S.R.M. UNIVERSITY

FACULTY OF ENGINERING AND TECHNOLOGY

SCHOOL OF COMPUTING

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

PROGRAMME: B.TECH (CSE) – PART TIME

CURRICULUM AND SYLLABUS

S.R.M. UNIVERSITY – FACULTY OF ENGINERING AND TECHNOLOGY

SCHOOL OF COMPUTING - DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

B.TECH (CSE) – PART TIME

CURRICULUM & SYLLABUS

I SEMESTER

Subject Code	Category	Subject Name	L	T	P	C
Theory						
PMA211	B	Mathematics –III	3	1	0	4
PCS201	P	Data Structures using C++	3	0	0	3
PCS203	P	Design & Analysis of Algorithms	3	0	0	3
PCS205	P	Microprocessor & Interfacing	3	0	0	3
Practical						
PCS211	P	Microprocessor Lab	0	0	3	2
PCS213	P	Data Structures & Algorithms Lab (C & C++)	0	0	3	2
Total			**12**	**1**	**6**	**17**

II SEMESTER

Subject Code	Category	Subject Name	L	T	P	C
Theory						
PMA212	E	Probability & Queuing Theory	3	0	0	3
PCS202	P	Principles of Programming Languages	3	0	0	3
PCS206	P	Operating Systems	3	0	0	3
PCS207	P	Computer Organization & Architecture	3	0	0	3
Practical						
PCS212	P	Operating Systems Lab	0	0	3	2
PCS214	P	JAVA Programming	2	0	2	3
Total			**14**	**0**	**5**	**17**

III SEMESTER

Subject Code	Category	Subject Name	L	T	P	C
Theory						
PEC211	E	Principles of Communication	3	0	0	3
PCS204	P	Theory of Computation	3	0	0	3
PCS301	P	Compiler Design	3	0	0	3
PCS303	P	Computer Networks	3	0	0	3
Practical						
PCS311	P	Compiler Design Lab	0	0	3	2
PCS313	P	Networking Lab	0	0	3	2
Total			**12**	**0**	**6**	**16**

IV SEMESTER

Subject Code	Category	Subject Name	L	T	P	C
Theory						
PCS304	P	Data Base Management Systems	3	0	0	3
PCS305	E	Operations Research Techniques	3	0	0	3

PCS306	P	Object Oriented Analysis & Design	3	0	0	3
PCS401	P	Software Engineering	3	0	0	3
Practical						
PCS314	P	Data Base Management Systems Lab	0	0	3	2
PCS411	P	Software Engineering Lab	0	0	3	2
Total			**12**	**0**	**5**	**16**

V SEMESTER

Subject Code	Category	Subject Name	L	T	P	C
Theory						
PCS302	P	Artificial Intelligence & Expert Systems	3	0	0	3
PCS308	P	Logic for Computer Science	3	0	0	3
PCS405	P	VLSI Design & Embedded Systems	3	0	0	3
	P	Elective – I	3	0	0	3
Practical						
PCS312	P	Artificial Intelligence & Expert Systems Lab	0	0	3	2
PCS413	P	VLSI & Embedded System Design Lab	0	0	3	2
Total			**12**	**0**	**6**	**16**

VI SEMESTER

Subject Code	Category	Subject Name	L	T	P	C
Theory						
PCS402	P	Scripting Languages & Web Technology	3	0	0	3
PCS403	P	Parallel & Distributed Computing	3	0	0	3
	P	Elective – II	3	0	0	3
	P	Elective – III	3	0	0	3
	P	Elective - IV	3	0	0	3
Practical						
PCS412	P	Web Technology Lab	0	0	3	2
Total			**15**	**0**	**0**	**17**

VII SEMESTER

Subject Code	Category	Subject Name	L	T	P	C
Theory						
PCS407	P	Software Quality Theory and Management	3	0	0	3
	P	Elective – V	3	0	0	3
	P	Elective - VI	3	0	0	3
Practical						
PCS414	P	Project	0	0	24	12
Total			**9**	**0**	**24**	**21**

TOTAL CREDITS TO BE EARNED: 120

Summary Table

Semester	I	II	III	IV	V	VI	VII	Total	%
Total	**17**	**17**	**16**	**16**	**16**	**17**	**21**	**120**	**100**
G	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
B	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**3.3**
E	**0**	**4**	**3**	**3**	**0**	**0**	**0**	**10**	**8.3**
P	**13**	**13**	**13**	**13**	**16**	**17**	**21**	**106**	**88.4**

Electives for Fifth Semester

Subject Code	Subject Name	L	T	P	C
PCS321	System Modeling and Simulation	3	0	0	3
PCS323	Digital Image Processing	3	0	0	3
PCS325	Visual Programming	3	0	0	3
PCS327	Soft Computing	3	0	0	3
PCS329	Advanced Operating System	3	0	0	3
PCS331	E-Commerce	3	0	0	3
PCS333	TCP/IP Principles & Architecture	3	0	0	3

Electives for Sixth Semester

Subject Code	Subject Name	L	T	P	C
PCS322	Advanced Networks	3	0	0	3
PCS324	Virtual Reality	3	0	0	3
PCS326	Advanced Databases	3	0	0	3
PCS328	Neural Networks	3	0	0	3
PCS330	Quantum Information Processing	3	0	0	3
PCS421	Genetic Algorithms	3	0	0	3
PCS423	Speech Technology	3	0	0	3
PCS425	Mobile Computing	3	0	0	3
PCS427	Network Security	3	0	0	3
PCS429	Fault Tolerant Computing	3	0	0	3
PCS431	WINDOWS Internals	3	0	0	3
PCS433	LINUX Internals	3	0	0	3
PCS435	Computer Vision	3	0	0	3
PCS437	Advanced Java Programming	3	0	0	3
PCS439	Component Based Technology	3	0	0	3

Electives for Seventh Semester

Subject Code	Subject Name	L	T	P	C
PCS422	ATM Networks	3	0	0	3
PCS424	Data Mining	3	0	0	3
PCS426	Grid Computing	3	0	0	3
PCS428	Agent Based Systems	3	0	0	3
PCS430	Human Computer Interaction	3	0	0	3
PCS432	Real Time System Design	3	0	0	3
PCS434	Pattern Recognition	3	0	0	3
PCS436	Robotics	3	0	0	3
PCS438	Decision Support System	3	0	0	3
PCS440	Bioinformatics	3	0	0	3
PCS442	Bluetooth Technology	3	0	0	3
PCS444	Software Reliability	3	0	0	3
PCS446	Firewall Architecture	3	0	0	3
PCS448	Optimization Techniques	3	0	0	3

SEMESTER – I

		L	T	P	C
PMA211	**MATHEMATICS – III**	**3**	**1**	**0**	**4**
	Prerequisite				
	NIL				

(Common for EEE, ECE, IT, CSE, ICE & EIE)

PURPOSE

To inculcate the problem solving ability in the minds of students so as to apply the theoretical knowledge to the respective branches of Engineering.

INSTRUCTIONAL OBJECTIVES

At the end of the course, the student should be able to

1. Have thorough knowledge in fourier series.
2. Exposed to solving problems using partial differential equations.
3. Be familiar with one and two dimensional wave and heat equations.
4. Gain good knowledge in the application of fourier transforms.

UNIT 1 FOURIER SERIES **9**

Dirichlet's conditions – General Fourier series – Half range Sine and Cosine series – Parseval's identity – Harmonic Analysis.

UNIT 2 PARTIAL DIFFERENTIAL EQUATIONS **9**

Formation – Solution of standard types of first order equations – Lagrange's equation – Linear homogeneous partial differential equations of second and higher order with constant coefficients - Classification of second order linear partial differential equations.

UNIT 3 ONE DIMENSIONAL WAVE & HEAT EQUATION **9**

Boundary and initial value problems - Transverse vibrations of elastic string with fixed ends – Fourier series solutions – One dimensional heat equation - Steady and transient states – problems.

UNIT 4 TWO DIMENSIONAL HEAT EQUATION **9**

Two dimensional heat equation – Steady state heat flow equation – Laplace Equation Cartesian form – Laplace equation in polar form – heat flow in circular plates including annulus - Fourier series solution.

UNIT 5 FOURIER TRANSFORMS **9**

Statement of Fourier integral theorem – Fourier transform pairs – Fourier Sine and Cosine transforms – Properties – Transforms of simple functions – Convolution theorem – Parseval's identity.

TUTORIAL **15**

TOTAL **60**

TEXT BOOKS

1. Grewal B.S., *Higher Engineering Mathematics*, 36th edition, Khanna Publishers, 2002. (**Unit I** – Chapter 10 Section 10.2 – 10.7, 10.9, 10.11 **Unit II** – Chapter 17 Section 17.2, 17.5, 17.6, 17.8 – 17.10, Chapter 28 Section 28.2, **Unit III** – Chapter 18 section 18.4 (2), 18.5(2), **Unit IV** – Chapter 18 Section 18.7, 18.8(1) **Unit V** – Chapter 22 section 22.3 – 22.7).

REFERENCE BOOKS

1. Kreyszig.E, *Advanced Engineering Mathematics*, 8th edition, John Wiley & Sons, Singapore, 2000.
2. Kandasamy P etal. Engineering Mathematics, Vol. II & Vol. III (4th revised edition), S.Chand & Co., New Delhi, 2000.
3. Narayanan S., Manicavachagom Pillay T.K., Ramanaiah G., *Advanced Mathematics for Engineering students*, Volume II & III (2nd edition), S.Viswanathan Printers and Publishers, 1992.
4. Venkataraman M.K., *Engineering Mathematics* – Vol.III – A & B (13th edition), National Publishing Co., Chennai, 1998.

		L	T	P	C
PCS201	**DATA STRUCTURES USING C++**	**3**	**0**	**0**	**3**
	Prerequisite				
	NIL				

PURPOSE

The purpose of this course is to impart knowledge on various data structure concepts to the students.

INSTRUCTIONAL OBJECTIVES

At the end of the course, student should be able to understand

1. Several data structures concepts like stack, queues, linked list, trees and files
2. Applications of data structures
3. Problem solving using data structure tools and techniques

UNIT 1 INTRODUCTION **8**

Introductory concepts of C++-Data types-Control structures-Definitions of Data Structure and Algorithm -The Abstract Data Type-Algorithm efficiency-Searching-List structures-Hashed List structures-Basic concepts-Hashing methods

UNIT 2 LINKED LISTS **9**

Linear and Linked List concepts-Linked List Algorithms-Processing a Linked List-List Applications-Complex Linked List Structures-Implementation-Case studies

UNIT 3 STACKS AND QUEUES **9**

STACKS: Basic Operations- Linked List Implementation- Applications-Stack ADT-Array Implementation-**QUEUES**: Operations-Linked List design-Implementation-Case study-Overflow and underflow of stack size

UNIT 4 TREES AND GRAPHS **10**

TREES: Basic Tree Concepts-Binary Trees- Tree Traversals- General Trees- Search Trees: Binary Search Trees-AVL trees-**GRAPHS:** Operations-Depth First Traversal-Breadth First Traversal-Implementation-Storage Structures-Case studies

UNIT 5 SORTING CONCEPTS **9**

General Sort concepts-Insertion Sort-Shell Sort-Selection Sort-Heap Sort-Exchange Sort-Bubble sort-Quick Sort-Case studies

Total :45

TEXT BOOK:

1. RICHARD F.GILBERG AND BEHROUZ A.FOROUZAN "*DATA STRUCTURES - A Pseudo code Approach with C++*",THOMSON ASIA, 2005.

REFERENCE BOOKS:

1. HERBERT SCHILDT "*The Complete Reference C++*" Fourth Edition, TataMcGraw Hill Edition, 2003.
2. YEDIDYAH LANGSAN, MOSHE J. AUGENSTEIN AND AORON M. TANENBAUM "*Data Structures using C and C++*", Prentice-Hall of India Pvt Ltd, 2004.
3. SARTAJ SAHNI "*Data Structures, Algorithms and Applications in C++"*, McGraw-Hill International Edition, 2000.
4. MARK ALLEN WEISS, "*Data Structures and Algorithm Analysis in C++"* Addison-Wesley Publishing Company, 1994.
5. AHO, HOPCROFT, ULLMAN – "*Data Structures and algorithms*" – Pearson Education – 1983.
6. JEAN PAUL TREMBLAY & PAUL SORENSON – "*An Introduction to Data Structures with Applications*" – TMH – 1984.

ONLINE REFERENCES

http://www.cmpe.boun.edu.tr/~akin/cmpe223/homepage.htm
http://www.csie.ndhu.edu.tw/~rschang/dscontent.htm

		L	T	P	C
PCS203	**DESIGN AND ANALYSIS OF ALGORITHMS**	**3**	**0**	**0**	**3**
	Prerequisite				
	PMA211				

PURPOSE

This course will provide an understanding of how to write algorithms for various problems and do an analysis of the same

INSTRUCTIONAL OBJECTIVES

1. Divide and Conquer , Dynamic Programming techniques
2. Backtracking , NP complete problems
3. Various analysis of algorithms

UNIT 1 ANALYSIS OF ALGORITHM **9**

Introduction - Algorithms – Pseudo code for algorithms – present – future. Mathematics for Algorithms – Definitions – Notation and Basic results – Asymptotic Notation- Mathematical Induction – Analysis of Algorithms - Recurrence relations.

UNIT 2 DIVIDE AND CONQUER METHOD **9**

General Method - Binary Search – Finding Maximum and Minimum – Merge Sort – Quick Sort Greedy Method – General Method – KnapSack Problem – Minimum Spanning Tree Algorithm – Single Source Shortest Path Algorithm.

UNIT 3 DYNAMIC PROGRAMMING **9**

General Method–Multistage Graph – All Pairs Shortest Path Algorithm – 0/1 Knapsack Problem – Traveling Salesman Problem - Basic search techniques and traversal techniques –bi-connected components – Depth First Search – Breadth First Search.

UNIT 4 BACKTRACKING **9**

The General Method – 8-Queens Problem- Sum of Subsets – Graph Coloring- Hamiltonian Cycle-Knapsack Problem – Branch and Bound Method – 0/1 Knapsack Problem – Traveling Salesman Problem

UNIT 5 P and NP **9**

Polynomial time – Nondeterministic Algorithms and NP – Reducibility and NP completeness – NP complete Problems – More on NP completeness. Case studies

TOTAL 45

TEXT BOOKS

1. E.Horowitz , Sahni & Sanguthevar Rajasekaran, "*Fundamentals of Computer Algorithms*", Galgotia Publications,1997
2. Richard Johnsonbaugh , Marcus Schaefer , " *Algorithms* " , Pearson Education, 2006
   3rd edition (chapter 1,2,10)

REFERENCE BOOKS

1. Aho, Ullman & Hopcraft, "*The Design and Analysis of Algorithms*", Pearson Education, 2001
2. S.E.Goodman , S.T.Hedetniemi , "*Introduction to the Design and Analysis of Algorithms*", McGraw Hill , 2002
3. Sara Baase , "*Computer Algorithms - Introduction to design and analysis",* Pearson Education, 1998

ONLINE RESOURCE

http://www.personal.kent.edu/~rmuhamma/Algorithms/algorithm.html

		L	T	P	C
PCS205	**MICROPROCESSOR AND INTERFACING**	**3**	**0**	**0**	**3**
	Prerequisite				
	NIL Same as IT0202				

PURPOSE

The purpose of this course is to impart knowledge of microprocessor architecture and programming, interfacing and coprocessors which gives foundation to advanced microprocessor architecture and programming.

INSTRUCTIONAL OBJECTIVES

In this course, students learn the following topics:

1. Architecture of 8086 & 8088 microprocessors
2. Instruction sets of 8086/88 and programming.
3. Math Coprocessor & I/O processor and multiprocessor configuration
4. Interfacing of microprocessor with various peripheral devices

UNIT 1 INTEL 8085 ARCHITECTURE **6**

Introduction to 8085 - 8085 architecture- Instruction Set & Assembler Directives- Assembly Language Programming with 8085.

