4] R. O. D. Harkey and J. Edwards, *Client/Server Survival Guide*, 3 ed.: John Wiley & Sons.

Web Resources

[5] Prof. I. Sengupta. 20 January). *Lecture Series on Internet Technologies Department of Computer Science Engineering, IIT Kharagpur*. Available: http://freevideolectures.com/Course/2308/Internet-Technology/9#

[6] Dave Goddeau. 22 January). *Lecture Series on java ArsDigita University*. Available: http://csvls.blogspot.com/2010/06/download-java-video-lectures.html

IT 8051
SOFTWARE TESTING TOOLS LAB

Lecture :	-	**Internal Assessment:**	25
Tutorial :	-	**Final Examination:**	50
Practical :	3 Hrs/Week	**Credits:**	2

Objectives:

- Practice writing test plans
- White box and block box testing methods
- Practice debugging the programs
- Practice testing tools.

Learning Outcomes:

Up on completion of this course, students will be familiar with:

- Writing test plans for different application programs
- Test different applications manually and by automation using different test tools

LIST OF PROGRAMS

Week 1

Implement Unit Testing for the following scenarios:

Exercise all logical decisions on their true and false sides
Exercise all loops at their boundaries and with in their operational bounds
Exercise internal data structure to ensure their validity
Exercise internal program structure to ensure performance

Week 2

Test using Top-down integration testing and bottom-up integration testing.

Week 3

Implement System Testing for the following scenarios:

a) Functional specification based testing
b) User Interface testing

Week 4

Using WinRunner test for the following scenarios:

a) GUI Checkpoint
b) Bitmap checkpoint
c) Database Checkpoint
d) Text checkpoint

Week 5

Use Load Runner for the following functional testing scenarios:

a) Performance testing
b) Procedure Testing
c) configuration testing

Week 6

Use Silk Tester for the following functional testing scenarios:
a) Load testing
b) Usability Testing
c) Storage testing

Week 7

Use Check Tester for the following functional testing scenarios:
a) Recovery testing
b) Load/Stress Testing
c) Procedure testing

Week 8

Use CASE Tool for the following functional testing scenarios:
a) Performance testing
b) Procedure Testing
c) configuration testing

Week 9

9. Use HP Win Runner for the following functional testing scenarios:
a) Performance testing
b) Procedure Testing
c) configuration testing

Week 10

Use WET Web Tester for the following functional testing scenarios:
a) Performance testing
b) Procedure testing
c) Configuration testing

Week 11

Use CF-Test for the following functional testing scenarios:
a) Performance testing
b) Procedure Testing
c) configuration testing

Week 12

Use Load Runner for the following testing scenarios:

a) Recovery testing
b) Installation Testing
c) Security testing

Learning Resources:

Text Book:

[1] Prasad K.V.V.K, *Software Testing Tools*: Dreamtech, 2004.
[2] E. Dustin, *et al.*, *Automated software testing*: Addison-Wesley, 1999.
[3] KanglinLi and MengqiWu, *Effective software test automation*: Wiley, 2004.

IT 8052
MAJOR PROJECT

Lecture	**:**	2 hrs / week	**Internal Assessment:**	50
Tutorial	**:**	6 hrs / week	**Final Examination:**	100
Practical	**:**	10 hrs / week	**Credits:**	12

Objectives:

- Analyze real world problems
- Learns to implement design methodologies based on the requirements
- Learns latest and advanced techniques in problem solving

Learning Outcomes: **Upon completion of the course the students will be familiar with :**

- Identification of real world problems
- Awareness of design methodologies & its implementation
- Advanced programming techniques
- Technical report writing

The following guidelines should be fulfilled:

1. Students shall be grouped into teams not exceeding three per team for pursuing minor project work.

2. Each team shall identify real life problem pertaining to a manufacturing /Service/Trading System and offer a Solution in the form of a Computer –Based System.

3. The team should put in a combined effort of 135 student hours (i.e, 3 students *45 hours per student) and submit their combined report. However, the reports should reflect the contributions of individuals.

4. The students shall select appropriate.

    - Analysis and Design Methodologies for the development of Computer Based Systems.
    - Operating System Platform, Programming Languages / Front – End and Back End Tools / Packages for implementation.
    - Software Testing Strategies and Techniques for testing the software.

5. The team shall follow the guidelines specified by the Head of the Department while preparing their Project Report.

The evaluation procedure will be as follows :

I Abstract of the project (Weightage of marks -10%)
It should be at least 500 words document with following milestones.

- Introduction
- Problem statement
- State of the art
- Objectives of the project
- Outcome

II PowerPoint presentation (Weightage of marks -25%)

- The presentation should be of maximum 12slides
- Slide agenda
- Introduction 1
- Problem statement/motivation1
- State of art 2-4 slides
- Implementation procedure4-6 slides
- Conclusion 1

III The students should submit Hard copy of complete report on their project with 15 pages (Weightage-25%)