KANNUR UNIVERSITY

FACULTY OF ENGINEERING

Curricula, Scheme of Examinations & Syllabus for Semesters V & VI of B.Tech. Degree Programme in Information Technology with effect from 2007 Admissions

FIFTH SEMESTER

Code	Subject	Hours/Week			Sessional Marks	University Examination	
		L	T	P/D		Hrs	Marks
2K6 IT 501	Engineering Mathematics IV	3	1	-	50	3	100
2K6 IT 502	Economics & Business Management	3	1	-	50	3	100
2K6 IT 503	Theory of Automata & Formal Languages	3	1	-	50	3	100
2K6 IT 504	Database Management Systems	3	1	-	50	3	100
2K6 IT 505	Operating Systems	3	1	-	50	3	100
2K6 IT 506	Software Engineering	3	1	-	50	3	100
2K6 IT 507(P)	Programming Environment Lab	-	-	3	50	3	100
2K6 IT 508(P)	DBMS & OS Lab	-	-	3	50	3	100
TOTAL		**18**	**6**	**6**	**400**	**-**	**800**

SIXTH SEMESTER

Code	Subject	Hours/Week			Sessional Marks	University Examination	
		L	T	P/D		Hrs	Marks
2K6 IT 601	Environmental Engg: & Disaster Management	3	1	-	50	3	100
2K6 IT 602	Graph Theory & Combinatorics	3	1	-	50	3	100
2K6 IT 603	Web Engineering & Information Technology Ethics	3	1	-	50	3	100
2K6 IT 604	Computer Graphics & Multimedia	3	1	-	50	3	100
2K6 IT 605	Computer Networks	3	1	-	50	3	100
2K6 IT 606	Elective - I	3	1	-	50	3	100
2K6 IT 607(P)	Networks Lab	-	-	3	50	3	100
2K6 IT 608(P)	Software Engineering Lab	-	-	3	50	3	100
TOTAL		**18**	**6**	**6**	**400**	**-**	**800**

Elective I

2K6 IT 606 (A) – Communication and Information Theory
2K6 IT 606 (B) – Digital Signal Processing
2K6 IT 606 (C) – Software Project Management
2K6 IT 606 (D) – Computational Intelligence
2K6 IT 606 (E) – Advanced Data Structures
2K6 IT 606 (F) – Computer Architecture
2K6 IT 606 (G) – Advanced Mobile Communication Systems
2K6 IT 606 (H) – Human Computer Interaction

2K6 IT 501 ENGINEERING MATHEMATICS IV

3 hours lecture and 1 hour tutorial per week

Module I Probability distributions (13 hours)

Random variables-Probability distributions - binomial distribution –Poisson distribution-normal distribution –Mean, variance and Moment generating function -Poisson process - Chebyshev's theorem- Geometric Distribution-Uniform Distribution, Gamma distribution, Beta Distribution, Exponential Distribution and Hyper-Geometric Distributions.

Module II Statistical inference (13hours)

Population and Sample-Sampling Distributions of Mean and Variance-Point Estimation-Interval Estimation -Null Hypotheses and Significance tests-Hypotheses concerning one mean- Confidence Intervals of mean and variance - Estimation of Variances-Hypotheses concerning one variance-Hypotheses concerning two variance- Chi square test as test of goodness of fit.

Module III (Series solutions of differential equations (13hours)

Power series method of solving ordinary differential equations - series solution of Bessel's equation – Recurrence formula for Jn(x)-expansions for J_0 and J_1 – value of $J_{1/2}$- generating function for Jn(x)- Orthogonality of Bessel functions - Legendre's equation – series solution of Legendre's differential equation -Rodrigues formula-Legendre Polynomials – Generating function for Pn(x)- Recurrence formulae for Pn(x) -Orthogonality of Legendre polynomials

Module IV Quadratic forms and Fourier Transforms (13 hours)

Quadratic forms - Matrix associated with a quadratic form - Technique of Diagonalization using row and column transformations on the matrix - Definite, Semidefinite and Indefinite forms - their identification using the Eigen values of the matrix of the quadratic form.

Fourier Transform-Properties of Fourier Transforms-Linearity property-Change of scale property-shifting properties –Modulation property-Transform of the Derivative-simple problems- Fourier Cosine transform-Fourier Sine Transform.

Text book

Johnson RA, Miller & Freund's Probability and Statistics for Engineers, Prentice Hall of India
(For Module I and II only)

Reference Books

1. Wylie C R & Barrett L. C., Advanced Engineering Mathematics, Mc Graw Hill
2. Kreyszig E., Advanced Engineering Mathematics, John Wiley.
3. Bali N. P. & Manish Goyal, A Text book of Engineering Mathematics, Laxmi Publications
4. Grewal B. S, Higher Engineering Mathematics, Khanna Publishers

Sessional work assessment

Two tests	2 x 15 = 30
Two assignments	2 x 10 = 20
Total marks	= 50

University Examination Pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module.
Q II - 2 questions of 15 marks each from module I with choice to answer any one.
Q III - 2 questions of 15 marks each from module II with choice to answer any one.
Q IV - 2 questions of 15 marks each from module III with choice to answer any one.
Q V - 2 questions of 15 marks each from module IV with choice to answer any one.

2K6 IT 502 ECONOMICS & BUSINESS MANAGEMENT

3 hours lecture and 1 hour tutorial per week

Module I (12 hours)

Definition of economics-nature and scope f economic science-nature and scope of managerial economics-central problems of an economy-scarcity and choice-opportunity cost-objectives of business firms-forms of business-proprietorship-partnership-joint stock company-co-operative organization-state enterprise

Module II (14hours)

Consumption – wants –characteristics of wants- law of diminishing marginal utility- demand – law of demand-elasticity of demand- types of elasticity-factors determining elasticity-measurement- its significance in business-demand forecasting-methods of demand forecasting- supply – law of supply- elasticity of supply

Module III (14hours)

Production – factors of production – features of production – features of factors of production- division of labour – production function- Cobb-Douglas production function-production possibility curve-isoquants-marginal rate of technical substitution- properties of isoquants -law of variable proportions- returns to scale-isocost line-least cost combination of factors-expansion path-technical and economical efficiency-linear programming –graphical method-economics of large scale production.

Module IV (12hours)

Market structures and price determination – perfect competition-monopoly -monopolistic competition-oligopoly-kinked demand curve-money and banking-nature and functions of money-money market and capital market-commercial banks –functions-central banking functions-methods of credit control.