UNIT 2 INTEL 8086/8088 ARCHITECTURE **9**

Introduction to 8086/8088 - 8086/8088 architecture- Instruction Set & Assembler Directives- Assembly Language Programming with 8086/8088- Special Architectural Features.

UNIT 3 COMMUNICATION INTERFACES **9**

Basic Peripherals & their interfacing with 8086/8088-Semiconductor Memory Interfacing-Dynamic RAM Interfacing-Interfacing I/O Ports-PIO 8255-Modes of Operation-Interfacing Analog to Digital Data Converters-Stepper Motor Interfacing

UNIT 4 PERIPHERAL INTERFACES **12**

Special Purpose Programmable Peripheral Devices & their Interfacing-Programmable Interval Timer 8253-Programmable Interrupt Controller 8259A-DMA Controller 8257-DMA Transfers & Operations-Programmable DMA Interface 8237.

UNIT 5 MULTIPROCESSOR SYSTEMS **9**

Interconnection Topologies- Software Aspects of Multiprocessor Systems- Numeric Processor 8087- Bus Arbitration & Control- Tightly Coupled & Loosely Coupled Systems.

TOTAL 45

TEXT BOOK

1. Ray A K, K M Bhurchandi, "*Advanced Microprocessor & Peripherals",* Tata McGraw Hill,1st Edition,2000.(CH1,CH2,CH3,CH4,CH5,CH6,CH7,CH8,CH16.)

REFERENCE BOOKS

1. Douglas V Hall, "*Microprocessor & Interfacing*", Tata McGraw Hill, 2nd Edition,1999.
2. Rafiquzzuman M, "*Microprocessor theory & Applications*", Prentice Hall of India,1994.
3. Yuchenhiu, Glenn A Gibson, "*Microprocessor Systems - 8086/8088 Family*", Prentice Hall of India, 2nd Edition, 1986.

ONLINE REFERENCES

1. www.emu8086.com
2. www.cpu-world.com
3. www.hobbyprojects.com
4. www.8052.com

		L	T	P	C
PCS211	**MICROPROCESSOR LAB**	**0**	**0**	**3**	**2**
	Prerequisite				
	NIL				

PURPOSE

This Lab Course will enable the students to implement some simple logic at assembly level.

INSTRUCTIONAL OBJECTIVES

To do any kind of operations (8 bit addition, subtraction, Multiplication and division) with 8085 microprocessor
To implement interfacing of 8086 with various peripheral devices

LIST OF EXERCISES **20**

Study of Peripherals & interfacing.

8085 Experiments:

8-bit Addition, Multiplication &Division.
16-bit Addition, Multiplication &Division.
Counters and Time Delay
BCD to Hexadecimal & vice-versa.
Traffic light control.
Stepper motor control.

8086 Experiments: **25**

Basic arithmetic & Logical operations.
Sorting & searching algorithms.
Data transfer instructions.
RAM size & system date.
Digital clock
Key board & printer status.
Password checking.
Serial interface & parallel interface
Trouble shooting.

TOTAL 45

REFERENCE: Laboratory manual

		L	T	P	C
PCS213	**DATA STRUCTURES AND ALGORITHMS LAB (C & C++)**	**0**	**0**	**3**	**2**
	Prerequisite				
	NIL				

PURPOSE

This laboratory course gives a thorough understanding of the concepts of various Data Structures and its applications. It also gives a comprehensive understanding of the various algorithms for problems

INSTRUCTIONAL OBJECTIVES

1. Implementing Stack, Queue , Linked List , Binary tree
2. Sorting and Searching Techniques
3. Divide and Conquer, Dynamic Programming methods
4. Greedy method , Traversals and Backtracking

LIST OF EXERCISES

CYCLE – I **20**

1. Implementation of stack & Queue
2. Singly Linked List
3. Doubly linked list
4. Binary tree Implementations and traversals.
5. Sorting Techniques : Insertion , Selection Sort
6. Sorting Techniques : Quick sort , Merge sort

CYCLE- II **25**

1. Divide and Conquer Method
   - Binary Search
   - Max Min Problem
2. Greedy Method
   - Knapsack Problem
3. Traversal Technique
   - Depth First Search
   - Breadth First Search
4. Backtracking
   - 8-Queens Problem

TOTAL 45

REFERENCE : Laboratory Manual

SEMESTER – II

		L	T	P	C
P**MA212**	**PROBABILITY AND QUEUEING THEORY**	**3**	**0**	**0**	**3**
	Prerequisite				
	Nil				

(Common for CSE, IT & ICE)

PURPOSE

To impart statistical techniques using probability and distributions.

INSTRUCTIONAL OBJECTIVES

At the end of the course, students should be able to

1. Be thorough with probability concepts and the corresponding distributions.
2. Get exposed to the testing of hypothesis using distributions.
3. Gain strong knowledge in principles of queuing theory.

UNIT 1 PROBABILITY AND RANDOM VARIABLES **9**

Probability concepts – Random Variable – Characteristics of random variables : Expectation, Variance, Covariance, Moments; Moment generating function – Function of random variable – Chebychev's inequality.

UNIT 2 THEORETICAL DISTRIBUTIONS **9**

Discrete : Binomial, Poisson, Geometric, Negative Binomial; Continuous : Exponential and Normal Distributions.

UNIT 3 TESTING OF HYPOTHESES **9**

Large sample tests based on Normal Distribution – Small sample tests based on t, F distributions – Chi square tests for goodness of fit and independence of attributes.

UNIT 4 PRINCIPLES OF QUEUEING THEORY **9**

Introduction to Markovian queueing models – Single server model with finite and infinite system capacity – Characteristics of the model; Applications of queueing theory to computer science and engineering.

UNIT 5 MARKOV CHAINS **9**

Introduction to Markov process – Markov chains – transition probabilities – Limiting distribution.

TOTAL 45

TEXT BOOKS

1. Veerarajan T., *Probability, Statistics and Random Processes*, Tata McGraw Hill,1st Reprint 2004.
   (**Unit I** – Chapter 1 Pages 1.1-1.20, Chapter 2 Pages 2.1 – 2.3, Chapter 3 Pages 3.1, Chapter 4 Pages 4.36 **Unit II** – Chapter 5 Pages 5.1 – 5.8, 5.38, 5.39,5.44 – 5.53, **Unit IV** – Chapter 8 Pages 8.1-8.10,8.15, **Unit V**–Chapter 6 Pages 6.1– 6.3, Chapter 7 Pages 7.45 – 7.49)

2. S.C. Gupta and V.K. Kapoor, *Fundamentals of Mathematical Statistics*, 9th extensively revised edition, Sultan Chand & Sons, 1999.
   (**Unit III** – Chapter 12 Section 12.1, 12.3,12.4,12.6-12.42, Chapter 13 Section 13.5, 13.39, 13.49, Chapter 14 Section 14.16- 14.24, 14.57).

REFERENCE BOOKS

1. Trivedi K S, " *Probability and Statistics with reliability, Queueing and Computer Science Applications*",Prentice Hall of India,New Delhi, 1984
2. Gross.D and Harris.C.M. "*Fundementals of Queuing theory*", John Wiley and Sons, 1985.
3. Allen.A.O., "*Probability Statistics and Queuing theory*",Academic Press, 1981.

		L	T	P	C
PCS202	**PRINCIPLES OF PROGRAMMING LANGUAGES**	**3**	**0**	**0**	**3**
	Prerequisite				
	PCS201, PCS203				

PURPOSE

The purpose of this course is to impart concepts of Programming Languages

INSTRUCTIONAL OBJECTIVES

1. Concepts of High level languages and its grammar
2. Study of Imperative languages (Pascal and C)
3. Study of Object oriented Programming (C++ and JAVA)
4. Study of Functional Programming (Haskell / Lisp)
5. Study of Logic Programming (Prolog and SQL)

UNIT 1 PRELIMINARY CONCEPTS **9**

High Level Languages, Issues in Programming - Case studies, Programming paradigms, Language implementation. Syntactic Structure — Language representation, Abstract Syntax tree, Lexical syntax, Context Free Grammars, Variants of CFG, Issues involved and Normal Forms for CFG.

UNIT 2 IMPERATIVE LANGUAGES **9**

Structured Programming — Need and Design issues. Block Structures **(Pascal)**, types arrays, records, sets, pointers, procedures, parameter passing, scope rules **(in C).**

UNIT 3 OBJECT ORIENTED LANGUAGES **9**

Grouping of data and Operations — Constructs for Programming Structures, abstraction
Information Hiding, Program Design with Modules, Defined types, Object oriented programming — concept of Object, inheritance, Derived classes and Information hiding – Templates- Exception handling (Using **C++ and Java** as example language).

UNIT 4 FUNCTIONAL PROGRAMMING **9**

Functional Programming — Features, Implementation, Types — values and operations, Product of types. Lists and Operations on Lists, Functions from a domain to a range, Function Application, Lexical Scope. Bindings of values and functions (Using **Haskell/ Lisp** as example language)

UNIT 5 LOGIC PROGRAMMING **9**

Formal Logic Systems, Working with relations and their implementation (Using **Prolog** as example). Database query Languages, Exception handling (Using **SQL** as example)

TOTAL 45

TEXT BOOK

1. Pratt, Zelkowitz, "*Programming Languages: Design and Implementation* Edition, Pearson Education," 2nd Edition, 2004

REFERENCE BOOKS

1. Ravi Sethi, "*Programming Language Concepts and Constructs*", Pearson Education, 2006
2. Kenneth C.Louden, "*Programming Languages- Principles & Practice*", Thomson, 2nd Edition
3. Doris Appleby, Julius J. Vandekopple, "*Programming Languages: Paradigms and Practice*", McGraw Hill, 1997
4. Damir Medak and Gerhard Navratil, "*Haskell-Tutorial*", Available on the Web, Feb2003.
5. Paul Hudak, John Peterson and Joseph H. Fasel, "*A gentle Introduction to Haskell*-98",2004
6. A.B.Tucker, Robert, Noonan, "*Programming Languages*", McGraw Hill, 2002.

ONLINE REFERENCES

1. http://www.cs.indiana.edu/eopl/
2. http://www.cs.brown.edu/courses/cs173/
3. http://www.cs.iastate.edu/~leavens/ComS342-EOPL2e/index.shtml
4. http://www.mhhe.com/engcs/compsci/tucker/

		L	T	P	C
PCS206	**OPERATING SYSTEMS**	**3**	**0**	**0**	**3**
	Prerequisite				
	PCS201, PCS203				

PURPOSE

Every computer professional should have a basic understanding of how an operating system controls the computing resources and provide services to the users. This course provides an introduction to the operating system functions, design and implementation. It serves as strong foundation for other courses like networks, compiler design, data base systems.

INSTRUCTIONAL OBJECTIVES

The students learn about:

1. Structure and functions of OS
2. Process scheduling, Deadlocks
3. Device management
4. Memory management
5. File systems

UNIT 1 INTRODUCTION **9**

Computer system overview-basic elements, Instruction execution, Interrupts, memory hierarchy, I/O communication techniques, operating system overview-objectives and functions, Evolution of OS Microsoft windows overview.

UNIT 2 PROCESSES **9**

Process description and control - process states, process description, process control; Processes and Threads, Symmetric Multiprocessing and microkernels. Windows Thread and SMP Management. Case studies-UNIX, SOLARIS thread management

UNIT 3 CONCURRENCY AND SCHEDULING **9**

Principles of concurrency - mutual exclusion, semaphores, monitors, Readers/Writers problem; Deadlocks – prevention- avoidance – detection .Scheduling : Types of scheduling – scheduling algorithms. Case studies-UNIX scheduling.

UNIT 4 MEMORY **9**

Memory management requirements, partitioning, paging, and segmentation; Virtual memory - Hardware and control structures, operating system software, Linux memory management, case studies- WINDOWS memory management, UNIX and SOLARIS Memory management

UNIT 5 INPUT/OUTPUT AND FILE SYSTEMS **9**

I/O management and disk scheduling – I/O devices, organization of I/O functions; OS design issues, I/O buffering, disk scheduling, Disk cache, File management – organization, directories, file sharing, record blocking, secondary storage management; case studies-LINUX I/O, UNIX File management.

TOTAL 45

TEXT BOOK

1. William Stallings, "*Operating Systems – internals and design principles* ", Prentice Hall India, 5th Edition, 2005.

REFERENCE BOOKS

1. Andrew S. Tannenbaum & Albert S. Woodhull, "*Operating System Design and Implementation*", Prentice Hall India, 2nd Edition, 1998.
2. Gary Nutt, "*Operating System - A Modern Perspective*", Pearson Education Asia, 2nd Edition 2000.
3. Harvey .M. Deitel, "*Operating Systems*", 2nd Edition , 2000.
4. Silberschatz, Peter Galvin, "*Operating System Concepts*", AWL 6th Edition, 2002,
5. Ida M.Flynn, Ann Mclver McHoes, "*Understanding Operating Systems*", 3rd Edition,Thomson Learning 2001s

ONLINE REFERENCES

www.oreilly .com
www.eclipse.org
www.refdesk.com

		L	T	P	C
PCS207	**COMPUTER ORGANIZATION AND ARCHITECTURE**	**3**	**0**	**0**	**3**
	Prerequisite				
	NIL				

PURPOSE

The purpose of this course is to give a strong foundation of the computer organization and its internal architecture.

INSTRUCTIONAL OBJECTIVES

1. Gives a knowledge of various architectures
2. CPU, Control unit, I/O Processing
3. Memory and its types
4. Design of the above components

UNIT 1 INTRODUCTION **9**

Evolution of Computer Systems-Computer Types-Functional units-Basic operational concepts-Bus structures-Memory location and addresses-memory operations- Addressing modes-Design of a computer system-Instruction and instruction sequencing, RISC versus CISC.

UNIT 2 CENTRAL PROCESSING UNIT **9**

Introduction-Arithmetic Logic Unit - Fixed point arithmetic, floating point arithmetic-Execution of a complete instruction-Basic concepts of pipelining.

UNIT 3 CONTROL UNIT DESIGN **9**

Introduction-Control Transfer-Fetch cycle - Instruction Interpretation & Execution - Hardwired control - Microprogrammed control.

UNIT 4 MEMORIES AND SUBSYSTEMS **9**

Semiconductor memory - Static and Dynamic -Associative memory- Cache memory- Virtual memory-Secondary memories-Optical magnetic tape & magnetic disks & controllers.

UNIT 5 I/O PROCESSING **9**

Introduction-Data transfer techniques- Bus Interface- I/O Channel-I/O Processor, I/O devices -Direct memory access.

TOTAL 45

TEXT BOOK

1.Carl Hamacher,"*Computer Organization*",Fifth Edition,McGrawHill International Edition, 2002

REFERENCE BOOKS

1. P.Pal Chaudhuri, "*Computer Organization and Design*" , 2nd Edition, PHI ' 2003
2. William Stallings , "*Computer Organization and Architecture* – Designing for Performance", PHI, 2004.
3. John P.Hayes, "*Computer Architecture and Organization*", III Edition, McGraw Hill International Editions, 1998.

ONLINE REFERENCES:

www.amazon.com
www.freebookcentre.com

		L	T	P	C
PCS212	**OPERATING SYSTEMS LAB**	**0**	**0**	**3**	**2**
	Prerequisite				
	PCS201, PCS203				

PURPOSE

This laboratory course gives a complete understanding of the operating systems principles and its implementations

INSTRUCTIONAL OBJECTIVES

1. Scheduling algorithms
2. Deadlock algorithms and page replacement algorithms
3. Memory management schemes, Thread and synchronization

LIST OF EXPERIMENTS **45**

1. Simulate the following CPU scheduling algorithms
   a) Round Robin b) SJF c) FCFS d) Priority
2. Simulate all file allocation strategies
   a) Sequential b) Indexed c) Linked
3. Simulate MVT and MFT
4. Simulate all File Organization Techniques
   a) Single level directory b) Two level c) Hierarchical d) DAG
5. Simulate Bankers Algorithm for Dead Lock Avoidance
6. Simulate an Algorithm for Dead Lock Detection
7. Simulate all page replacement algorithms
   a) FIFO b) LRU c) LFU
8. Shared memory and IPC
9. Simulate Paging Technique of memory management.
10. Threading & Synchronization Applications
11. Write a collection of sufficient no. of processes which carry out the following different types of tasks independently:
    1. Only computation
    2. Only printfs

Tune each of the above process to run for 30 seconds when it runs standalone.
Then run them simultaneously with different combinations.
Gather per process and system statistics
e.g. required cpu time, turnaround time, wait time, in each test combination

12. Write a collection of programs p1, p2, p3 such that they execute sequentially with the same process-id, and each program should also print its PID. *(process id)* The user should be able to invoke any combination of these programs, to achieve the required functionality.
For example consider three programs *twice , half, square* which accept only one integer as argument and does some specific operation.

a) twice 10 prints 20 and some int which is its process-id as output
b) square 10 prints 100 and some int which is its process-id as output
c) half 10 prints 5 and some int which is its process-id as output

Now the user should be able to combine these programs in any combination to achieve the required result.
For example:
a) twice square half twice half 10
should calculate *half(twice(half(square(twice(10)))))* and print 200 as result. It should also print the process ids of each program as it executes. Note that the process-id printed by each of these programs should be the same, in this case.

TOTAL 45

REFERENCE :

Laboratory Manual

		L	T	P	C
PCS214	**JAVA PROGRAMMING**	**2**	**0**	**2**	**3**
	Prerequisite				
	NIL				

PURPOSE

To learn and Practice the basics of JAVA language

INSTRUCTIONAL OBJECTIVES

1. To learn & practice the Object Oriented concepts like Inheritance, Overloading etc.
2. To learn & practice Interfaces and Packages
3. To learn &practice Java applet programming

THEORY **30**

Java Basics – Data types- methods – class – objects- overloading- Inheritance-types of inheritance- overriding- Exception handling – Strings - Interfaces- Packages- Threads- Applets- Exception handling

PRACTICAL **30**

JAVA BASICS

1. Programs illustrating various data types in Java
2. Programs illustrating class, objects and methods
3. Programs for addition and multiplication of Matrices
4. Programs illustrating Overloading in Java
5. Programs illustrating the implementation of Various forms of Inheritance(Single, Hierarchical, Multilevel)
6. Programs illustrating Overriding methods in Java
7. Programs illustrating Exception Handling
8. Programs to manipulate strings

JAVA INTERFACES, PACKAGES and THREADS

9. Programs illustrating Interfaces in Java
10. Programs to create Packages in Java
11. Programs illustrating Threads in Java

JAVA APPLETS

12. Programs to write applets to draw the various shapes
13. Programs to manipulate labels, lists, text fields and panels
14. Programs to handle mouse events
15. Programs using layout mangers

TOTAL **60**

REFERENCE: Laboratory Manual

SEMESTER III

		L	T	P	C
PEC211	**PRINCIPLES OF COMMUNICATION**	**3**	**0**	**0**	**3**
	Prerequisite				
	PCS203				

PURPOSE

The subject Communication Engineering is offered for EIE , ICE EEE&CSE branch students who are expected to know about the basics of communication engineering such as Analog modulation methods(AM, FM,PM Transmission, Reception), PCM and finally Digital modulation techniques.

INSTRUCTIONAL OBJECTIVES

1. AM Modulation and Demodulation – DSB-FC,DSB-SC,SSB,VSB.
2. FM Modulation and Demodulation
3. Data Transmission – ASK, FSK, PSK.
4. PAM, PPM, PWM, PCM, TDM AND FDM.
5. Fundamentals of Radar, TV, satellite and fiber optical communication.

UNIT 1 AM MODULATION **9**

Source of noise – Internal and external – Types – Need for Modulation_ Amplitude Modulation – Generation of AM waves (DSB-FC) - Suppressed carrier systems (DSB-SC) – Single side band modulation(SSB) – Vestigial side band modulation (VSM) - comparison of various AM systems.

UNIT 2 TRANSMITTERS AND RECEIVERS **9**

Demodulation of AM waves – Envelope Detectors – Synchronous Detectors - Pilot carrier method – AM Transmitters - Low level and High level transmitters – AM Receivers – TRF receiver, super heterodyne receiver – Frequency Division Multiplexing.

UNIT 3 FM MODULATION AND DEMODULATION **9**

Introduction to angle modulation systems – Definitions for FM & PM – Narrow band FM – Wide band FM – FM Modulators - Direct and Indirect method – FM Transmitters - FM Demodulators – Slope detector - Ratio Detector – Frequency discriminator – PLL - FM Receivers - Noise in angle modulated systems – Comparison between AM & FM.

UNIT 4 PULSE MODULATION **9**

Introduction to Pulse modulation systems – Pulse amplitude modulation – Pulse Time modulation – Pulse code modulation – Inter symbol Interference - Eye Patterns – Equalization - companding – time division multiplexing – synchronous and asynchronous - pulse stuffing – Bandwidth of PCM – noise in PCM – delta modulation – adaptive delta modulation – comparison between PCM and DM – DPCM.

UNIT 5 COMMUNICATION SERVICES (ELEMENTARY TREATMENT ONLY) **9**

Radar: Basic Radar system – Radar range equation – Pulsed radar systems.

Television: Picture elements – Transmission and reception of picture information – Motion picture – Horizontal and vertical scanning frequencies – TV transmitters – TV Receivers – TV channels. Satellite communication: Read – orbit – Satellite altitude – Transmission path – its loss – Satellite system. Fiber optical communication: Need – Principles of light transmission in a fiber – optical fiber communication system – optical fiber – Light sources – Photo detectors – Advantages.

TOTAL 45

TEXT BOOKS

1. R.P.SINGH, S.D.SAPRE, "*Communication Systems, Analog and Digita*l ", McGraw Hill Pub. 5th Reprint 2000.
2. DESHPANDE,N.D , "*Communication Electronics*" , Tata McGraw Hill Pub.1989.

REFERENCE BOOKS

1. KENNEDY, "*Electronic of Communication Systems*", McGraw Hill – 5th reprint – 2000.
2. RODDY D. and COOLEN J.," *Electronic communications*", Prentice Hall of India P. Ltd. 1987.

ANOKH SINGH, "*Principles of communication Engineering*", S.Chand & Co. 1991.

		L	T	P	C
PCS204	**THEORY OF COMPUTATION**	**3**	**0**	**0**	**3**
	Prerequisite				
	PMA211				

PURPOSE

The purpose of this course is to impart concepts of Theory of Computation

INSTRUCTIONAL OBJECTIVES

1. Study of Finite Automata, Regular Expressions, Grammars.
2. Pushdown Automata, Turing Machines
3. Undecidability problems.

UNIT 1 FINITE AUTOMATA 10

Introduction - Basic Mathematical Notation and techniques- Finite State systems – Basic Definitions – Finite Automaton – DFA & NDFA – Finite Automaton with €-moves – Regular Languages- Regular Expression – Equivalence of NFA and DFA – Equivalence of NDFA's with and without €-moves – Equivalence of finite Automaton and regular expressions –Minimization of DFA- - Pumping Lemma for Regular sets – Problems based on Pumping Lemma.

UNIT 2 GRAMMARS 10

Grammar Introduction – Types of Grammar - Context Free Grammars and Languages– Derivations and Languages – Ambiguity- Relationship between derivation and derivation trees – Simplification of CFG – Elimination of Useless symbols - Unit productions - Null productions – Greiback Normal form – Chomsky normal form – Problems related to CNF and GNF

UNIT 3 PUSHDOWN AUTOMATA 9

Pushdown Automata - Definitions – Moves – Instantaneous descriptions – Deterministic pushdown automata – Equivalence of Pushdown automata and CFL - pumping lemma for CFL – problems based on pumping Lemma

UNIT 4 TURING MACHINE 8

Turing Machines- Introduction – Formal definition of Turing machines – Instantaneous descriptions- Turing Machine as Acceptors – Turing Machine as Transducers Computable Languages and functions – Turing Machine constructions – Modifications of Turing Machines.

UNIT 5 COMPUTATIONAL COMPLEXITY 8

Undecidability- Basic definitions- Decidable and undecidable problems - Properties of Recursive and Recursively enumerable languages – **Introduction to Computational Complexity:** Definitions-Time and Space complexity of TMs – complexity classes – introduction to NP-Hardness and NP-Completeness.

TOTAL 45

TEXT BOOK

1. E.Hopcroft and J.D.Ullman, "*Introduction to Automata Theory, Languages and Computation*", Pearson, Education Publishers, 2nd Edition, 2004

REFERENCE BOOKS

1. Michael Sipser, "*Introduction to the Theory of Computation*", Thomson Asia, 2004
2. J.C.Martin, "*Introduction to Languages and Theory of Computation*", McGraw Hill,2003
3. K.L.P. Mishra, N.Chandrasekaran , " *Theoretical Computer Science* ", PHI, 3rd Edition, 2007

ONLINE REFERENCES

1. http://www.cis.upenn.edu/~cis511/
2. http://en.wikipedia.org/wiki/Theory_of_computation
3. http://geisel.csl.uiuc.edu/~loui/sdcr/.
4. http://www.math.niu.edu/~rusin/known-math/index/68QXX.html#INTRO
5. http://www.eecs.harvard.edu/theory/
6. http://www.cse.ohio-state.edu/~gurari/theory-bk/theory-bk.html

		L	T	P	C
PCS301	**COMPILER DESIGN**	**3**	**0**	**0**	**3**
	Prerequisite				
	PCS204				

PURPOSE

To learn the design aspects of a Compiler, and study other system software tools

INSTRUCTIONAL OBJECTIVES

1. To study the concepts of Assembler, Macro Processor, Loader and Linker
2. To learn about the various phases of compiler and syntax analysis
3. To learn the various parsing techniques
4. To learn the semantic analysis, translation of statements
5. To learn about Generating and Optimizing codes

UNIT 1 ASSEMBLER,MACRO,LOADER & LINKER **9**

Assembler: Overview of the assembly process - Design of two pass assembler- Single pass assembler - Macros : Macro definition and usage- schematics for macro expansion - Design of a Macro pre- processor - Design of a Macro assembler ; Introduction to Loaders and Linkers.

UNIT 2 INTRODUCTION TO COMPILERS **8**

Compiler: Introduction - Analysis of the source program - phases of a compiler - Compiler construction tools- Lexical analysis - Role of the lexical analyzer - Specification of tokens –Recognition of tokens -Lexical analyzer generators- Design aspects of Lexical Analyzer

UNIT 3 SYNTAX ANALYSIS – PARSING **10**

Syntax Analysis: Role of the parser - Context free grammars - Top-down parsing: shift reduce- predictive parsing; Bottom-up parsing: Operator precedence, LR parsers (SLR, Canonical LR,LALR) - Parser generators- Design aspects of Parser.

UNIT 4 SEMANTIC ANALYSIS – TRANSLATION & RUNTIME STORAGE **9**

Syntax-directed translation: Syntax-directed definitions - S-attributed definition - L-attributed definition -Top-down and bottom-up translation- Type checking - Type systems -Specification of a type checker; Run time environment -Source language issues -Storage organization –Storage allocation strategies - Access to non-local names - Parameter passing - Symbol tables- Design aspects of Syntax Directed Translation

UNIT 5 CODE GENERATION & OPTIMIZATION **9**

Intermediate code generation: Intermediate languages - Declaration - Assignment Statement - Boolean expression - Procedure calls - Code optimization : Introduction - Sources of optimization - Introduction to data flow analysis- Code generator : Issues in the design of a code generator- the target machine- A simple code generator- Design aspects of Code Optimizer.

TOTAL : 45

TEXT BOOKS

1. Alfred V. Aho, Ravi Sethi & Jeffrey. D. Ullman, "*Compilers Principles, Techniques & Tools*",Pearson Education, third edition, 2007.
2. D.M.Dhamdhere, "*System Programming and Operating Systems*", 2nd Edition., Tata Mcgraw Hill,1995

REFERENCE BOOKS

1. Kenneth C. Louden, *Compiler Construction, Principles and Practice*, Thomson Books,2007.
2. Aho. A.V & Ullman J.D, "*Principles of Compiler Design*", Narosa publications,1985.
3. S.S. Muchnick Harcourt Asra," *Advanced Compiler Design implementation*", Morgan Kaufman, 1997.
4. Anrew W. Appel, "*Modern Compiler Implementation in JAVA*", Cambridge University Press, 2003.

ONLINE RESOURCES:

http://lambda.uta.edu/cse5317/notes/notes.html
www.cs.bilkent.edu.tr/~ilyas/courses/cs416/

		L	T	P	C
PCS303	**COMPUTER NETWORKS**	**3**	**0**	**0**	**3**
	Prerequisite				
	PCS203				

PURPOSE

To study the various layer in Computer Networking and its Protocol design

INSTRUCTIONAL OBJECTIVES

3. To understand the concepts of data communications.
4. To study the functions of different layers.
5. To make the students to get familiarized with different protocols and network components.

UNIT 1 INTRODUCTION **8**

Network Architecture – Historical review – Network software architecture: layers and protocol, OSI Vs TCP. Network hardware architecture: topologies, devices. Introduction to types of networks-Optical Networks, Sensor networks.

UNIT 2 PHYSICAL AND DATA LINK LAYERS **10**

Basics for Data communications—Transmission Media— Guided and unguided transmission media — Communication satellites - Data link Layer design issues—Error Detection & Correction—Elementary Data link Protocols—Sliding window Protocols.

UNIT 3 MAC & NETWORK LAYERS **10**

Media access control and LANs: The channel allocation – Methods and protocols for LANs – IEEE 802 standards and LAN technologies – Ethernet, token ring – hardware addressing - Network layer design issues—Routing Algorithms—Congestion Control Algorithms

UNIT 4 TRANSPORT LAYER **9**

Transport services—Elements of transport Protocols—A simple transport Protocols—UDP—TCP—Performance issues.

UNIT 5 APPLICATION LAYER **8**

DNS—E-mail—WWW-Multimedia—Introduction to Cryptography–basic concepts-firewalls.

TOTAL 45

TEXT BOOK

1. Andrew S. Tanenbaum, "*Computer Networks*", Pearson, Fourth Edition, 2005.

REFERENCE BOOKS

1. Behrouz A. Forouzan, "*Data communication and Networking*", Tata McGraw-Hill, 2004.
2. James F. Kurose and Keith W. Ross, "*Computer Networking: A Top-Down Approach Featuring the Internet*", Pearson Education, Third Edition 2003.
3. William Stallings, "*Data and Computer Communication*",Seventh Edition, Pearson Education, 2003.