Text books and References

1 Varshney R.L & Maheshwari K.L , Managerial economics, S Chand & Co. Ltd..
2 Dwiivedi D.N, Managerial Economics, Vikas Publishing House Pvt Ltd
3. Dewett K.K, Modern Economic theory, S Chand & company Ltd.
4. Barthwal A.R ,Industrial Economics, New Age International Publishers
5. Benga T.R & Sharma S.C, Industrial Organization and Engineering Economics , Khanna Publishers
6. Ahuja H.L Modern Micro Economics –Theory and Applications , S Chand & Co. Ltd
7. Koutsoyiannis A , Modern Microeconomics, Macmillan Press Ltd.
8. Joel Dean, managerial Economics Prentice-Hall of India Pvt Ltd.
9. Dewett .K.K& Verma J.D,Elementary Economic Theory , S Chand & Co. Ltd.
10. Jhingan M.L., Macro Economic theory , Vrinda Publications Pvt.Ltd.

Sessional work assessment

Two tests	2 x 15 = 30
Two assignments	2 x 10 = 20
Total	= 50

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module.
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one.
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one.
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one.
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 IT 503 THEORY OF AUTOMATA & FORMAL LANGUAGES

3 hours lecture and 1 hour tutorial per week

Module I (14 hours)
Introduction; alphabets, Strings and Languages; Automata and Grammars -Finite automata (FA) -DFA-NFA – Finite Automata with epsilon-transitions-Equivalence of DFAs and NFAs -Regular expressions (RE) -Definition, RE to FA, FA to RE, algebraic laws for RE, applications of REs. -Regular grammars and FA -Proving languages to be non-regular -Pumping Lenma – Applications. Closure properties of Regular languages -Closure under Boolean operations, reversal, homomorphism, inverse homomorphism, etc. –Myhill-Nerode theorem-DFA Minimization -Decision properties of Regular languages - Two-way finite automata, Finite automata with output.

Module II (13 hours)
Context-free Grammars (CFG) -Parse tree - Ambiguity in grammars and Languages-Applications of CFG-Pushdown Automata (PDA) -Equivalence of PDAs and CFGs -DPDAs -Definition, DPDAs and Regular Languages,-DPDA and Ambiguous grammars--CYK algorithm -Simplification of CFGs -Normal forms -CNF and GNF --Pumping lemma for CFLs,Closure properties of CFLs - Decision properties of CFL.

Module III (13 hours)
Turing Machines -Formal definition and behavior - TM as a computer of integer functions -Programming techniques for TMs -Storage in state, multiple tracks, subroutines, etc.-Computing a partial function with Turing machine-Variants of TMs –Multitape TMs, Nondeterministic TMs. -TMs with semi-infinite tapes, multistack machines.-universal Turing Machines-Equivalence of the various variants with the basic model- Models of computation and Church-Turing Thesis.

Module IV (13 hours)
Computability – Closure properties of recursive and recursively enumerable language. Undecidability- A language that is not RE – An undecidable problem that is RE – Undecidable problems about TM-Halting problem – Post Correspondence Problem – The Chomsky hierarchy – Context sensitive language and LBA –Equivalence of LBA and CSG.

Text books
1. J E Hopcroft And J D Ullman : Introduction to Automata Theory and Computation, Addison Wesley
2. John C Martin : Introduction to Languages and the Theory of Computation(3 rd Edition) , TMH

Reference books

1. H R Lewis and C H Papadimitriou : Elemnts of Theory of Computation
2. Sipser : Introduction to theory of Computation, CENAGE LEARNING Indian Edition
3. Linz P : An Introduction to Formal Languages and Automata, Narosa

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern
Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 IT 504: DATABASE MANAGEMENT SYSTEMS

3 hours lecture and 1 hour tutorial per week

Module I (12 hours)

Introduction - Characteristics of Database approach - Advantages of using DBMS approach - Data models - schemas and instances - Three-schema architecture and data independence - Database languages and interfaces - The database system environment - Centralized and client-server architectures - Classification of Database Management systems.

Entity-Relationship Model - Entity Types, Entity Sets, Attributes and Keys - Relationship types, Relationship Sets, Roles and Structural Constraints - Weak Entity Types - Refining the ER Design - ER Diagrams and Naming Conventions - Example of Other Notation: UML Class Diagrams

Module II (16 hours)

Relational Model and Relational Algebra - Relational Model Concepts - Constraints - Relational Database Schemas – Relational Algebra: Unary Operations - Set Theoretic operations - Binary Operations - Aggregate functions and grouping – Outer Join and Outer Union - Examples of Queries - The Tuple Relational Calculus - The Domain Relational Calculus

SQL - Data Definition and Data Types - Specifying constraints - Schema change statements - Basic queries – Aggregate functions and grouping - Insert, Delete and Update statements - Assertions and Triggers - Views

Database Design - Informal Design Guidelines for Relation Schemas - Functional Dependencies - Normal Forms Based on Primary Keys (Up to BCNF) - Properties of Relational Decompositions - Algorithms for Relational Database Schema Design - The Database Design and Implementation Process - Use of UML Diagrams in database design.

Module III (12 hours)

Disk Storage, Basic File Structures, and Hashing - Secondary Storage Devices – Placing File Records on Disk - Operations on Files - Heap Files - Sorted Files - Hashing Techniques - Parallelizing Disk Access Using RAID Technology - New Storage Systems

Indexing Structures for Files - Types of Single-Level Ordered Indexes - Multilevel Indexes - Dynamic Multilevel Indexes Using B-Trees and B+ Trees - Indexes on Multiple Keys

Module IV (14 hours)

Transaction Management - Transaction and System Concepts – ACID Properties - Schedules - Characterizing Schedules Based on Recoverability and Serializability - Transaction Support in SQL

Concurrency Control Techniques - Locking Techniques - Timestamp Ordering - Multiversion Concurrency Control - Optimistic Concurrency Control - Using Locks for Concurrency Control in Indexes

Database Recovery Techniques - Recovery Concepts - Recovery Techniques Based on Deferred and Immediate Updates - Shadow Paging - Recovery in Multidatabase Systems - Backup and Recovery from Catastrophic Failures