ONLINE REFERENCES:

1. www.cs.purdue.edu
2. ocw.mit.edu/
3. http://www.public.asu.edu
4. http://authors.phptr.com/tanenbaumcn4
5. cs.umass.edu
6. www.csee.usf.edu
7. www.cs.cmu.edu

		L	T	P	C
PCS311	**COMPILER DESIGN LAB**	**0**	**0**	**3**	**2**
	Prerequisite				
	PCS204				

PURPOSE

To Practice and implement the system software tools and compiler design techniques

INSTRUCTIONAL OBJECTIVES

1. To implement Loader, Linker, Assembler & Macro processor
2. To implement the NFA,DFA, First & Follow procedures
3. To implement Top down and Bottom up parsing techniques

LIST OF EXPERIMENTS **45**

1. Implementation of a Linker
2. Implementation of a Loader
3. Implementation of an Assembler
4. Implementation of Macro processor
5. Implementation of a Lexical Analyser
6. Converting a regular expression to NFA
7. Converting NFA to DFA
8. Computation of FIRST and FOLLOW sets
9. Construction of Predictive Parsing Table
10. Implementation of Shift Reduce Parsing
11. Computation of Leading and Trailing Sets
12. Computation of LR(0) items
13. Construction of DAG
14. Intermediate Code Generation
15. Design of Simple Compiler using Tamil words
16. Trace the execution of another program - debugger

TOTAL **45**

REFERENCE: Laboratory Manual

		L	T	P	C
PCS313	**NETWORKING LAB**	**0**	**0**	**3**	**2**
	Prerequisite				
	PCS203				

PURPOSE

This laboratory course deals with the complete implementation aspects of Networking and their applications

INSTRUCTIONAL OBJECTIVES

1. TCP Socket Programming , UDP applications , File transfer
2. RMI and Routing Algorithms.

LIST OF EXPERIMENTS **45**

1. Write a socket Program for Echo/Ping/Talk commands.
2. Create a socket (TCP) between two computers and enable file transfer between them.
3. Write a program to implement Remote Command Execution (Two M/Cs may be used)
4. Create a socket (UDP)
5. Write a code simulating ARP /RARP.
6. Create a socket for HTTP for web page upload & Download.
7. Write a program for TCP module Implementation.(TCP services)
8. Write a program for File Transfer in client-server architecture using following methods.
   (a) USING RS232C (b) TCP/IP
9. Write a program to implement RMI (Remote Method Invocation)
10. 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
    - Distance vector
11. Implement client in C and server in Java.
12. Using QUAL NET 4.0

    a) Create a scenario with the following specifications.
    - No of subnets - 2
    - No. of nodes - 40
    - Traffic

    FTP - 11 to 21
    FTP - 30 to 40
    UDP - 5 to 7
    - Routing Protocol – AODV
    - 802.16

Show the throughput using different bandwidths i.e., 10 Mbps and 100 Mbps respectively.

b) Create a scenario as described below.

No of students – 2

SN -1 Nodes – 15

SN -2 Nodes - 10

Generate FTP Traffic & HTTP traffic between

Nodes 1 to 11 (FTP)

14 to 7 (HTTP / Gen FTP)

Trace the packet with in the Simulation time and display the Trace file.

TOTAL 45

REFERENCE : Laboratory Manual

SEMESTER IV

		L	T	P	C
PCS304	**DATABASE MANAGEMENT SYSTEMS**	**3**	**0**	**0**	**3**
	Prerequisite				
	PCS201				

PURPOSE

To study the concepts of Relational Database design and query languages

INSTRUCTIONAL OBJECTIVES

1. To provide a general introduction to relational model
2. To learn about ER diagrams
3. To learn about Query Processing and Transaction Processing

UNIT 1 INTRODUCTION **9**

The Evolution of Database Systems- Overview of a Database Management System-Outline of Database-System Studies-The Entity-Relationship Data Model: Elements of the E/R Model-Design Principles-The Modeling of Constraints-Weak Entity Sets

UNIT 2 THE RELATIONAL DATA MODEL & ALGEBRA **9**

Basics of the Relational Model-From E/R Diagrams to Relational Designs-Converting Subclass Structures to Relations-Functional Dependencies-Rules About Functional Dependencies-Design of Relational Database Schemas - Multivalued Dependencies-Relational Algebra: Relational Operations-Extended Operators of Relational Algebra- Constraints on Relations

UNIT 3 SQL **9**

Simple Queries in SQL-Sub queries-Full-Relation Operations-Database Modifications-Defining a Relation Schema-View Definitions- Constraints and Triggers: Keys and Foreign Keys-Constraints on Attributes and Tuples-Modification of Constraints-Schema-Level Constraints and Triggers -Java Database Connectivity-Security and User Authorization in SQL

UNIT 4 INDEX STRUCTURE, QUERY PROCESSING **9**

Index Structures:Indexes on Sequential Files-Secondary Indexes-B-Trees-Hash Tables-Bitmap Indexes-Query Execution: Physical-Query-Plan Operators-One-Pass , two-pass & index based Algorithms, Buffer Management, Parallel Algorithms-Estimating the Cost of Operations-Cost-Based Plan Selection -Order for Joins-Physical-Query-Plan

UNIT 5 FAILURE RECOVERY AND CONCURRENCY CONTROL **9**

Issues and Models for Resilient Operation -Undo/Redo Logging-Protecting against Media Failures-Concurrency Control: Serial and Serializable Schedules-Conflict-Serializability-Enforcing Serializability by Locks-Locking Systems With Several Lock Modes-Concurrency Control by Timestamps, validation- transaction management: Serializability and Recoverability-View Serializability-Resolving Deadlocks-Distributed Databases: commit& lock

TOTAL 45

TEXT BOOK

1. Hector Garcia-Molina, Jeff Ullman, and Jennifer Widom, "*Database Systems: The Complete Book*" - Pearson Education, 2002

REFERENCE BOOKS

1. Silberschatz, H. Korth and S. Sudarshan, "*Database System Concepts*", 4rth Edition, McGraw-Hill International, 2002.
2. R. Elmasri and Shamakant B. Navathe, "*Fundamentals of Database Systems*", 3rd Edition, Addision Wesley , 2000.

ONLINE RESOURCES

http://www.cs.helsinki.fi/u/laine/tikape/k03/material03.html
http://infolab.stanford.edu/~ullman/dscb.html
http://cs.nyu.edu/courses/spring06/G22.2433-001/

		L	T	P	C
PCS305	**OPERATIONS RESEARCH TECHNIQUES**	**3**	**0**	**0**	**3**
	Prerequisite				
	PMA211				

PURPOSE

To enlighten the students with the various optimization techniques

INSTRUCTIONAL OBJECTIVES

At the end of the course the students will be able to know

1. Concepts of Linear programming technique
2. Applications and use of Assignment, Transportation and Replacement models
3. Techniques of PERT, CPM
4. Detailed knowledge of Inventory control
5. Advanced Linear Programming

UNIT – 1 LINEAR PROGRAMMING **9**

Operations research and decision making, Types of mathematical models and constructing the model, Formulation of linear programming problem, Simplex method (Analytical & Graphical), Two phase and Big M methods

UNIT – 2 ASSIGNMENT & TRANSPORTATION MODELS **9**

Assignment models, Transportation problem – North west corner method – Least cost method – Vogel's approximation method – Modi method, Unbalance and degeneracy in transportation model, Replacement model – Replacement of items that deteriorate, gradually, fail suddenly, group replacement policy analysis.

UNIT – 3 SCHEDULING AND NETWORK ANALYSIS **9**

Problem of sequencing – Processing 'n' jobs through two machines and three machines, Processing two jobs through 'm' machines. Network analysis – PERT and CPM, Total slack, free slack, Probability of achieving completion date, Cost analysis

UNIT – 4 INVENTORY CONTROL **9**

Inventory models – Deterministic models – Economic ordering quantity, Reorder level, optimum cost – Instantaneous and Non-instantaneous receipt of goods with or without shortages.

UNIT – 5 ADVANCED LINEAR PROGRAMMING **9**

Integer programming problem - Cutting plane algorithm – Transportation models - Vogel's Approximation method – MODI method – Unbalanced transportation problem – Degeneracy in transportation models – Assignment models – Traveling salesman problem-Dynamic Programming problem.

TOTAL 45

TEXT BOOK

1. Handy .A. Taha, "*Operations Research*", Prentice Hall of India., 5th Edition, 1995

REFERENCE BOOKS

1. Kanti Swarup, Gupta P.K., and Man Mohan, *Operations Research*, Sultan Chand & Sons, 1994.
2. Sharma S.D., *Operations Research*, Kedarnath Ramnath & Co., Meerut,1994.
3. Sundaresan.V, Ganapathy Subramanian.K.S. and Ganesan.K, *Resource Management Techniques*, A.R. Publications,2002

		L	T	P	C
PCS306	**OBJECT ORIENTED ANALYSIS AND DESIGN**	**3**	**0**	**0**	**3**
	Prerequisite				
	PCS202				

PURPOSE

This course separates and makes explicit the decisions that make up an object oriented analysis and design. We show how to use the UML notations most effectively both to discuss designs with colleagues, and in documents.

INSTRUCTIONAL OBJECTIVES

To provide the students with sufficient knowledge for

1. Understanding Object Basics, Classes and Objects, Inheritance
2. How software objects are altered to build software systems that are more robust
3. Gaining enough competence in object-oriented analysis and design (OOAD) to tackle a complete object oriented project
4. Understanding the issues and options in reuse
5. Using UML, a common language for talking about requirements, designs, and component interfaces

UNIT 1 INTRODUCTION **8**

Categories of Information systems – traditional paradigm Vs Object oriented paradigm – Objects and Classes – Inheritance – Object relationship – Examples of UML class modeling – Unified Process – Iteration and incrementation within the unified process

UNIT 2 UML AND THE UNIFIED PROCESS **9**

Overview of requirements – Initial understanding of the domain – Business Model – Requirements workflow – Osbert Oglesby case study- MSG Foundation case study – revising the requirements – MSG Foundation case study – Continuing the requirements workflow – MSG Foundation case study - Refining the revised requirements – MSG Foundation case study

UNIT 3 OBJECT ORIENTED ANALYSIS **10**

Extracting entity classes – Initial dynamic model – Extracting control classes- refining use cases – incrementing the class diagram – Initial dynamic model – MSG Foundation case study – revising the entity classes- Extracting – USE case realization – MSG Foundation case study – incrementing the class diagram – more on use cases - risk

UNIT 4 OBJECT ORIENTED DESIGN WORKFLOW **10**

Design workflow – format of the attributes – allocation of operations – Osbert Oglesby case study – Workflows of the unified process – Phases of the unified process – class diagrams – Use case diagrams – Interaction diagrams – state charts – package diagrams – Deployment diagrams

UNIT 5 TESTING AND MANAGEMNET ISSUES **8**

Quality issues – Non execution based testing – execution based testing – cost benefit analysis – risk analysis – Improving the process - Metrics – CPM/PERT _- Choice of programming language – Reuse case studies – Portability – planning and estimating duration and cost – testing the project management plan – maintenance and the object oriented paradigm - CASE Tools for maintenance

TOTAL 45

TEXT BOOKS

1. S. R Schach, "*Introduction to Object Oriented analysis and Design"*, Mc Graw Hill, 2003
2. Ali Bahrami , "*Object Oriented System Development*", McGraw Hill International Edition, 1999.

REFERENCE BOOKS

1. Booch G., "*Object Oriented Analysis and Design*", Addison Wesley Publishing Company, 2nd Edition, 2000.
2. Rambaugh.J, Blaha. M. Premerlani.W, Eddy F and Loresen W, "*Object Oriented Modeling and Design*",Prentice Hall of India, 1997.
3. Coad P, Yourdon E., "*Object oriented analysis*", Yourdon Press, 1991.

		L	T	P	C
PCS401	**SOFTWARE ENGINEERING**	**3**	**0**	**0**	**3**
	Prerequisite				
	NIL				

PURPOSE

This course in Software Engineering provides an in-depth understanding of the Software Engineering principles and methodologies

INSTRUCTIONAL OBJECTIVES

1. Planning and Estimation of Software projects
2. Software Requirements Specification, Software Design Concepts
3. Implementation issues ,Validation and Verification Procedures
4. Maintenance of Software and methodologies

UNIT 1 SOFTWARE PROJECT MANAGEMENT 9

Software project planning : Importance of software – Introduction – Defining the problem – Developing a solution strategy – Planning and development process – Other planning activities. Software cost estimation : Introduction – Software cost factors – Software cost estimation techniques – Staffing level estimation – Estimating software maintenance costs.

UNIT 2 SOFTWARE REQUIREMENTS ANALYSIS 9

Introduction – The software requirement specifications – Formal specification techniques – Languages and processors for requirements specification : SDAT, SSA, GIST, PSL/PSA, REL/REVS- Software prototyping – rapid prototyping techniques- user interface prototyping- Analysis & modeling – data, functional & behavioral models – Structured analysis & data dictionary.

UNIT 3 SOFTWARE DESIGN CONCEPTS 9

Abstraction – Modularity – Software architecture – Cohesion, coupling – Various design concepts and notations – Real time and distributed system – Design – Documentation – Data flow oriented design – Jackson system development – Design for reuse – Programming standards. User interface Design- principles- SCM- Need for SCM- Version control – Introduction to SCM process – software configuration items

UNIT 4 IMPLEMENTATION AND TESTING 9

Implementation Issues : Introduction – Structured coding techniques – Coding style – Standards and guidelines – Documentation guidelines-Modern Programming Languages Features : The translation process – PL characteristics. Software testing – levels – test activities – types of s/w test – black box testing – testing boundary conditions – structural testing – test coverage criteria based on data flow mechanisms – regression testing – testing in the large. S/W testing strategies – strategic approach and issues - unit testing – integration testing – validation testing – system testing and debugging

UNIT 5 SOFTWARE MAINTENANCE & RELIABILITY ISSUES 9

Introduction – Quality assurance – Walk through and inspections – Static analysis – Symbolic execution- Software Maintenance: Introduction – Enhancing maintainability during development – Managerial aspects of software maintenance – Configuration management – Source code metrics – Other maintenance tools and techniques. Software reliability – issues- Software reliability Vs Hardware reliability – Failures and Faults - Classification of Failures – Components and Operational Models

TOTAL 45

TEXT BOOKS

1. Richard Fairley, "*Software Engineering Concepts*", McGraw Hill, 1985.
2. Roger S. Pressman, "*Software Engineering A Practitioner Approach*" 4th edition , McGraw Hill, 1999

REFERENCE BOOKS

1. Roger S.Pressman, *Software engineering- A practitioner's Approach*, McGraw-Hill International Edition, 5th edition, 2001.
2. Ian Sommerville, *Software engineering*, Pearson education Asia, 6th edition, 2000.
3. Pankaj Jalote- *An Integrated Approach to Software Engineering*, Springer Verlag, 1997.
4. Shooman, *Software Engineering*, McGraw Hill, 1983.
5. John D. Musa, " *Software Reliability*", McGrawHill, 1985

6. David Gustafson, "*Software Engineering*", Schaum's outlines,Tata McGraw- Hill,2003.

ONLINE REFERENCES :

1. http://www.rspa.com/spi
2. http://www.comp.lancs.ac.uk/computing/resources/IanS/SE6/Slides/index.html
3. http://www.softwareqatest.com/qatlnks1.html

		L	T	P	C
PCS314	**DATABASE MANAGEMENT SYSTEMS LAB**	**0**	**0**	**3**	**2**
	Prerequisite				
	PCS201				

PURPOSE

This laboratory course gives a thorough understanding of the concepts of database design model and its applications. It also gives a comprehensive understanding of using a query language.

INSTRUCTIONAL OBJECTIVES

1. Designing a database
2. Using DDL and DML commands
3. Backing up of files

LIST OF EXPERIMENTS **45**

1. Data Definition Language (DDL) commands in RDBMS
2. Data Manipulation Language (DML) and Data Control Language (DCL)
3. High level language extensions with cursors
4. High level language extension with Triggers
5. Procedures and Functions
6. Embedded SQL
7. Database design using E-R model and Normalization
8. Design and implementation of payroll processing system
9. Design and implementation of Banking system
10. Design and implementation of Library Information System
11. Design and implementation of Student Information System
12. Automatic Backup of Files and Recovery of Files

TOTAL 45

REFERENCE : Laboratory Manual

		L	T	P	C
PCS411	**SOFTWARE ENGINEERING LAB**	**0**	**0**	**3**	**2**
	Prerequisite				
	NIL				

PURPOSE

To understand the concepts and implement the software engineering methodologies in the list of applications given below.

INSTRUCTIONAL OBJECTIVES

Develop two or three of the following applications using the software engineering methodologies given below using Visual tools as front end and MS-ACCESS as Backend.