Text books

R. Elmasri and S. B. Navathe: Fundamentals of Database Systems, 5th Edition, Addison-Wesley, 2007

Reference books

1. A. Silberschatz, H. F. Korth and S. Sudarshan: Database System Concepts, 5/E, Mc-Graw Hill, 2006.
2. Database systems, a practical approach to design implementation and management – Thomas Connolly and Carolyn Begg, Pearson Education,
3. Raghu Ramakrishnan and Johannes Gehrke: Database Management Systems, McGraw-Hill
4. C.J. Date, A. Kannan, S. Swamynatham: An Introduction to Database Systems, Pearson education
5. Jeffrey D Ullman: Principles of Database Systems, Galgotia Publications

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6IT 505 OPERATING SYSTEMS

3 hours lecture and 1 hour tutorial per week

Module I (12 hours)

Computers and Software –General System software- Resource abstraction & Sharing-Operating system strategies (Batch, Timesharing, real time, embedded etc) – Concept of Multiprogramming- Operating system organization – Basic functions-Implementation considerations-Computer organization-bootstrapping the machine-Mobile computers, Multiprocessors and parallel computers- Device Management-Device controllers & Device drivers – I/O strategies (direct I/O with polling, Interrupt driven I/O, DMA), Buffering, Disk scheduling strategies

Module II (15 hours)

Process & Threads- Implementing process & Threads – Process address space- process state transition diagram-Process manager responsibilities- concept of Linux process & thread descriptors-Process scheduler organization-different scheduling strategies(non preemptive & preemptive)- Process synchronization- critical section- semaphore & its implementation – classical synchronization problems and its solutions(Producer-consumer, readers-writers, dining philosopher)- Deadlock-prevention-avoidance-bankers algorithm-detection-reduced resource allocation graph- Inter process communication(Pipes, message passing etc)-concept of process management in Linux and widows NT.

Module III (12 hours)

Memory management- address space abstraction-address binding-memory allocation-Fixed partition & variable partition memory strategies-dynamic address binding-swapping-paging-virtual memory address translation-dynamic paging-static paging algorithms-dynamic paging algorithm-working set algorithm-segmentation-implementation-memory mapped files-concept of memory management in Linux & Winows NT/XP.

Module IV (12 hours)

File Management – Low level files and Structured files- Low level file implementation – different approaches to Block management- Structured sequential file-Indexed sequential file-different directory structures-file systems-Mounting file systems- Protection and Security-security and Policy – Authentication , authorization and cryptography- Kerberos authentication- General protection model- Acess matrix-Access control list – Capability list – Concept of File management in Linux and Windows NT.

Text books

1. Gary Nutt,Operatig Systems (3rd edn), Pearson education
2. Gary Nutt, Nebendu Chaki, and Sarmistha Neogy, Operating Systems(Third Edition), Pearson Education.

Reference books

1. Siberschatz & Galvin, Operating system concepts (7 edn), Addison Wesley
2. Crowley C., Operating Systems – A Design oriented Approach, TMH
3. Tanenbaum A. S, Modern Operating Systems, Prentice hall, Pearson Education

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 IT: 506 SOFTWARE ENGINEERING

3 hours lecture and 1 hour tutorial per week

Module I (12 hours)
Introduction- The software process, Software process models-Waterfall model, RAD model, Prototyping model, Spiral model, Component based development, Aspect-oriented software development System modeling, System engineering process, System models-Data models, Object oriented model, Scenario based model, Flow oriented model, Class-based model, Behavioral model Software requirements- Functional and Non-functional requirements- SRS- Requirement Engineering Process

Module II (13 hours)
Design Engineering- Design concepts, design model, pattern based software design Architectural Design-system structuring, control models, modular decomposition, Object oriented Design, Component based design, User Interface Design

Module III (13 hours)
Software Testing- Testing process, Testing strategies- Verification and validation, Software inspection, Unit testing and Integration Testing, Validation testing, System testing Testing tactics- Software Testing Fundamentals, Black box testing, White box testing, Object-oriented testing, Clean room engineering process.

Module IV (14 hours)
Project Management- Metrics for process and projects, Estimation- Project planning process, Software scope and feasibility, Resources, software project estimation, Decomposition techniques, Project scheduling, Risk Management- Risk identification, Risk projection, Risk refinement, RMMM Quality management-Product metrics, Quality-Quality control, Quality assurance, Cost of Quality, Change Management-Configuration Management, Software re-engineering, Reverse Engineering, CBSE process.

Text books
4. Pressman S. Roger, "Software Engineering", Tata Mac Graw Hill
5. Sommerville Ian, "Software Engineering 6th Addition", Addition Wesley 2002

Reference books

1. Jalot Pankaj, "An Integrated Approach to S/W Engg."Narosa Publishing House
2. Rajib Mall

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern
Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6IT 507(P): Programming Environment Lab

3 hours practical per week

Object-oriented programming in Java/C++

1. Define a base class “Shape” and derived classes for “Rectangle”, “Square”, “Ellipse” and “Circle” with proper class hierarchy.
2. Implement operator and function overloading.
3. Design and implement an interface.
4. Design and implement a Generic class

Functional Programming in LISP/Scheme

1. Write a program to implement Tower of Hanoi problem for n number of disks.
2. Write a program to implement Missionaries and Cannibals problem.
3. Write a program to implement Binary Search Tree (BST) and do the following operations on BST.
   (i) Insertion of an element
   (ii) Deletion of a n element
   (iii) Display of BST
   (iv) Display of Maximum and Minimum elements of BST
4. Write a program to implement Quick Sort on both list of numbers and list of strings. If strings, sort them in lexicographic order.

Concurrent Programming in Java/ Ada

1. Design and implement a multi-threaded program.
2. Design and implement a multi-process application

Reference books

1. Robert W Sebesta, Concepts of programming Languages (7 edn) – Pearson Education
2. Sethi R, Programming languages: Concepts & Constructs, Addison Wesley
3. Scott M L, Programming language Pragmatics, Morgan Kaufman
4. Elaine Rich, Kevin Knight, “Artificial Intelligence”, Tata McGraw Hill Publishing Company Limited

Sessional work assessment

Laboratory practical and Record	= 35
Test	= 15
Total marks	= 50

2K6 IT 508(P) - DBMS & OS LAB

3 hours practical per week

Database Management Systems

Recommended Software: Mysql /Oracle latest version

1. DDL statements in SQL
2. DML statements in SQL
3. Simple Queries using SELECT command on a given database.
4. Queries (along with sub Queries) using ANY, ALL, IN, EXISTS, NOTEXISTS, UNION, INTERSECT and Constraints.
5. Queries using Aggregate functions (COUNT, SUM, AVG, MAX and MIN), GROUP BY, HAVING
6. Creation and dropping of Views
7. High level language extension with cursors.
8. High level language extension with triggers.
9. Procedures and Functions.

Operating systems

1. Inter-process communication using pipes, FIFO, message queues and shared memory
2. Producer-Consumer problem using mutex and condition variables
3. Producer-Consumer problem using semaphores
4. Detection and handling of signals like death of child process, user generated interrupts etc. by a process.
5. Open a directory and display its contents, size of each file, total size etc.
6. Banker's algorithm
7. Simulation of various process scheduling algorithms (Pre-emptive and non pre-emptive)
8. Simulation of various memory page replacement strategies

Reference books

1. Kay Robbins, Steve Robbins: UNIX Systems Programming- Communication, Concurrency and Threads.
2 Paul Dubois: MySQL,
3. R. Elmasri and S. B. Navathe: Fundamentals of Database Systems, 5/E, Addison-Wesley, 2007
4. Vikram Vaswani: How to Do Everything with PHP and MySQL, McGraw Hill,
5. Ellie Quigley: PHP and MySQL by Example, Prentice Hall PTR, 2006
6. Garry Nutt, Operating Systems

Sessional work assessment

Laboratory practical and Record	= 35
Test	= 15
Total marks	= 50

2K6 IT 601 ENVIRONMENTAL ENGG: & DISASTER MANAGEMENT

3 hours lecture and 1 hour tutorial per week

MODULE I (12 HOURS)

Multidisciplinary nature of Environmental studies – Definition – scope and importance – need for public awareness Natural resources – renewable and non-renewable resources – natural resources – forest resources - water resources Mineral resources – food resources – energy resources – Land resources – use, overuse and misuse of these resources with appropriate case studies to substantiate – effect on the environment – role of individual in conservation of natural resources – equitable use of resources for sustainable lifestyle.

MODULE II (12 HOURS)

Ecosystem – concept – structure and function – producers, consumers & decomposers – energy flow in the ecosystem- Ecological successive food chains - food webs (all in brief)
Ecological pyramids – introduction, types and characteristic features, structure and function of forest, grassland, desert and acquatic ecosystems (ponds, lakes, streams, rivers, oceans and estuaries) Biodiversity and its conservation – Introduction – definition : genetic species and ecosystem diversity – Biogeographical classification of India – value of biodiversity – consumptive and productive use, social, ethical, aesthetic and option values – biodiversity at global, national and local levels –India as a mega-diversity nation – hot spots of biodiversity – threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity : In-situ and Ex-situ conservation of biodiversity.

MODULE III (13 HOURS)

Environmental Pollution – Definition – causes - effects and control measures of : Air Pollution – water Pollution – soil Pollution – marine Pollution – noise Pollution – thermal Pollution – Nuclear hazards .
Solid waste management – causes, effects and control measures of urban and industrial wastes – Role of an individual in preventing Pollution – Environmental Protection Act – Prevention and control of air and water Pollution – Wildlife Protection Act – Forest Conservation Act – Issues involved in Enforcement of Environmental Legislation – Public awareness.
Disaster Management – Principles of disaster management – nature and extent of disasters – natural disasters , hazards, risks and vulnerabilities – man-made disasters – chemical, industrial, nuclear and fire. – preparedness and mitigation measures for various hazards – financing relief expenditure – legal aspects - post disaster relief – voluntary agencies and community participation at various stages of disaster management – rehabilitation programmes.

MODULE IV (10 HOURS)

Social Issues and the Environment – From unsustainable to sustainable development – urban problems related to energy – water conservation, rain water harvesting , watershed management – resettlement and rehabilitation of people ; its problems and concerns, case studies – environmental ethics : Issues and possible solutions – climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies – waste land reclamation – consumerism and waste products.
Human population and the environment – Population growth, variations among nations – population explosion – Family welfare programmes – Environment and human health – Pollution hazards, sanitation and health – Human rights for a clean environment – value education – HIV/AIDS – social concern – Women and Child welfare – role of Information Technology in environment and human health – Case studies.

FIELD WORK (5 HOURS)

- Visit to a local area to document environmental assets – river / forest / grassland / hill / mountain
- Visit to local polluted site – urban / rural / industrial / agricultural
- Study of common plants, insects , birds
- Study of simple ecosystems – pond, river, hill slopes, etc.

Text book

1. Clarke. R.S. Marine Pollution. Clanderson Oress Oxford.`
2. Mhaskar A.K. Matter Hazardous. Techno-Science Publications.
3. Townsend. C., Harper. J. and Michael Begon, Essential of Ecology. Blackwell Science.
4. S. Deswal & A . Deswal, A Basic Course in Environmental Studies, Dhanpat Rai & Co
5. Environmental Studies – Dr. B . S. Chauhan, University Science Press.
6. Kurien Joseph & R. Nagendran, Essentials of Environmental Studies, Pearson Education.
7. Trivedi. R.K. and Goel. P.K. Introduction to air pollution. Techno-Science Publications.

Reference Books

1. Agarwal.K.C. Environmental biology. Nidi Publ.Ltd. Bikaner.
2. Bharucha erach, Biodiversity of India, Mapin Publishing Pvt.Ltd.,.
3. Brunner,R.C.. Hazardous Waste Incineration. McGraw Hill Inc..
4. Cunningham W.P. , Cooper T.H., Gorhani E. & Hepworth M.T. Environmental Encyclopedia ,Jaico Publ.House ,.
5. De A.K. Environmental Chemistry.Wiley Eastern Ltd.
6. Hawkins R.E. Encyclopediaof Indian Natural History, Bombay Natural History Society ,.
7. Heywood V.H. & Watson R.T.. Global Biodiversity Assessment. Cambridge Univ. Press.
8. Jadhav H. & Bhosale V.M.. Environmental Protection and Laws. Himalaya Pub. House,
9. Odum E.P. Fundamentals of Ecology W.B. Saunders Co..
10. Rao M.N. & Datta A.K. Waste Water Treatment. Oxford & IBH Publ. Co. Pvt. Ltd..
11. Sharma B.K.. Environmental Chemistry Goel Publ. House, Meerut
12. Trivedi R.K., Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol.I & II.Enviro Media.
13. Wagner K.D. Environmental Management. W.B. Saunders Co.