Requirements Analysis
Design Concepts
Function Point Analysis
Implementation
Software Testing Techniques
Error Tracking

Suggested List of Applications:

1. Library Management System
2. Bank Management System
3. Inventory System
4. Software for a Game
5. Text Editor
6. Natural Language Based Grammar Checker
7. Airline Reservation System
8. Online Survey

TOTAL 45

REFERENCE : Laboratory Manual

SEMESTER V

		L	T	P	C
PCS302	**ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS**	**3**	**0**	**0**	**3**
	Prerequisite				
	PMA211				

PURPOSE

The purpose of this course is to impart concepts of Artificial Intelligence and Expert System

INSTRUCTIONAL OBJECTIVES

1. To study the concepts of Artificial Intelligence
2. Methods of solving problems using Artificial Intelligence
3. Introduce the concepts of Expert Systems and machine learning.

UNIT 1 INTRODUCTION TO Al AND PRODUCTION SYSTEMS **10**

Introduction to Al — Problem formulation, Problem Definition — Production systems, Control strategies, Search strategies. Problem characteristics, Production system characteristics — Specialized production systems — Problem solving methods — Problem graphs, Matching, Indexing and Heuristic functions — Hill Climbing, Depth first and Breath first, Constraints satisfaction — Related algorithms, Measure of performance and analysis of search algorithms.

UNIT 2 REPRESENTATION OF KNOWLEDGE **10**

Game playing — Knowledge representation, Knowledge representation using Predicate logic, Introduction to predicate calculus, Resolution, Use of predicate calculus, Knowledge representation using other logic — Structured representation of knowledge.

UNIT 3FUNDAMENTALS OF EXPERT SYSTEMS **9**

Basic plan generation systems — Strips — Advanced plan generation systems — K strips — D Comp. Expert systems — Architecture of expert systems, Roles of expert systems — Knowledge Acquisition — Meta knowledge, Heuristics.

UNIT 4 KNOWLEDGE INFERENCE **8**

Knowledge representation — Production based system, Frame based system. Inference — Backward chaining, Forward chaining, Rule value approach, Fuzzy reasoning — Certainty factors, Bayesian probability.

UNIT 5 MACHINE LEARNING **8**

Strategic explanations — Why, Why not and how explanations. Learning — Machine learning, adaptive learning. - Typical expert systems — MYCIN, PIP, INTERNIST, DART, XOON, Expert systems shells

TOTAL 45

TEXT BOOKS

1. Elaine Rich, "*Artificial Intelligence*", 2nd Edition, McGraw Hill, 2005
2. Dan W.Patterson, " *Introduction to AI and ES*", Pearson Education, 2007

REFERENCE BOOKS:

1. Peter Jackson," *Introduction to Expert Systems*", 3rd Edition, Pearson Education, 2007
2. Stuart Russel, Peter Norvig "*AI – A Modern Approach*", 2nd Edition, Pearson Education 2007.

ONLINE REFERENCES:

1. http://library.thinkquest.org/2705/
2. http://www-formal.stanford.edu/jmc/whatisai/
3. http://en.wikipedia.org/wiki/Artificial_intelligence
4. http://ai.eecs.umich.edu/
5. http://www.cee.hw.ac.uk/~alison/ai3notes/subsection2_6_2_3.html
6. http://starbase.trincoll.edu/~ram/cpsc352/notes/heuristics.html
7. http://www.macs.hw.ac.uk/~alison/ai3notes/section2_4_3.html
8. http://www.rbjones.com/rbjpub/logic/log019.htm
9. http://www.cs.odu.edu/~jzhu/courses/content/logic/pred_logic/intr_to_pred_logic.html
10. http://www.macs.hw.ac.uk/~alison/ai3notes/chapter2_5.html

		L	T	P	C
PCS308	**LOGIC FOR COMPUTER SCIENCE**	**3**	**0**	**0**	**3**
	Prerequisite				
	PMA211				

PURPOSE

To study important concepts in Logic

INSTRUCTIONAL OBJECTIVES

1. To provide main notions of Mathematical Logic
2. To learn Formal framework to construct logic arguments
3. To student deductive systems along with completeness

UNIT 1 PROPOSITIONAL LOGIC **9**

Declarative sentences – Natural deduction – Popositional logic as a Formal Language – Semantics of Propositional Logic – Normal Forms – SAT Solvers

UNIT 2 PREDICATE LOGIC **9**

Predicate Logic as a formal Language - Proof Theory of Prediacte Logic - Semantics of Prediacte Logic – Undecidability of Predicate Logic - Expressiveness of Predicate Logic Models – Micromodels of Software

UNIT 3 VERIFICATION BY MODEL CHECKING **9**

Motivation for Verification – Linear Time Temporal Logic – Model Checking : systems, Tools and Properties – Branching Time temporal Logic – Model Checking algorithms – CTL+ and the expressive power of LTL and CTL – Fixed point characterization of CTL

UNIT 4 PROGRAM VERIFICATION AND MODAL LOGIC **9**

A Framework for software verification – Proof calculus for partial correctness – Proof calculus for total correctness – Basic Modal logic – Logic Engineering – Natural Deduction – Reasoning about knowledge in a multi-agent system

UNIT 5 BINARY DECISION DIAGRAMS **9**

Representing Boolean functions – Algoritms for reduced OBBDs - Geometric Templates from Spatial Relations – Application – Image Based Rendering – Symbolic Model Checking – A relational Mu – calculus – Coding CTL models and specifications

TOTAL 45

TEXT BOOK

1. Huth M and Ryan M ," *Logic in Computer Science : Modeling and Reasoning about systems*", Cambridge University Press 2005

REFERENCE BOOKS

1. Enderton H B, "*A Mathematical Introduction to Logic*", Academic Press, 2001
2. *Mathematical Logic for Computer Science*", Springer, 2001
3. Herbert B. Enderton, "*A Mathematical Introduction to Logic*", Elsevier,2005
4. I.M.Copi, D.Cohen, P.Jetli, M.Prabakar, "*Introduction to Logic",* Pearson Education,2006

ONLINE REFERENCES

http://www.cs.swan.ac.uk/~csetzer/logic-server/
http://www.cis.upenn.edu/~jean/gbooks/logic.html
http://arxiv.org/list/cs.LO/recent
http://www.cs.rice.edu/~vardi/comp409/

		L	T	P	C
PCS405A	**VLSI Design and Embedded Systems**				
	Prerequisite	3	0	0	3

Purpose

- VLSI provides improved solutions for high speed networking, high performance computers, and specific applications of integrated circuits, requiring the use of multiple disciplines.
- There is urgent need to absorb and assimilate the latest development in the VLSI and embedded system design field.
- VLSI industry needs VLSI design engineers and Embedded System design engineers.

INSTRUCTIONAL OBJECTIVES

In this course, the students will be able to

1. Study the physics of MOSFET's at an elementary level derive their I/V characteristics, describe the second-order effects, and derive small – signal model.
2. Acquire working knowledge of basic digital design paradigms and the necessary Verilog HDL constructs that would help to build small digital circuits
3. Learn the concepts of embedded processors, embedded programming and Real- Time Operating Systems.

UNIT - 1 **9**

Basic MOS device physics (Elementary treatment only)

MOSFET as a switch – MOSFET structure, symbols, operation – logic gates in CMOS, transmission gate circuits.

UNIT - 2 **9**

Electrical Characteristic of MOSFET's and CMOS Logic Gates

Threshold voltage, derivation of I/V characteristics – short channel effects – MOS device models – DC characteristics, switching characteristics and power dissipation of CMOS inverter.

UNIT - 3 **9**

Digital System design with Verilog HDL (Elementary treatment only)

Basic concepts, modules and ports - gate-level modeling, dataflow modeling, behavioral modeling, switch -level modeling, UDPs.

UNIT - 4 **9**

Introduction to Embedded Systems (Elementary treatment only)

Challenges of Embedded Systems - Embedded system design process, Embedded processors - 8051 Microcontroller, ARM Processor, - Architecture, Instruction sets and embedded programming in Assembly Language (ALP) and in High - Level Language 'C'

UNIT - 5 **9**

Real Time Operating System (Elementary treatment only)

Concept of tasks, task states, task and data, hard and soft real time systems - task scheduling like SJF, RR, EDF, RM - Process, Process Table , Inter process communication. Interrupts. clock synchronization, dead locks - semaphores, shared data, semaphore functions, message queue functions, mailbox functions, pipeline functions, timer functions, events, memory management, interrupt routines in RTOS environment, basic design using an RTOS

TEXT BOOKS

1. John P. Uyemura, "Introduction to VLSI Circuits and Systems", Wiley India, 2006

2. Samir Palnitkar, "Verilog HDL: A guide to Digital Design and Synthesis", 2nd edition, Pearson Education.

3. Rajkamal, " Embedded Systems" Architecture, Programming and Design ", Tata Mc Graw Hill Education, 2008

REFERENCE BOOKS

1. Jan M. Rabaey , Ananth Chandrakasan and Bonvoje Nikohc, " Digital Intergrated Circuits" Second Edition, Prentice Hall.

2. Muhammad Ali Mazidi, Janice Gillspie Mazidi, Rolon D. McJinlay, "The 8051 Microcontroller and Embedded Systems" Perason Education, 2004

3. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, "Operating System Principles" 7th edition, Wiley India

		L	T	P	C
	ELECTIVE - I	**3**	**0**	**0**	**3**
	Prerequisite				
	Nil				

One course from the list of courses given below to be selected by the students
PCS321, PCS323, PCS325,PCS327, PCS329, PCS331, PCS333

		L	T	P	C
PCS312	**ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS LAB**	**0**	**0**	**3**	**2**
	Prerequisite				
	PMA211				

PURPOSE
To learn & implement the various concepts & algorithms of AI & Expert Systems

INSTRUCTIONAL OBJECTIVES
1. To implement Heuristic functions & Prepositional Logic
2. To implement A* & AO* algorithms
3. To implement an Expert system for medical diagnosis

LIST OF EXPERIMENTS **45**

1. Water Jug Problem (Using DFS And BFS)
2. Single Player Game(Using Heuristic Function)
3. Two Player Game(Using Heuristic Function)
4. A* Algorithm
5. AO* Algorithm
6. Predicate To Prepositional Logic
7. Syntax Checking of English sentences-English Grammar.
8. Develop an Expert system for Medical diagnosis.
9. Develop any Rule based system for an application of your choice.
10. Develop an algorithm for morphological derivation / verb derivation and implement it.

TOTAL 45

REFERENCE : Laboratory Manual

		L	T	P	C
PCS413A	**VLSI Design and Embedded Systems Lab**	**0**	**0**	**3**	**2**
	Prerequisite				
	CS0205, CS0211				

PURPOSE

- Almost all embedded systems are designed with microcontrollers as an essential basic part. This subject provides basic knowledge of typical microcontrollers.
- HDL Programming is fundamental for VLSI design and hence this course is given.

INSTRUCTIONAL OBJECTIVES

To make the students

- To learn two typical microcontrollers and how to use it in practical application. The lab component gives hands on training on the design, development and microcontroller applications.
- To write programs in VHDL and verilog for modeling digital circuits.

Total 45

LIST OF EXPERIMENTS

1. Design with 8 bit Microcontrollers 8051/PIC Microcontrollers

   i. I/O Programming Timers, Interrupts, Serial Port programming
   ii. PWM Generation, Motor Control ADC/DAC, LCD and RTC interfacing , Sensor Interfacing
   iii. Both Assembly and C Programming

2. Design with ARM Processors - I/O programming ADC/DAC timers, Interrupts

3. Study of one type of Real Time Operating Systems (RTOS)

4. Design and Implementation of simple Combinational Sequential Circuits

5. Design with Programmable Logic Devices using Xilinx/ Altera FPGA and CPLD

SEMESTER VI

		L	T	P	C
PCS402	**SCRIPTING LANGUAGES AND WEB TECHNOLOGY**	**3**	**0**	**0**	**3**
	Prerequisite				
	PCS202, PCS303				

PURPOSE

Uses of web sites and portals have become common for knowledge sharing and business. The course focuses on the fundamentals of CGI, SCRIPTING LANGUAGES, Web Applications

INSTRUCTIONAL OBJECJTIVES

This course introduces the students to

1. Basic web concept and Internet protocols.
2. CGI Concepts & CGI Programming
3. SCRIPTING LANGUAGES
4. Study of DHTML, XML
5. Study of On-Line web application & Internet Concepts

UNIT 1 INTRODUCTION **9**

Internet Principles – Basic Web Concepts – Client/Server model – retrieving data from Internet – HTM and Scripting Languages – Standard Generalized Mark –up languages – Next Generation – Internet –Protocols and Applications

UNIT 2 COMMON GATEWAY INTERFACE PROGRAMMING **9**

HTML forms – CGI Concepts – HTML tags Emulation – Server – Browser Communication – E-mail generation – CGI client Side applets – CGI server applets – authorization and security. Introduction to PERL.

UNIT 3 SCRIPTING LANGUAGES **9**

Java Script Programming-Dynamic HTML-Cascading style sheets-Object model and Event model- Filters and Transitions-Active X Controls-Multimedia-Client side script.- VB Script programming – Forms – Scripting Object

UNIT 4 SERVER SIDE PROGRAMMING **9**

Dynamic Web content – cascading style sheets – DHTML – XML – Server side includes – communication – Active and Java Server Pages – Firewalls – Proxy Servers.

UNIT 5 ON-LINE APPLICATIONS **9**

Simple applications – on-line databases – monitoring user events – plug-ins –database connectivity – Internet Information Systems – EDI application in business – Internet Commerce – Customization of Internet Commerce.

TOTAL 45

TEXT BOOKS

1. Jason Hunter, William Crawford, "*Java Servlet Programming*", O' Reilly Publications, 1999.
2. Ravi Kalakota and Andrew B Whinston, "*Frontiers of Electronic Commerce*", Addison Wesley, 1996
3. Eric Ladd, Jim O' Donnel, "*Using HTML 4, XML and Java",* Prentice Hall of India – QUE,1999

REFERENCE BOOKS

1. Jeffy Dwight, Michael Erwin and Robert Niles, "*Using CGI*", Prentice Hall of India QUE, 1999.
2. Scot Johnson, Keith Ballinger, Davis Chapman, "*Using Active server Pages*", Prentice Hall of India, 1999.
3. Ted coombs, Jason coombs , Brewer, " *Active X source book*", John wiley, 1999
4. Evangelos Petroutsos , " *Mastering Visual Basic 6*", BPB Publications, 1998

ONLINE REFERENCES

http://books.google.com
http://en.wkipedia.org/wiki/scriptinglanguage

		L	T	P	C
PCS403	**PARALLEL AND DISTRIBUTED COMPUTING**	**3**	**0**	**0**	**3**
	Prerequisite				
	PCS201, PCS303				

PURPOSE

The purpose of this course is to provide the basics of parallel computing, algorithm design and parallel programming.

INSTRUCTIONAL OBJECTIVES

1. An introduction about parallel computing.
2. Parallel programming platforms
3. Principles of parallel algorithm design
4. Principles of message passing
5. Shared address space platforms

UNIT 1 INTRODUCTION TO PARALLEL COMPUTING 9

Motivating Parallelism-Scope of parallel computing-Parallel programming platforms-Implicit Parallelism-Limitations of Memory System Performance-Dichotomy of Parallel computing platforms-Physical organization of parallel platforms-Communication costs in parallel machines-Routing mechanisms for inter connection networks.

UNIT 2 PRINCIPLES OF PARALLEL ALGORITHM DESIGN 9

Preleminaries-Decomposition techniques-characteristics of tasks and interactions-mapping techniques for load balancing-methods for containing interaction overheads-parallel algorithm models.

UNIT 3 BASIC COMMUNICATION OPERATIONS 9

One to all broadcast and all to one reduction-all to all broadcast and reduction
-scatter and gather –sources of overhead in parallel programs-performance metrics for parallel systems-the effect of granularity on performance.