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University Examination Pattern

Q I – 8 short answer type questions of 5 marks, 2 from each module.
Q II- 2 questions of 15 marks each from module I with choice to answer any one.
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Q IV- 2 questions of 15 marks each from module III with choice to answer any one.
Q V- 2 questions of 15 marks each from module IV with choice to answer any one.

2K6 IT 602: GRAPH THEORY & COMBINATORICS

3 hours lecture and 1 hour tutorial per week

Module I (13 hours)
Introduction to graphs-definitions and examples-subgraphs-complements-isomorphism-vertex degree-Euler trails and circuits-.Planar Graphs-Kuratowski's theorem(without proof).Graph coloring and chromatic polynomials

Module II (13 hours)
Trees-Definitions and properties-examples-Weighted Trees-Dijkstra's shortest path algorithm-Spanning trees - Kruskal and Prim's algorithms.

Module III (13 hours)

Fundamental principles of counting-The rules of sum and product -permutations and combinations-binomial theorem-principle of inclusion and exclusion-derangements.-Rook polynomials

Module IV (14 hours)
Generating functions-definitions and examples-calculational and techniques.-partitions of integers-exponential generating functions-recurrence relations-first order linear recurrence relation-second order linear homogeneous recurrence relation with constant coefficients-Non homogeneous recurrence relation-method of generating function

Text books
6. Grimaldi R P ,"Discrete and Combinatorial Mathematics".4 th Edn Pearson education Asia

Reference books

1. Joe L Mott Abraham Kandel Theodore P Baker,"Discrete Mathematics for Computer Scientist and Mathematicians ,2 nd Edn PHI
2.Rose K H "'Discrete Mathematics and its Applications",6th Edn McGrawHill
3.Kolman Busby Ross ,"Discrete Mathematical Structures",PHI
4.Corman ,Leserson and Rivest,"Introduction to Algorithms",PHI
5. Fred Buckley and Frank Harry, “Distance in graphs”, Addison Wesley

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern
Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 IT 603 WEB ENGINEERING & INFORMATION TECHNOLOGY ETHICS

3 hours lecture and 1-hour tutorial per week

Module I (12 hours)
Web-based Systems, Web applications, Web Engineering, components of Web engineering, Web Engineering Process, Incremental process flow, Generic actions and tasks, Umbrella activities, Planning, Building a WebE Team, Developing a schedule, Managing risks, Quality and change, Tracking the project, Modeling frameworks and languages.

Module II (14 hours)
Analysis modeling, Content, Interaction, Functional and Configuration models, Relationship navigation analysis, WebApp design, Design Goals, Quality and Process, Interaction design, Principles and guidelines, Workflow, Preliminaries, Steps, Issues, Information design, Architecture, Organizing content, Structuring the information space, Accessing the information, Navigation design, Functional design, Functionality, Design process, Architecture

Module III (12 hours)
Construction and deployment, Principles and Concepts, Design guidelines, Technologies and tools, Implementation and Development, Testing WebApps, Concepts, Testing of contents, user interface, usability, compatibility, navigation, configuration, security and performance, Change and content management, Criteria

Module IV (14 hours)
Overview of ethics, Ethics for IT professionals and IT users, Computer and Internet crime, Privacy, Freedom of expression, Intellectual property, Impact of information technology on the quality of life

Text Books

1. "Web Engineering: A Practioner's Approach" Roger Pressman, David Lowe, McGraw-Hill.
2. "Ethics in Information Technology" George Reynolds, Second Edition, Cengage Learning, 2003

Reference books

1. "Web Engineering: Modelling and Implementing Web Applications", Rossi, G., Pastor, O., Schwabe, D, Olsina, Springer, 2008
2. "Web Engineering", Emilia Mendes and Nile Mosley Springer, 2008
3. "Ethics and Information Technology" James G. Anderson and Kenneth Goodman, Springer, 2007

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern
Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 IT 604 COMPUTER GRAPHICS & MULTIMEDIA

3 hours lecture and 1-hour tutorial per week

Module I (13 hours)

Introduction to Computer Graphics. Raster Graphics - Features, raster algorithms including primitives like lines, circles, filling, clipping in 2D, etc. Geometric transformations in 2D - coordinate transformations and their matrix representation, the window to viewport transformation. Transformations in 3D, Viewing in 3D –Input devices ,Interaction techniques.

Module II (16 hours)

Solid modeling -Regularized Boolean set operations-Primitive instancing – sweep representation – Boundary representation. **Visible surface determination** – Techniques for efficient Visible-Surface Algorithms, Categories of algorithms, Back face removal –z-Buffer algorithm – List priority algorithm – scan line algorithms.

Representing Curves and surfaces – polygon meshes – parametric cubic curves-Hermite curves-Bezier curves –B-Splines. Parametric bicubic surfaces – Hermite surfaces – Bezier surfaces – B-Spline surfaces.

Module III (13 hours)

Introduction to Multimedia – Media and Data Streams - Properties of multimedia systems – Characterizing data streams – Characterizing continuous media datastreams. **Audio Technology** – Audio representation —Music – speech -MIDI Vs digital audio-audio file formats-wav-ogg-au etc. Graphics and Images –Video Technology – Animation –basic concepts.

Module IV (14 hours)

Data compression –Storage space –coding requirements –Classification of coding – Basic compression Techniques – JPEG –H.261 – MPEG –DVI. **Multimedia Applications**-Media Integration-Media Communication-Media Consumption-Media Entertainment-Future Directions.

Text books

1.James D Foley, Van Dam A, Steven and Hughes, “Computer Graphics”, Pearson Education
2.Ralf Steinmetz and Klara Nahrstedt, “Multimedia Fundamentals”, Pearson Education

Reference books

1. Donald Hearn and M.Pauline Baker, “Computer Graphics”, Pearson Education.
2. Newmann W and Sprull, “Principles of Interactive Computer Graphics”, TMH.
3.Koegel Buford J F, “Multimedia Systems”, Addison Wesley.
4.Prabat K Andleigh and Kiran Thakrar, “Multimedia Systems and Design”, PHI.

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 IT 605 COMPUTER NETWORKS

3 hours lecture and 1 hour tutorial per week

Module I (14 hours)
Components – Direction of Data flow – networks – Components and Categories – types of Connections – Topologies –Protocols and Standards – ISO / OSI model – Transmission Media – Line Coding – Modems – RS232 Interfacing sequences-Modulation-Multiplexing-TDM ,FDM ,WDM ,OFDM

Module II (16 hours)
Data link layer services - Error detection and correction – Parity – LRC – CRC – Hamming code .HDLC. - Multiple Access Protocols - Link Layer addressing - Hub and Switches -PPP. LAN - Ethernet IEEE 802.3 - IEEE 802.4 - IEEE 802.5 - IEEE 802.11 – FDDI - SONET – Bridges.

Module III (13 hours)

Network layer: Introduction - Virtual circuit and datagram networks - Router - Internet Protocol -Forwarding and addressing in the Internet - Routing Algorithms -LS -DV -Hierarchial routing -Routing in the Internet -Broadcast and Multicast routing.

Module IV (14 hours)
Transport layer : Introduction and services-multiplexing and demultiplexing -Connectionless transport UDP - Principles of Reliable data transfer - Connection oriented transport TCP - Principles of Congestion Control - TCP congestion control. Application Layer -Principles -HTTP -FTP -SMTP-DNS

Text books
1.Behrouz A. Forouzan, “Data communication and Networking”, Tata McGraw-Hill, 2004.
2.Kurose and Ross, "Computer Networking", Third Edition,Pearson

Reference books

1.Crowley C.,Operating Systems - A Design Oriented Approach, TMH
2.Tanenbaum A S, Computer Networks, PHI
3.William Stallings, **“**Data and Computer Communication, Pearson EducationI

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern
Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 IT 606 (A) COMMUNICATION AND INFORMATION THEORY

3 hours lecture and 1 hour tutorial per week

Module I (12 hours)

Information Theory: Concept of amount of information, units – entropy, marginal, conditional and joint entropies – relation among entropies – mutual information, information rate, channel capacity – redundancy and efficiency of a channel, symmetric channels – binary symmetric channel (BSC), binary erasure channel (BEC), deterministic and noiseless channels – capacity of band limited Gaussian channels, Shannon – Hartley theorem – band width – SNR trade off – capacity of a channel of infinite bandwidth , optimum modulation systems..

Module II (13 hours)

Source coding: Instantaneous codes – construction of instantaneous codes – Kraft's inequality, coding efficiency and redundancy, noiseless, coding theorem – construction of basic source codes –Shannon –Fano Algorithm, Huffman Coding, Lempel Ziv coding.

Codes for error detection and correction -parity check coding – linear block codes – error detecting and correcting capabilities – generator and parity check matrices – standard array and syndrome decoding – Hamming codes – encoding and decoding.

Module III (13 hours)

Cyclic codes – description – generator and parity check matrices – encoding of cyclic codes – syndrome computation and error detection, decoding of cyclic codes.

Concept of field, group and Vector spaces - BCH codes- description and decoding, Reed Solomon codes, burst error correction –block and convolutional interleaving.

Module IV (14 hours)

Convolutional codes - encoding – time and frequency domain approaches, state, Tree and Trellis diagrams – Transfer function and minimum free distance – maximum likelihood decoding of convolutional codes – The Viterbi Algorithm, Sequential decoding – Stack Algorithm.

Text books

1. Communication Systems - Simon Haykin, John Wiley & Sons Pvt. Ltd.
2. Error Control Coding Fundamental s and Application - Shu Lin & Daniel J.Costello Englewood Cliffs, NJ.

Reference books

1. Principles of Communication Systems - Taub & Schilling, Tata Mc Graw Hill, New Delhi.
2. Principles of Digital Communication - Das, Mullick & Chatterjee. Wiley Eastern Ltd.
3. Information and Coding Theory - Dr. P. S. Sathya Narayana Probability Dynaram Publications, Bangalore.
4. Information Theory, Coding and Cryptography -Ranjan Bose, TMH

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 IT 606 (B) DIGITAL SIGNAL PROCESSING

3 hours lecture and 1 hour tutorial per week

Module I (13 hours)
Review of signals and systems. Introduction - advantages and limitations of Digital Signal Processing. Infinite Impulse Response (IIR) Filters - Signal Flowgraph- Basic Network structure for IIR filter- Direct- Cascade- Parallel Forms. Design of IIR Digital filters from analog filters- Butterworth design- Chebyshev design- design based on numerical solutions of differential equations- Impulse Invariant Transformation.

Module II (16 hours)
Finite Impulse Response (FIR) Filters: Linear phase FIR filters- Frequency response of linear phase FIR filters - Location of the zeros of linear phase FIR filters. Realization of FIR- cascade - lattice design-Fourier Series method-using windows-rectangular- triangular or barlett windows- hanning- hamming- Blackman- Kaiser windows.

Module III (13 hours)

Discrete fourier Transform: Properties-Circular convolution- Linear Convolution using DFT- relation between Z-Transform and DFT- Fast Fourier Transform; decimation – in time and Frequency - FFT algorithms – General Computation using Radix 2 algorithm.

Module IV (14 hours)

Finite word length effects in digital filters: Introduction- Number Representation - Fixed Point- Sign-Magnitude - One's-complement- Two's - complement forms -Addition of two fixed point numbers- Multiplication in Fixed Point arithmetic - Floating point numbers- Block floating point numbers- quantization - truncation- rounding - effects due to truncation and rounding- Input quantization error - Product quantization error - Co-efficient quantization error- zero-input limit cycle Oscillations - Overflow limit cycle Oscillations - Scaling- Quantization in Floating Point realization IIR digital filters - Finite Word Length Effects in FIR Digital Filters- Quantization effects in the Computation of the DFT- quantization errors in FFT algorithms.

Reference books

1. Ifechor-, Digital signal processing, Pearson edn.
2. Oppenhiem ,Desecrate time signal processing , Pearson edn.
3. Oppenhiem and Sheffer ,Digital signal processing , PHI
4. Johny R Johnson ,Introduction to Digital signal processing
5. Proakis and Manolakis, Digital signal processing
6. P Ramesh Babu ,Digital signal processing:,Scitech Pub.

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 IT 606(C) SOFTWARE PROJECT MANAGEMENT

3 hours lecture and 1 hour tutorial per week

Module I (12 hours)
Introduction to Software Project Management Software project versus other types of project - problems - management control - stakeholders - Requirement specifications - Information and control in organizations. Introduction to step wise project planning - Select - identify scope and objectives - identify project infrastructure - Analyse project characteristics - products and activities - Estimate effort for each activity - Identify activity risks - Allocate resources - Review / publicize plan - Execute plan and lower levels of planning. Project evaluation - Introduction - Strategic assessment - technical assessment - cost benefit analysis - cash flow forecasting - cost benefit evaluation techniques - risk evaluation.