UNIT 4 PROGRAMMING USING MESSAGE PASSING PARADIGM 9

Principles of message passing programming-Building blocks-Message passing interface-Topologies and embedding-Overlapping computation with communication-Collective communication and computation operation.

UNIT 5 PROGRAMMING SHARED ADDRESS SPACE PLATFORMS 9

Thread basics-Why threads?-POSIX thread-Thread basics-Synchronization primitives in Pthreads-controlling thread and synchronization attributes-Composite synchronization constructs-Case study:Implementation of Chat Server.

TOTAL 45

TEXT BOOKS

1. Ananth Grama ,Vipin Kumar,"*Introduction to parallel computing*",Second edition,2007
2. Cameron Hughes,Tracey Hughes,"*Parallel and Distributed Programming using C++*.Pearson education,2005

REFERENCE BOOK

1. Albert y.Zomaya ,"*Parallel and Distributed Computing Hand book*"McGrawl Publications 2005.

ONLINE REFERENCES:

www.ebooks.com
www.freebookcentre.com

		L	T	P	C
	ELECTIVE - II	**3**	**0**	**0**	**3**
	Prerequisite				
	Nil				

One course from the list of courses given below to be selected by the students

PCS322, PCS324, PCS326, PCS328, PCS330, PCS421, PCS423, PCS425, PCS427, PCS429, PCS431, PCS433, PCS435, PCS437, PCS439

		L	T	P	C
	ELECTIVE -III	**3**	**0**	**0**	**3**
	Prerequisite				
	Nil				

One course from the list of courses given below to be selected by the students

PCS322, PCS324, PCS326, PCS328, PCS330, PCS421, PCS423, PCS425, PCS427, PCS429, PCS431, PCS433, PCS435, PCS437, PCS439

		L	T	P	C
	ELECTIVE - IV	**3**	**0**	**0**	**3**
	Prerequisite				
	Nil				

One course from the list of courses given below to be selected by the students

PCS322, PCS324, PCS326, PCS328, PCS330, PCS421, PCS423, PCS425, PCS427, PCS429, PCS431, PCS433, PCS435, PCS437, PCS439

		L	T	P	C
PCS412	**WEB TECHNOLOGY LAB**	**0**	**0**	**3**	**2**
	Prerequisite				
	NIL				

PURPOSE

The purpose of this Lab is to Impart knowledge on various web technologies.

INSTRUCTIONAL OBJECTIVES

1. Creating web pages.
2. Client side Scripting programs
3. Creating Dynamic web Pages.
4. Java servelets
5. Experiment s with Java server pages.
6. On line-Transactions—Data Base connectivity

LIST OF EXPERIMENTS

1. Create a web portal with properly aligned paragraphs, images and list of items in different styles.
2. Client side and server side image maps.
3. Use of style sheets in web pages.
4. Front end validations using Javascript .
5. Write a program in java to create servelets for displaying students mark list. Assume that students information is available in the data base which has been stored in a server.
6. Run the program in java to create servlets for conducting online examination.
7. Storing the form fields in a data base through JSP.

Reference : Laboratory Manual **Total: 45**

SEMESTER VII

		L	T	P	C
PCS407	**SOFTWARE QUALITY THEORY & MANAGEMENT**	**3**	**0**	**0**	**3**
	Prerequisite				
	Nil				

PURPOSE

This course introducing the concept of software quality and its improvement

INSTRUCTIONAL OBJECTIVES

1. Principles of software quality and concepts
2. Quality assurance models
3. Future trend in quality assurance models

UNIT I: SOFTWARE QUALITY **9**

Introduction = views of quality – hierarchical models of quality (Bohem, MC calls)

UNIT II MEASURING SOFTWARE QUALITY **9**

Measuring quality – Software metrics-Gill approach management and improvement of quality- case tools for quality – quality standards

UNIT III QUALITY MANAGEMENT SYSTEMS **9**

Historical perspective – Deming, Crossby, Juran's principles – Elements of a QMS, - QMS for software control, Assurance, improvement

UNIT IV QUALITY MANAGEMENT STANDARDS **9**

Purpose of standards – ISO 9000 Series – CMM-Tickit-SPICE models

UNIT V: FURTURE TRENDS **9**

TSP & PSP- Clean room software engineering- Defect injection and prevention

TOTAL 45

TEXT BOOK

1. Alen Gillies "Software quality theory and management", International Thompson Computer Press-1997

REFERENE BOOK

1. Watt S. Humphery, "Managing software process", Addision Wesely 1996
2. Roger Pressman, "Software Engineering" McGraw Hill 1997

		L	T	P	C
	ELECTIVE - V	**3**	**0**	**0**	**3**
	Prerequisite				
	Nil				

One course from the list of courses given below to be selected by the students

PCS422, PCS424, PCS426, PCS428, PCS430, PCS432, PCS434, PCS436, PCS438, PCS440, PCS442, PCS444, PCS446,PCS448

		L	T	P	C
	ELECTIVE - VI	**3**	**0**	**0**	**3**
	Prerequisite				
	Nil				

One course from the list of courses given below to be selected by the students

PCS422, PCS424, PCS426, PCS428, PCS430, PCS432, PCS434, PCS436, PCS438, PCS440, PCS442, PCS444, PCS446,PCS448

		L	T	P	C
PCS414	**PROJECT**	**0**	**0**	**24**	**12**
	Prerequisite				
	Should have studied the Computer Science and Engineering Subjects Prescribed / opted for upto VII SEMESTER				

PURPOSE

To simulate real life situations related to Computer Science and engineering and impact adequate training so that confidence to face and tackle any problem in the field is developed.

INSTRUCTIONAL OBJECTIVES

1. To guide the students such a way that the students carry out a comprehensive work on the chosen topic which will stand them in good stead as they face real life situations.

PROJECT

Each student is given a Project which will cover all the aspects (to the extent possible) like investigation, planning, designing, detailing and estimating of a Computer Science and engineering structure in which the aspects like analysis, application of relevant codes, etc., will find a place. Alternately, a few research problems also may be identified for investigation and the use of laboratory facilities to the fullest extent may be taken as a project work. Alternately, a student is encouraged to take an industrial project with any Computer Science and engineering organization or firm. A project report is to be submitted on the topic which will be evaluated.

ELECTIVES FOR FIFTH SEMESTER

		L	T	P	C
PCS321	**SYSTEM MODELLING AND SIMULATION**	**3**	**0**	**0**	**3**
	Prerequisite				
	Nil				

PURPOSE

This course provides a complete understanding of the various mathematical models, simulation techniques and its applications

INSTRUCTIONAL OBJECTIVES

1. Mathematical models for simulation
2. Random numbers generation
3. Analysis of simulation data and modeling
4. Applications of Simulation, and, simulation software

UNIT 1 INTRODUCTION **9**

Systems & Environment – Discrete & Continuous systems- model of a system – Types- Discrete event system simulation – steps; Simulation Example – Queuing systems – Inventory systems – other examples; General Principles – concepts in Discrete event simulation – List processing

UNIT 2 MATHEMATICAL & STATISTICAL MODELS **9**

Statistical models – Discrete & Continuous distributions – Poisson process; Queuing models – Characteristics – notations; long run measure of performance of queuing systems – server utilization – costs in queuing problems; steady-state behavior of infinite population Markovian models- Multiserver Queue: M/M/c/∞/∞ , M/M/c/k/k

UNIT 3 RANDOM NUMBERS **9**

Random number generation – Properties – Generation of Pseudo Random numbers – Techniques for generation – Tests for Random numbers – Random variate generation –
Inverse Transform Technique – Exponential, Uniform, Weibull, Triangular, Empirical continuous, Discrete distributions- Acceptance Rejection principle

UNIT 4 ANALYSIS OF SIMULATION DATA **9**

Input modeling – Identifying the distribution – parameter estimations – Goodness of Fit test – Fitting a non stationery poisson process – selecting input models without data; Verification and Validation of simulation models- model building – verification of models – calibration and validation of models – output analysis for a single model.

UNIT 5 APPLICATION & SIMULATION SOFTWARES **9**

Simulation of Computer systems – simulation Tools – model input – High level system simulation – CPU and memory simulation; Simulation of Computer networks – Traffic modeling – media access control – Data Link layer, TCP , Model construction.
History of Simulation Software - Simulation in Java, GPSS, SSF; Introduction to various simulation softwares

TOTAL 45

TEXT BOOK

1. Jerry Banks, John S.Carson, Barry L.Nelson, David M. Nicol, "*Discrete Event System Simulation*", Pearson Education, Fourth Edition, 2005

REFERENCE BOOKS

1. Geoffery Gordon, "*System Simulation*", Pearson Education, 2nd Edition, 2007
2. Arerill M.Law, David Kelton, " *Simulation Modelling & Analysis*", McGraw Hill International Edition, 2000

ONLINE REFERENCES

1. Simulation Software Development Framework
   www.topology.org/soft/sim.html
2. Simulation in Python
   www.simpy.sourceforge.net
3. C++ Simulation : http://cxxsim.ncl.ac.uk

		L	T	P	C
PCS323	**DIGITAL IMAGE PROCESSING**	**3**	**0**	**0**	**3**
	Prerequisite				
	Nil				

PURPOSE

This course provides a complete understanding of the various image processing techniques

INSTRUCTIONAL OBJECTIVES

1. Image fundamentals and techniques
2. To learn various Image enhancement , restoration and compression techniques
3. To learn various Image segmentation , representation and description methods

UNIT 1 INTRODUCTION **8**

Origin of Digital Image processing – fundamental steps – Components of Image processing system – Visual perception – Light and EM spectrum – Image sensing and acquisition – Image sampling and Quantization – relationship between pixels

UNIT 2 IMAGE ENHANCEMENT **9**

Spatial Domain: Gray level transformation – Histogram processing – Arithmetic / Logic operations- Spatial filtering – smoothing filters – sharpening filters

Frequency Domain: Fourier transform – smoothing frequency domain filters – sharpening filters – Homographic filtering

UNIT 3 IMAGE RESTORATION **10**

Model of Image degradation/ restoration process – Noise models – mean filters – order statistics – adaptive filters – band reject – bandpass – notch – optimum notch filters – Linear, position invariant degradations – establishing degradation functions – Inverse filtering – Weiner – least square – Geometric mean filters

UNIT 4 IMAGE COMPRESSION **9**

Fundamentals – Image compression models – Information theory – error free compression: variable length – LZW – Bitplane – Lossless predictive coding; Lossy compression : Lossy predictive – transform – wavelet coding; Image compression standards

UNIT 5 IMAGE SEGMENTATION, REPRESENTATION & DESCRIPTION **9**

Segmentation: Detection of discontinuities – Edge linking & Boundary detection – Thresholding – region based segmentation

Representation & Description: Chain codes – Polygonal approximations – signatures – Boundary segments – Skeletons; Boundary Descriptors – Regional descriptors

TOTAL 45

TEXT BOOK

1. Rafael C. Gonzalez, Richard E. Woods, "*Digital Image Processing*" , 2nd edition , Pearson Education, 2007.

REFERENCE BOOKS

1. S.Annadurai, R.Shanmugalakshmi, "*fundamentals of Digital Image Processing*", Pearson Education, 2007
2. Rafael C. Gonzalez, Richard E. Woods, Eddins, "*Digital Image Processing using MATLAB*" , Pearson Education, 2005
3. Anil Jain K. "*Fundamentals of Digital Image Processing*", PHI, 1999.
4. William Pratt , "*Digital Image Processing*", Wiley Interscience, 2nd edition 1991

ONLINE REFERENCES

http://eeweb.poly.edu/~onur/lectures/lectures.html
www.caen.uiowa.edu/~dip/LECTURE/lecture.html

		L	T	P	C
PCS325	**VISUAL PROGRAMMING**	**3**	**0**	**0**	**3**
	Prerequisite				
	Nil				

PURPOSE

This course gives a strong foundation to the Visual Programming concepts

INSTRUCTIONAL OBJECTIVES

1. Basics of Windows Programming
2. Visual Basic ,Visual C++ and Visual JAVA Programming
3. Java Applets and Networking concepts

UNIT 1 INTRODUCTION TO WINDOWS PROGRAMMING 8

Different paradigms of programming – Structured Programming- Object Oriented Programming-Functional Programming- Logic programming- Visual Programming- Concurrent Programming – Comparison – Event driven programming – Windows programming fundamentals – Applications.

UNIT 2 VISUAL BASIC PROGRAMMING 10

Visual Basic Applications – Creating and using Controls – Menus and Dialogs – Managing projects – Programming fundamentals – Objects and instances – Debugging – Responding to mouse events – Using grid control – Creating graphics for application – Displaying and printing information – Interacting with the environment – File system controls - Processing files – Accessing databases with the data controls.

UNIT 3 VISUAL C++ PROGRAMMING 9

Visual C++ components – Developing simple applications – Microsoft Foundation classes – Controls – Message handling - Document-view architecture – Dialog based applications – Mouse and keyboard events.

UNIT 4 VISUAL JAVA – INTRODUCTION 9

Java basics – Java classes – Object references – Inheritance – Exception handling - File I/O – Java tools – Developing Java applications.

UNIT 5 JAVA APPLETS AND NETWORKING 9

Visual J++ Applet wizard – Handling events – Multithreading – Animation techniques – Animating images – Applets and HTML – Java beans – JavaScript – Combining scripts and Applets – Applets over web and networking.

TOTAL 45

TEXT BOOKS

1. Charles Petzold, "*Windows Programming*", Microsoft Press, 1995.(Unit – I)
2. Marion Cottingham "*Visual Basic",* Peachpit Press, 1999. (Unit – II)
3. Kate Gregory '*Using Visual C++",* Prentice Hall of India Pvt., Ltd., 1999. (Unit – III)
4. H.M.Deitel and P.J.Deitel, "*Java how to program with an Introduction to Visual*
5. *J++"*, Prentice Hall, 1998. (Unit – IV & V)

REFERENCE BOOKS

1. C.H. Pappas, W.H. Murray, III "*Visual C++: The Complete Reference*", Tata McGraw-Hill Publishing Company, 1999.
2. Stephen R.Davis, "*Lean Java Now*", Microsoft Press, 1996.
3. Jamie Jaworski, "*Java Unleashed*", SAMS Techmedia Publication, 1999.
4. Jason Blooberg. Jeff Kawski, and Paul Treffers, "*Web Page Scripting Techniques*",Hayden books, 1996

ONLINE RESOURCES

http://www.hitmill.com/programming/vb.htm
http://www.programmersheaven.com/
http://www.austinlinks.com/CPlusPlus/
http://support.microsoft.com/kb/305326

		L	T	P	C
PCS327	**SOFT COMPUTING**	**3**	**0**	**0**	**3**
	Prerequisite				
	Nil				

PURPOSE

This course provides a way to understand the concepts of Artificial Intelligence , ANN , Genetic Algorithms and Fuzzy systems and its applications

INSTRUCTIONAL OBJECTIVES

1. Basics of AI and ANN
2. Neuro fuzzy systems and its applications
3. Genetics algorithms and its applications

UNIT 1 BASICS OF NEUROSCIENCE AND ANN MODELS 9

The Brain as a Neural network-Basic Properties of Neurons – Neuron Models – Rosenblatt's Prceptron – The widrow-Hoff LMS Learning Algorithm-Order of a Predicate and a Perceptron – Complexity of Learning using Feedforward Networks.

UNIT 2FUZZY SYSTEMS 9

Fuzzy Sets and Fuzzy Reasoning – Fuzzy Matrices – Fuzzy Functions – Decompositions – Fuzzy Automata and Languages – Fuzzy Control Method – Fuzzy Decision Making.