Module II (16 hours)
Selection of an appropriate project approach - - structured methods - rapid application development - waterfall model - v - process model - spiral model - software prototyping - tools - incremental delivery - selecting process model - Software effort estimation - - problems with over and under estimates - basis for software estimating - software effort estimation technique -- COCOMO - Activity Planning - Objectives - Project schedules - projects and activities - sequencing and scheduling activities - network planning models - formulating a network model - using dummy activities - forward pass - backward pass - identifying the critical path .

Module III (12 hours)

Risk Management - nature of risk - managing - identification - analysis - reducing - evaluating - z values. Resources allocation - nature of resources - requirements - scheduling - critical paths - counting the cost - resources schedule - cost schedule - scheduling sequence. Monitoring and control - creating the frame work - collecting the data - visualizing the progress - cost monitoring - earned value - prioritizing monitoring - Change control.

Module IV (14 hours)
Managing contracts - types of contract - stages in contract placement - terms of a contract - contract management - acceptance. Managing people and organizing teams - organizational behaviors background - selecting the right person for the job - instruction in the best methods - motivation - decision making - leadership - organizational structures. Software quality - importance - defining - 1S09126 practical measures - product versus process quality management - external standards - techniques to help enhance software quality.

Text books
1. Bob Hughes and Mike Cotterell - Software project management , Fourth Edn , McGraw Hill

Reference books.

2. "Information Technology Project Management" Kathy Schwalbe, International Student Edition, THOMSON Course Technology, 2003
3. Software Project Management in Practice, Pankaj Jalote, Pearson Education, 2002
4. Software Project Management, A Concise Study, S.A. Kelkar, Revised Edition, Prentice-Hall India, 2003
5. Walker Royce "Software Project Management – A Unified Framework ", Pearson Education, 2004
6. Ramesh Gopalaswamy, "Managing Global Projects", Tata McGraw Hill, 2001

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern
Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 IT 606(D) COMPUTATIONAL INTELLIGENCE

3 hours lecture and 1 hour tutorial per week

Module 1 (14Hrs)

Artificial Intelligence: History and Applications, Production Systems, Structures and Strategies for state space search- Data driven and goal driven search, Depth First and Breadth First Search, DFS with Iterative Deepening, Heuristic Search- Best First Search, A* Algorithm, AO* Algorithm, Constraint Satisfaction, Using heuristics in games- Minimax Search, Alpha Beta Procedure.

Module 2 (12 Hrs)

Knowledge representation - Propositional calculus, Predicate Calculus, Theorem proving by Resolution, Answer Extraction, AI Representational Schemes- Semantic Nets, Conceptual Dependency, Scripts, Frames, Introduction to Agent based problem solving.

Module 3 (12 Hrs)

Machine Learning- Symbol based and Connectionist, Social and Emergent models of learning, The Genetic Algorithm- Genetic Programming, Overview of Expert System Technology- Rule based Expert Systems, Introduction to Natural Language Processing.

Module 4(12 Hrs)

Languages and Programming Techniques for AI- Introduction to PROLOG and LISP, Search strategies and Logic Programming in LISP, Production System examples in PROLOG.

Reference books

1. George F Luger, Artificial Intelligence- Structures and Strategies for Complex Problem Solving, 4/e, 2002, Pearson Education.
2. E. Rich, K.Knight, Artificial Intelligence, 2/e, Tata McGraw Hill
3. S Russel, P Norvig, Artificial Intelligence- A Modern Approach, 2/e, Pearson Education, 2002
4. Winston. P. H, LISP, Addison Wesley
5. Ivan Bratko, Prolog Programming for Artificial Intelligence, 3/e, Addison Wesley, 2000

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any

2K6 IT 606(E) ADVANCED DATA STRUCTURES

3 hours lecture and 1 hour tutorial per week

Module I (12 hours)
Review of elementary data structures. Advanced Trees – Red Black Trees -properties -operations, AVL Trees, Optimal Binary Search Trees, Splay Trees.

Module II (15 hours)
B Trees-Definition - Operations - Tries -Binary Heaps- Priority Queues- Binomial Heaps-Binomial trees and binomial heaps -operations - Fibonacci Heaps-Structure -Mergeable heap operations -Decreasing a key and deleting a node -Bounding the maximum degree.

Module III (12 hours)
Disjoint set representation – Operations -Linked list representation -Disjoint set forest -Path compression algorithm – Graph algorithms - Connected components - topological sort - Minimum spanning tree, Algorithms of Kruskal and Prim.

Module IV (15 hours)
Single-source shortest paths – Dijkstra's algorithm, Bellman-Ford Algorithm. All-Pairs shortest paths – Floyd-Warshall algorithm, Johnson's algorithm for sparse graphs. Maximum Flow - Flow networks, Ford-Fulkerson Method.

Reference books
1.Cormen T.H., Leiserson C.E, and Rivest R.L., Introduction to Algorithms, Prentice Hall India, New Delhi, 1990.
2.Wirth N., Algorithms + Data Structures = Programs, Prentice Hall India, New Delhi, 1976.
3.Sartaj Sahni, Data Structures, Algorithms and Applications in C++, Universities Press, 2005

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern
Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 IT 606 (F) COMPUTER ARCHITECTURE

3 hours lecture and 1 hour tutorial per week

Module 1 (14Hrs)
Fundamentals – Technology trends – Performance measurement – Comparing and summarizing performance – Quantitative principles of computer design – Amdahl's law. Instruction set architectures – Memory addressing – Type and size of operands – Instruction set encoding – Role of compilers – Case study: MIPS 64 architecture. Pipelining – Pipeline hazards – Data and Control hazards – Implementation issues – MIPS floating point pipeline – Exception handling.

Module 2 (13 Hrs)
Instruction level parallelism – Dynamic scheduling – Tomasulo's algorithm – Dynamic hardware prediction – High performance instruction delivery – Multiple issue processor – Multiple issue with dynamic scheduling – Hardware based speculation – Limitations of ILP.

Module 3 (14 Hrs)
Static scheduling – Loop unrolling – Static branch prediction – VLIW architecture – Software pipelining – Hardware support for exploring more parallelism at compile time. Memory hierarchy design – Cache performance – Reducing cache misses and miss penalty – Reducing miss rate and hit time – Main memory organization – Virtual memory and its protection.

Module 4(13 Hrs)
Multiprocessor and thread level parallelism – Classification of parallel architectures – Models of communication and memory architecture – Symmetric shared memory and distributed shared memory architectures – Cache coherence protocols – Memory consistency models – Multi threading – Exploiting thread level parallelism. Interconnection networks – Shared and switched media – Network topology – Practical issues.

Text books
1. Computer Architecture: A Quantitative Approach, Hennesy J. L. & Pattersen D. A., 3/e, Harcourt Asia Pte Ltd. (Morgan Kaufman), Singapore

Reference books

1. Computer Organisation and Design: The Hardware/ Software Interface, Pattersen D. A. & Hennesy J. L., 3/e, Harcourt Asia Pte Ltd (Morgan Kaufman), Singapore
2. Parallel Computer Architecture: A Hardware Software Approach, D. E. Culler & Jaswinder Pal Singh, Morgan Kaufmann Publishers

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern
Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any

2K6 IT 606 (G) ADVANCED MOBILE COMMUNICATION SYSTEMS

3 hours lecture and 1 hour tutorial per week

Module I (12 hours)
Introduction, wireless transmission - frequencies for radio transmission - signals - antennas - signal propagation - multiplexing - modulation - spread sprectrum - cellular systems - medium access control - specialized MAC - SDMA - FDMA - TDMA - aloha - CSMA - collision avoidance - polling - CDMA - comparison of S/T/F/CDMA

Module II (13 hours)
Telecommunication systems - mobile services - system architecture - radio interface - protocols - localization and calling - handover - security - new data services - satellite systems- broadcast systems - digital audio broadcasting - digital video broadcasting, WDM Optical networks.

Module III (13 hours)

Wireless LAN - infrared Vs radio transmissions - infrastructure and adhoc networks - IEEE 802.11 b/a/g - bluetooth - IEEE 802.16, Mobile network layer - mobile IP - packet delivery - registration - tunneling and encapsulation - optimizations - reverse tunneling - dynamic host configuration protocol scription and decoding, Reed Solomon codes, burst error correction –block and convolutional interleaving.

Module IV (14 hours)
Adhoc networks - routing - algorithms - metrics - mobile transport layer - TCP - indirect TCP - snooping TCP - mobile TCP - retransmission - recovery - transaction oriented TACP - support for mobility - file systems - WWW - WAP - architecture - datagram protocol - transport security - transaction protocol - session protocol - application - environment - WML - WML script - wireless telephony application.

Reference books

1. Schiller J., Mobile Communications, 2/e, Pearson Education, 2003.
2. C. Siva Ram Murthy, Ad Hoc Wireless Networks: Architectures and Protocols, Pearson Education, 2004.
3. C. Siva Ram Murthy, WDM Optical Networks: Concepts, Design, and Algorithms, Pearson Education.
4. Singhal et.al S., The Wireless Application Protocol, Addison Wesley

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 IT 606 (H) HUMAN COMPUTER INTERACTION

3 hours lecture and 1 hour tutorial per week

Module I (12 hours)

Introduction to interactive systems – Drawing – Event Handling – Widgets – Mutiple View Models – Abstact Model Widgets – Look and Feel

Module II (16 hours)

2 D Geometry – Geometric Transformations – Interacting with Geometry – Cut, Copy, Paste, Drag and Drop – Undo – Scripts nad Versions

Module III (16 hours)

Functional Design – Text Input – Digital Ink – Selection – Presentation architecture – Web Interaction – Physical Interaction

Module IV (10 hours)

Functional Design – Distributed and Collaborative Interaction - Evaluating Interaction – Internationalization – Input Synatx specification

Reference books

1. Dan Olsen: Human Computer Interaction, Cengage Learning
2. Dan Olsen: Building Interactive Systems: Principles for Human-Computer Interaction, Cengage Learning

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6IT 607(P) – NETWORKS LAB

3 hours practical per week

1. Study and configuration of NIC cards.
2. Implementation of client server model using TCP protocol.
3. Implementation of client server model using UDP protocol.
4. Implementation of client server model using Multicast server.
5. Implementation of POP3 protocol.
6. Implementation of SMTP protocol.
7. File transfer-using socket.
8. Chatting program using socket.
9. Configuring a gateway.
10. DNS configuration.
11. DHCP configuration.
12. Web server installation and configuration.
13. Mail server configuration.
14. Setting up multiple virtual hosts in a single domain.
15. Simulation of Medium access control protocols-Go back N, Selective repeat, sliding window
16. Perform a case study about the different routing algorithms to select the network path with its optimum and economical during data transfer.
    - Shortest path routing
    - Flooding
    - Link State
    - Hierarchical

Reference books

1. Stevens W. Richard, “Unix Network Programming”, PHI
2. James F. Kurose & Ross, “Computer Network, Third Edition”, Pearson Education
3. Comer D.E., “Internetworking with TCP/IP, Volume 1, II & III, PHI

Sessional work assessment

Laboratory practical and Record	35
Test	15
Total marks	50

2K6IT 608(P) – SOFTWARE ENGINEERING LAB

3 hours practical per week

Develop software for an application using typical Case Tool, following Software Engineering methodology as given below:

Problem Statement
Thorough study of the problem – Identify project scope, Objectives and infrastructure.

Business modeling and requirements specification
The specification language Unified Modeling Language (UML) will be used.

UML
Use work products – data dictionary, use case diagrams and activity diagrams, build and test, class diagrams, sequence diagrams, collaboration diagrams and add interface to class diagrams.

Software Implementation
Coding - Use tools for automatic code generation from system specifications.

Change Management
Program, Data and Documentation management

Software Testing
Prepare test plan, perform validation testing, coverage analysis, memory leaks, develop test case hierarchy, Site check and site monitor.

Software Documentation and Reverse Engineering
Apply Reverse Engineering approach and compare with the forward engineering approach. Prepare documents and reports

Reference books

1. Thomas T. Barker , "Writing s/w documentation - a task oriented approach", Allyn & Bacon Series of Technical Communication , 1998.
2. Antoni Diller, Z: An Introduction to Formal Methods, John Wiley & Sons Ltd 2 nd edition,1994,.
3. Dean Leffingwell & Don Widrig, Managing Software Requirements: A Unified Approach, Addison-Wesley 5th Printing November 2000.

Sessional work assessment

Laboratory practical and Record	35
Test	15
Total marks	50