UNIT 3 NEURO-FUZZY SYSTEMS 9

Introduction to Neuro – Fuzzy Systems –Fuzzy System Design Procedures – Fuzzy Sets and Logic Background - Fuzzy / ANN Design and Implementation

UNIT 4 GENETIC ALGORITHMS 9

Introduction – Robustness of Traditional Optimization and Search Techniques – The goals of optimization-Computer Implementation-Data Structures, Reproduction, Crossover and Mutation – Mapping Objective Functions to fitness form – Some Applications of Genetic Algorithms.

UNIT 5 ARTIFICIAL INTELLIGENCE 9

AI technique-Level of the Model – Problems, Problem Spaces and Search – Issues in the Design of Search Programs – Heuristic Search Techniques – Knowledge Representations and Mappings

TOTAL 45

TEXT BOOKS

1. N. K. Bose and P. Liang , "*Neural Network Fundamentals*"
2. Timothy J. Ross , "*Fuzzy Logic with Engineering Applications*", McGraw- Hill International Editions,1995 (UNIT II & III)

REFERENCE BOOKS

1. Elaine Rich and Kelvin knight ,"*Artificial Intelligence*",McGraw- Hill 2000
2. David E. Goldberg, "*Genetic Algorithms-In Search, optimization and Machine Learning*", Pearson Education.
3. Robert J. Schalkoff, "*Artificial Neural Networks*", McGraw-Hill International Editions,1997.
4. Freeman J.A. & D.M. Skapura , "*Neural Networks: Algorithms, Applications and Programming Techniques*", Addison Wesley, 1992.
5. G.J. Klir & B. Yuan, "*Fuzzy Sets & Fuzzy Logic*", PHI, 1995.
6. Melanie Mitchell , "*An Introduction to Genetic Algorithm*", PHI, 1998.

ONLINE REFERENCE

www.cs.nthu.edu.tw/~jang/nfsc.htm

		L	T	P	C
PCS329	**ADVANCED OPERATING SYSTEM**	**3**	**0**	**0**	**3**
	Prerequisite				
	Nil				

PURPOSE

To learn the Advances concepts of Operating Systems

INSTRUCTIONAL OBJECTIVES

1. To learn the Multiprocessor and Network Operating Systems
2. To learn the Distributed OS ,Database OS and Real time OS

UNIT 1 MULTIPROCESSOR OPERATING SYSTEMS **9**

Threads – Process synchronization – Processor scheduling – Memory management – Reliability – Fault tolerance.

UNIT 2 NETWORK OPERATING SYSTEMS (NOS) **9**

Types of NOS – NOS to LANs – Choosing and NOS – Multiple NOS on a single Network – NOS and Network management – Future Trends.

UNIT 3 DISTRIBUTED OPERATING SYSTEMS **9**

Issues - Communication Primitives – Remote procedure call – Logical clocks – Vector clocks – Distributed mutual exclusion – Non token based algorithms – Token based algorithms – Issues in deadlock detection and resolution – Centralized and distributed deadlock detection algorithms – Election algorithms, Issues in load distributing – Load distributing algorithms – Distributed File System design issues – Mechanisms for building DFS

UNIT 4 DATABASE OPERATING SYSTEMS **9**

Requirements - Concurrency control model – Serializability theory – Distributed database systems – Synchronization primitives – Lock based and timestamp based algorithms – Fully replicated database systems.

UNIT 5 REAL TIME OPERATING SYSTEMS **9**

Architecture of Real Time Systems – Operating Systems Issues – Performance Measures – Estimating Program runtimes – Uniprocessor Scheduling – IRIS Tasks – Task Assignment Mode changes – Fault – tolerant scheduling – Case Study: Design of a Protocol to access one OS to other

TOTAL 45

TEXT BOOKS

1. Mukesh Singhal, Niranjan G.Shivaratri, "*Advanced Concepts in Operating systems*", McGraw-Hill, New York, 1994.(UNIT 1, III & IV)
2. C.M.Krishna, Kang G.Shin, "*Real Time Systems*", McGraw-Hill, 1997.(Unit – V)
3. Philip Hunter, "*Network Operating Systems – Making Right Choices*", Addison Wesley, 1995. (Unit – II)

REFERENCE BOOKS

1. Andrew S. Tanenbaum, "*Modern Operating Systems*", Prentice Hall, NJ (Section 9 – 13 only).
2. Pradeep K. Sinha, "*Distributed Operating Systems Concepts and Design*", PHI,1997.
3. Gary Nutt, "*Operating Systems – A Modern Perspective*", Addison Wesley, 2000.

ONLINE REFERENCES

http://cactus.eas.asu.edu/partha/Teaching/Archive/531.1999/
http://redwood.snu.ac.kr/bbs/zboard.php?id=Conference
http://resources.linuxinsider.com/search/keyword/linuxinsider/Operating%20Systems%20Lecture%20Notes/Operating%20Systems%20Lecture%20Notes

		L	T	P	C
PCS331	**E- COMMERCE**	**3**	**0**	**0**	**3**
	Prerequisite				
	Nil				

PURPOSE

This course provides a better understanding of the concepts of Electronic Commerce

INSTRUCTIONAL OBJECTIVES

1. E-Commerce Framework, EDI
2. Security in E-Commerce
3. Intelligent Agents

UNIT 1 INTRODUCTION **9**

History of E- Commerce – Overview of E- Commerce framework – E- Business models – Network infrastructure - Role of Internet – E- commerce and World wide Web.

UNIT 2 E COMMERCE **9**

Consumer oriented E- Commerce applications – Mercantile process models ; Electronic Payment Systems – Digital Token based EPS – Smart cards – Credit cards – Risks – designing EPS.

UNIT 3 ORGANIZATIONAL COMMERCE AND EDI **9**

Electronic Data Interchange – EDI applications in Business – EDI and e Commerce – EDI standardization and implementation – Internet based EDI.

UNIT 4 SECURITY **9**

Internet security standards – secure electronic payment protocols ; cryptography and authentication – security issues – encryption techniques; e commerce payment mechanisms –SET protocol – electronic check – electronic cash; E-commerce ethics, regulations and social responsibility.

UNIT 5 INTELLIGENT AGENTS **9**

Definition and capabilities – limitation of agents – security – web based marketing – search engines and Directory registration – online advertisements – Portables and info mechanics – website design issues.

TOTAL 45

TEXT BOOKS

1. Ravi Kalakota and Andrew B Whinston, " *Frontiers of Electronic Commerce* ",Pearson Education Asia, 1999.(Chapters 1,2,3,6-10,16)
2. Marilyn Greenstein and Todd M Feinman , " *Electronic commerce: Security, Risk Management and Control* " Tata McGraw-Hill , 2000.(Chapters 7,8,10-12)

REFERENCE BOOKS

1. Judy Strauss and Raymond Frost , " *E Marketing* ", PHI, 2002
2. Brenda Kienan , " *Managing e Commerce Business*" , PHI,2001
3. Vivek Sharma and Rajiv Sharma , " *Developing e Commerce Sites – an integrated approach* " , Pearson Education Asia, 2000

ONLINE REFERENCES

http://www.techtutorials.info/ecommerce.html(Unit-1,2)
http://en.wikipedia.org/wiki/Electronic_data_interchange (Unit-3)
http://cs.anu.edu.au/student/comp3410/lectures/security/symmetric-4up.pdf (Unit-4)
http://www.iseca.org/mirrors/sans.org/4-37.pdf
http://www.webopedia.com/didyouknow.internet/2005/ssl.asp
http://www.cs.berkeley.edu/~russell/aimale/chapter02.pdf (unit-5)

		L	T	P	C
PCS333	**TCP/IP PRINCIPLES AND ARCHITECTURE**	**3**	**0**	**0**	**3**
	Prerequisite				
	Nil				

PURPOSE

To learn the principle s of TCP / IP and its Architecture.

INSTRUCTIONAL OBJECTIVES

1. Network Layer and Applications
2. UDP and TCP applications
3. Transport Layer Reliability
4. To understand the basic concepts of TCP/IP Architecture

UNIT 1 INTRODUCTION **9**

Intermediate communication entities- Layering network addresses-DNS-Client server model- Port numbers-Standardization process-RFC's-Standard simple services-Application programming interfaces-Ethernet &IEEE 802 – encapsulation-SLIP-PPP-loop back interface-MTU-path MTU-ARP cache – Packet format – proxy ARP & Gratitions ARP –ARP command – RARP- Structure TCP/IP s/w in operating system.

UNIT 2 NETWORK LAYER AND APPLICATION **9**

Introduction- IP header- IP routing - Subnet addressing- Subnet mask- Special case IP addresses – Examples-Ifconfig – Netstat- routing principles - ICMP host and Network unreachable errors - ICMP redirect errors – ICPM router discovery messages- Dynamic routing - UNIX routing daemons- routing information protocol (RIP)-OSPF-CIDR – Case study: Voice over IP for two way Communication.

UNIT 3 UDP AND APPLICATIONS **9**

Introduction- UDP header- UDP checksum- examples-IP fragmentation - ICMP unreachable errors – Path MTU discovery- Interaction between UDP and ARP-UDP datagram size- ICMP source quench error- Broad casting and Multi casting - IGMP- NFS- -TFTP-BOOTP

UNIT 4 TCP **9**

Introduction- TCP services- TCP header – Connection establishment and termination – Maximum size – TCP half close – TCP state transition diagram – Reset segments- Simultaneous open and close – TCP options – Interactive input – Delayed acknowledgement – Nagle algorithm – Window size advertisement- Normal data flow – Sliding window – Window size - PUSH flag – Slow start– Bulk data throughput – Urgent mode

UNIT 5 TRANSPORT LAYER RELIABILITY AND APPLICATION **9**

CP/IP time out – Retransmission – Roundtrip time measurement – Congestion avoidance algorithms – Fast retransmit and fast recover algorithm – Repacaketization - ICMP errors- TCP persistent – TCP features and performance – Telnet and rhogin - SMTP – TCP dump

TOTAL 45

TEXT BOOKS

1 .W. Richard Stevens, "*TCP/IP Illustrated,The Protocol-Volume I*" , Addison-Wesley Pub Co,1st Edition,1994

2 Dougles E.Comer, "*Internetworking with TCP/IP–Principles, Protocols & Architecture*", Pearson education, 4th Edition,2000

REFERENCE BOOKS

1. Behrouz A. Forouzam, "*TCP/IP Protocol Suite*", Tata McGraw Hill, 2000
2. Michael Santifaller, "*TCP/IP – ONC/NFS, Internetworking in UNIX Environment*", Addison Wesley Professional, 2nd Edition, 1994.
3. Richard Stevens, " *TCP/IP Illustrated"*, Vol 1,2,3 Pearson education India, 1996

ONLINE REFERENCES

http://www.rhyshaden.com/ipadd.html
http://ckp.made-it.com/ieee8023.html
http://en.wikipedia.org/wiki/IEEE_802
http://edia.org/wiki/Transmission_Control_Protocol#Protocol_operation

ELECTIVES FOR SIXTH SEMESTER

		L	T	P	C
PCS322	**ADVANCED NETWORKS**	**3**	**0**	**0**	**3**
	Prerequisite				
	Nil				

PURPOSE

This course gives a overview of advanced computer networks and TCP/IP protocols and also covers security and network management aspects.

INSTRUCTIONAL OBJECTIVES

1. IPV4 and IPV6 protocols routing
2. Resource allocation and service management
3. Network security and example security systems
4. Network management and its protocols
5. Advanced network protocol applications

UNIT 1 HIGH SPEED NETWORKS **8**

Introduction – Protocols and Architecture – TCP and IP – High Speed Networks – Frame relay- ATM – High Speed LANs

Performance modeling and estimation – Queuing analysis – self similarity and self similar traffic.

UNIT 2 CONGESTION, TRAFFIC MANAGEMENT AND INTERNET ROUTING **9**

Congestion control in data networks and internets – Link level flow and error control – TCP traffic control – Traffic and Congestion control in ATM Networks – Internet routing – graph theory and least cost paths – Interior routing protocols.

UNIT 3 PRINCIPLES OF WIRELESS NETWORK OPERATION **9**

Network planning – topologies – fundamentals – signal to interference ratio calculation – capacity expansion techniques – network planning for CDMA systems – Wireless network operations – mobility – radio resources and power management – security.

UNIT 4 LOCAL AND BROADBAND AND AD HOC NETWORKS **9**

Introduction WLANs – IEEE 802.11 WLANs – Wireless ATM and HIPERLAN – Adhoc Networking and WPAN – Wireless geolocation systems architecture.

UNIT 5 NETWORK MANAGEMENT **10**

Network Management – Choosing a configuration method – Management Information Base – SNMP – XML – CORBA –choosing a configuration protocol – COPS

Advanced Applications – IP encapsulation – VPNs – Mobile IP – Header Compression – Voice over IP – IP and ATM IP over dial-up links

Case Study: Design of Cluster Networks

TOTAL 45

TEXT BOOKS

1. William Stallings, "*High Speed Networks, Internet Performance and QoS",* Prentice Hall, 2003. (UNIT 1and II)
2. Kaveh Pahlevan and Prashant Krishnamoorthy, "*Principles of Wireless Networks"*, Prentice Hall of India, 2006. (UNIT 3and IV)
3. Adrian Farrel, "*The Internet and its Protocols* " First India Reprint 2005, Elsevier publications (UnitsV)

REFERENCE BOOKS

1. Larry L.Peterson and Bruce S.Davie, "*Computer Networks*" Third Edition, Elsevier Publications 2003.
2. William Stallings, *"Local & Metropolitan Area Networks",* 6th edition, Prentice Hall, 2000
3. Behrouz A Forouzan, "*Data Communication and Computer Networking"*, 3rd edition, 2004

ONLINE REFERNCES

www.utdallas.edu/~metin/SuNet
www.rivier.edu/faculty/vriabov
ce.sharif.edu/courses
http://williamstallings.com/HsNet2e.html

		L	T	P	C
PCS324	**VIRTUAL REALITY**	**3**	**0**	**0**	**3**
	Prerequisite				
	Nil				

PURPOSE

This course provides a detailed understanding of the concepts of Virtual Reality and its application.

INSTRUCTIONAL OBJECTIVES

1. Geometric modeling and Virtual environment.
2. Virtual Hardware and Software.
3. Virtual Reality applications.

UNIT 1 INTRODUCTION **9**

Virtual Reality & Virtual Environment : Introduction – Computer graphics – Real time computer graphics – Flight Simulation – Virtual environments –requirement – benefits of virtual reality- **3D Computer Graphics** : Introduction – The Virtual world space – positioning the virtual observer – the perspective projection – human vision – stereo perspective projection – 3D clipping – Colour theory – Simple 3D modeling – Illumination models – Reflection models – Shading algorithms.

UNIT 2 GEOMETRIC MODELLING **9**

Geometric Modeling: Introduction – From 2D to 3D – 3D space curves – 3D boundary representation - **Geometrical Transformations**: Introduction – Frames of reference – Modeling transformations – Instances – Picking – Flying – Scaling the VE – Collision detection - **A Generic VR system**: Introduction – The virtual environment – the Computer environment – VR Technology – Model of interaction – VR System.

UNIT 3 VIRTUAL ENVIRONMENT **9**

Animating the Virtual Environment: Introduction – The dynamics of numbers – Linear and Non-linear interpolation - The animation of objects – linear and non-linear translation - shape & object inbetweening – free-form deformation – particle system- **Physical Simulation** : Introduction – Objects falling in a graphical field – Rotating wheels – Elastic collisions – projectiles – simple pendulum – springs – Flight dynamics of an aircraft.

UNIT 4 VR HARDWARES & SOFTWARES **9**

Human factors : Introduction – the age- the ear- the somatic senses - **VR Hardware** : Introduction – sensor hardware – Head-coupled displays –Aquatic hardware – Integrated VR systems-**VR Software**: Introduction – Modeling virtual world –Physical simulation- VR toolkits – Introduction to VRML.

UNIT 5 VR APPLICATION **9**

Introduction – Engineering – Entertainment – Science – Training – **The Future**: Introduction – Virtual environments – modes of interaction.

TOTAL 45

TEXT BOOKS

1. John Vince, "*Virtual Reality Systems* ", Pearson Education Asia, 2002

REFERENCE BOOKS

1. Adams, "*Visualizations of Virtual Reality*", Tata McGraw Hill, 2000.
2. Grigore C. Burdea, Philippe Coiffet , "*Virtual Reality Technology*" , WileyInterscience,1 Edition,1994.
3. William R. Sherman, Alan B. Craig, "*Understanding Virtual Reality: Interface, Application, and Design*",Morgan Kaufmann, 1st Edition,2002.

ONLINE REFERENCES

www.vresources.org
www.vrac.iastate.edu
www.w3.org/MarkUp/VRML/
http://books.google.com - Multimedia and Virtual Reality Engineering, Virtual Reality Technology

		L	T	P	C
PCS326	**ADVANCED DATABASES**	**3**	**0**	**0**	**3**
	Prerequisite				
	Nil				

PURPOSE

The purpose of this course is to impart knowledge on various data structure concepts to the students.

INSTRUCTIONAL OBJECTIVES

At the end of the course, student should be able to understand

1. Several Database concepts like Distributed Database, Spatial Database, Mobile Database, Temporal Database
2. Applications of Databases
3. Analysis of Database design and Methodology

UNIT 1 INTRODUCTION **9**

Introduction to Database – Database Environment – Relational Model – Relational Algebra and Relational Calculus – Introduction to SQL – Commercial RDBMS – Ms Access 2000, Oracle 8i.

UNIT 2 DATABASE ANALYSIS & DESIGN TECHNIQUES **9**

Database Planning – Design & Administration – Fact finding techniques - E-R Modeling – EER Modeling – Normalization.

UNIT 3 METHODOLOGY **9**

Logical Database Design for Relation Model – Physical Database Design for Relational Database – Security – Transaction Processing – Query Processing.

UNIT 4 OBJECT ORIENTED AND DISTRIBUTED DATABASES **9**

Introduction to Object DBMS – Object DBMS Concepts and Design – Distributed Database Concepts and Design – Advanced Concepts of Distributed Database – Introduction to Parallel Database.

UNIT 5 CURRENT TRENDS **9**

Mobile Database – Geographic Information Systems – Genome Data Management – Multimedia Database – Parallel Database – Spatial Databases –Temporal databases - Database administration – Data Warehousing and Data Mining.

TOTAL 45

TEXT BOOK

1. Thomas Connolly, Carolyn Begg.,"*Database Systems*", 3rd Edition – Pearson Education.

REFERENCE BOOKS

1. Abraham Silberschatz, Henry F.Korth, Sudarshan,"D*atabase System Concepts"*,4th Edition – McGraw-Hill.
2. M.Tamer Ozsu , Patrick Ualduriel, "*Principles of Distributed Database Systems*", Second Edition, Pearson Education, 2003.
3. Ramez Elmasri & Shamkant B.Navathe, "*Fundamentals of Database Systems*", Fourth Edition, Pearson Education , 2004.
4. Peter Rob and Corlos Coronel, "*Database Systems – Design, Implementation and Management"*, Thompson Learning, Course Technology, 5th Edition, 2003.

ONLINE RESOURCES

http://www.doc.ic.ac.uk/~pjm/adb/index.html
http://www.cs.manchester.ac.uk/postgraduate/taught/programmes/fulllist/
index.html#COMP60362

		L	T	P	C
PCS328	**NEURAL NETWORKS**	**3**	**0**	**0**	**3**
	Prerequisite				
	Nil				

PURPOSE

To study the Artificial Neural Networks and its applications in computer field

INSTRUCTIONAL OBJECTIVES

1. To learn the basics of ANN and comparing with Human brain
2. To learn the various architectures of building an ANN and its applications
3. To learn the pattern classification techniques , advanced methods of representing information in ANN

UNIT 1 INTRODUCTION **9**

Definition of ANN-Biological Neural Networks-Applications of ANN-Typical Architectures-Setting the weights-Common Activation functions-Development Of Neural Networks-McCulloch-Pitts Neuron

UNIT 2 SIMPLE NEURAL NETS FOR PATTERN CLASSIFICATION **9**

General discussion - Hebb net – Perceptron- Adaline - Backpropagation neural net- Architecture- Algorithm-Applications

UNIT 3 PATTERN ASSOCIATION **9**

Training Algorithm for Pattern Association-Heteroassociative memory neural network-Autoassociative net-Iterative Autoassociative net-Bidirectional Associative Memory

UNIT 4 NEURAL NETS BASED ON COMPETITION **9**

Fixed Weights Competitve Nets- Kohonen's Self-Organizing Map – Learning Vector Quantization-Counter Propagation Network.

UNIT 5 ADAPTIVE RESONANCE THEORY AND NEOCOGNITRON **9**

Motivation – Basic Architecture- Basic Operation-ART1-ART2-Architecture-Algorithm-applications-Analysis-Probablistic Neural Net-Cascade Correlation-Neocognitron: Architecture—Algorithm.

TOTAL 45

TEXT BOOK

1. Laurene Fausett, "*Fundamentals Of Neural Networks-Architectures, Algorithms and Applications*", Pearson Education, 2004.

REFERENCE BOOKS

1. James. A.Freeman and David.M.Skapura, "*Neural Networks Algorithms, Applications and Programming Techniques* " ,Pearson Education , 2002.
2. B.Yegnanarayana, "*Artificial Neural Networks*",Prentice - Hall, of India, 2001.
3. Simon Haykin, "*Neural Networks - A Comprehensive Foundation'*, Pearson Education – 2001.
4. L.O.Chua , T.Roska, "*Cellular Neural Networks and Visual computing- Foundations and Applications*", Cambridge University Press, 2002
5. D.J.Mackay, "*Information Theory, Inference and Learning Algorithms*", Cambridge University Press, 2005.

ONLINE REFERENCES

http://www.cs.stir.ac.uk/~lss/NNIntro/InvSlides.html
http://www.willamette.edu/~gorr/classes/cs449/intro.html

		L	T	P	C
PCS330	**QUANTUM INFORMATION PROCESSING**	**3**	**0**	**0**	**3**
	Prerequisite				
	Nil				

PURPOSE

This course aims to exploit genuine quantum features to envisage novel forms of information processing.

INSTRUCTIONAL OBJECTIVES

To provide the students sufficient knowledge for

1. quantum mechanics
2. gate and measurement based models of quantum computation
3. to complement the traditional approaches of computation

UNIT 1 INTRODUCTION **9**

Quantum bits – quantum computation – quantum gates – quantum circuits - quantum parallelism - Deutsch's algorithm — Experimental quantum Information processing – example problems.

UNIT 2 QUANTUM MECHANICS **9**

Linear operators and matrices – adjoints and Hermitian operators – tensor products – polar and singular value decomposition - state space – quantum measurement – projective measurements – superdense coding – ensembles of quantum states – EPR and Bell inequality

UNIT 3 QUANTUM COMPUTATION **9**

Single qubit operations – Universal quantum gates – a discrete set of universal operations – quantum computational complexity – quantum simulation algorithm – perspectives on quantum simulation

UNIT 4 QUANTUM SEARCH ALGORITHMS **9**

The oracle – the procedure – Geometric visualization – Quantum counting – Speeding up the solution of NP complete problems – Quantum search of an unstructured database – Optimality of the search algortithms

UNIT 5 QUANTUM INFORMATION THEORY **9**

Distinguishing quantum states and the accessible information – Schumacher's quantum noiseless channel coding theorem for data compression – communication over noisy quantum channel – Entanglement distillation and Quantum error correction – quantum key distribution – security of quantum key distribution.

TOTAL 45

TEXT BOOK

1. M. A. Nielsen and I. L. Chuang, "*Quantum Computation and Quantum information",* Cambridge University Press 2000

REFERENCE BOOKS

1. Bellac Michel Le, "*A short introduction to quantum information and quantum computation*", Cambridge University Press, 2006
2. Vishal Sahni, "*Quantum Computing*", Tata McGrawHill, 2007.

ONLINE REFERENCES

http://www.qubit.org/
http://www.hpl.hp.com/research/qip/
http://www.qipirc.org/links.php
http://www.nsf.gov/pubs/2000/nsf00101/nsf00101.htm

		L	T	P	C
PCS421	**GENETIC ALGORITHMS**	**3**	**0**	**0**	**3**
	Prerequisite				
	Nil				

PURPOSE

This course enables us to understand the concepts of Genetic Algorithms and its applications

INSTRUCTIONAL OBJECTIVES

1. Genetic Operators and modeling
2. Applications of Genetic Algorithms
3. Genetic Based Machine Learning

UNIT 1 INTRODUCTION TO GENETIC ALGORITHM **9**

Introduction to Genetic Algorithm – History – Basic concepts – Creation of Off-springs – Working principle - Encoding – binary encoding – octal encoding – hexadecimal encoding – permutation encoding- value encoding – tree encoding – fitness function

UNIT 2 GA OPERATORS **10**

Reproduction- Roulette-wheel Selection – Boltzmann Selection – Tournament Selection-Rank Selection – Steady –state selection – Elitism – generation gap and steady-state selection - Inheritance operators - Crossover- Single-point crossover – Two-point cross over – Multi-point cross over – Uniform Cross over – Matrix Cross Over – Cross Over rate - Mutation operators – mutation – mutation rate

UNIT 3 GENETIC MODELLING **9**

Inversion and deletion : Inversion – deletion and duplication - deletion and regeneration – segregation – cross over and inversion – Bit-wise operators – one's complement operator – logical bit-wise operators – shift operators – bit-wise operators used in GA – generational cycle – convergence of GA - Differences and Similarities between GA and Other Traditional Methods

UNIT 4 APPLICATIONS OF GA **8**

The rise of GA – GA application of Historical Interaction. – Dejung & Function optimization – Current applications of GA -**Techniques in genetic search :**Dominance, Diploidy & abeyance –Niche & Speciation – Multi objective optimization – Knowledge-Based Techniques. – GA & parallel processes- Real Life Problem

UNIT 5 GENETICS-BASED MACHINE LEARNING **9**

Genetics – Based Machined learning – Classifier system – Rule & Message system – Apportionment of credit: The bucket brigade – Genetic Algorithm – A simple classifier system in Pascal. – Results using the simple classifier system-The Rise of GBMC – Development of CS-1, the first classifier system. – Smitch's Poker player–Current Applications.

Total 45

TEXT BOOKS

1. David E. *Gold berg*, "*Genetic Algorithms in Search, Optimization & Machine Learning*", Pearson Education, 2001.
2. S.Rajasekaran, G.A.Vijayalakshmi Pai, " *Neural Networks, Fuzzy Logic and Genetic Algorithms"*, Pearson Education , 2003.

REFERENCE BOOK

1. Kalyanmoy Deb ,"*Optimization for Engineering Design , Algorithms and examples*" PHI 1995.

ONLINE REFERENCES

www.ai-depot.com
www.cscs.umich.edu/links/evocomp.html

		L	T	P	C
PCS423	**SPEECH TECHNOLOGY**	**3**	**0**	**0**	**3**
	Prerequisite				
	Nil				

PURPOSE

To study important concepts in Speech technology

INSTRUCTIONAL OBJECTIVES

To provide a general introduction to speech technology

1. To study about text to speech conversion, speech recognition
2. To study about machine translation

UNIT 1 INTRODUCTION AND FINITE STATE TRANSDUCERS 9

Introduction: Knowledge in Speech and Language processing – Ambiguity – Models and algorithms – Language, thought and understanding - Regular expressions – Finite state automata – Regular Languages – Morphology: Survey of English morphology – Morphological parsing – Combining FST Lexicon and rules – The porter stemmer – Human morphological processing

UNIT 2 TEXT TO SPEECH AND PROBABILISTIC MODELS 9

Speech Sounds and Phonetic Transcription – Phonological Rules – Transducers – Advanced issues in computational phonology – Mapping text to phones for TTS – prosody in TTS – Probabilistic models: Spelling errors – Detecting Non-word errors – Bayesian method to spelling and pronunciation. Minimum Edit Distance – Weighted Automata – N-grams: Counting words – Smoothing – Back-off – Deleted Interpolation – Entropy

UNIT 3`SPEECH RECOGNITION AND GRAMMER 9

Architecture – Overview of Hidden Markov Models - Viterbi Algorithm - Acoustic processing – Acoustic probabilities – Speech Recognizer – Speech synthesis – English word classes – Part of Speech Tagging – Rule Based POS tagging – Transformation Based Tagging – issues- Context Free Rules and Trees – Sentence Level Constructions – Noun phrase – Agreement – Spoken Language Syntax – Grammars and Human Processing.

UNIT 4`PARSING 9

Parsing as Search – Top Down Parser – Problems – Earley Algorithm – Finite State Parsing Methods – Probabilistic Context Free Grammars – Problems with PCFGs – Probabilistic Lexicalized CFGs – Dependency Grammars – Human Parsing – Computational Desiderata for Representations - First Order Predicate Calculus – Linguistically Relevant Concepts – Alternative Approaches to Meaning.

UNIT 5 SEMANTIC ANALYSIS AND MACHINE TRASLATION 9

Syntax Driven Semantic Analysis – Attachments – Robust Semantic Analysis – Dialogue and Conversational Agents : Dialogue Acts – Automatic Interpretation – Dialogue Structure – Dialogue Managers in Conversational Agents – Machine Translation : Language Similarities and Differences – Transfer Metaphor – Interlingua Idea – Statistical Techniques – Usability and System Development.

TOTAL 45

TEXT BOOK

1. Daniel Jurafsky, James H. Martin, "*Speech and Language processing"* – Pearson Education", 2004.

REFERENCE BOOKS

1. R Rabinder L and Juang B.H "*Fundamentals of Speech Recognition* "- Prentice Hall, 1993.
2. Lawrence R. Rabiner, Ronald W. Schafer," *Digital Processing of Speech Signals*" – Prentice Hall, 1978.

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http://www.stanford.edu/class/cs224s/2006/
http://www.cs.colorado.edu/%7Emartin/SLP/slp-web-resources.html
http://www.speech.cs.cmu.edu/comp.speech/
http://www.speech.cs.cmu.edu/comp.speech/

		L	T	P	C
PCS425	**MOBILE COMPUTING**	**3**	**0**	**0**	**3**
	Prerequisite				
	Nil				

PURPOSE

To learn the standards and issues in Wireless and Mobile Computing

INSTRUCTIONAL OBJECTIVES

1. Wireless transmission basics
2. Different architectures of Tele communication Systems
3. Medium Access control Techniques
4. Protocols in mobile network layer and transport layer.
5. Ad Hoc networks

UNIT 1 INTRODUCTION **9**

Introduction – wireless transmission – radio propagation – signals and propagation – antennas – multiplexing and modulation – spectrum - operation of cellular systems, planning a cellular system, analog & digital cellular systems.

UNIT 2 MAC,TELECOMMUNICATIO AND SATELLITE SYTEMS **9**

Medium access control Techniques-SDMA-TDMA-FDMA-CDMA-Comparison. Tele Communication Systems-GSM-DECT and TETRA - Satellite Systems-Routing,Localization and Handover.

UNIT 3 WIRELESS LAN **9**

Wireless LAN – IEEE 802.11 standards – HIPERLAN – Blue tooth technology and protocols. Wireless Local Loop technologies.

UNIT 4 MOBILE NETWORK LAYER AND TRANSPORT LAYER **9**

Reference model -Handover Location Management-Mobile QOS-Access Point Control Protocol,Mobile IP-DHCP-Mobile transport layer-Traditional TCP-Indirect snooping-Mobile TCP-Wireless Application protocol.

UNIT 5 ADHOC WIRELESS NETWORKS **9**

Introduction-Issues in Adhoc Wireless Networks-Adhoc Wireless Internet-Routing protocols in Ad Hoc networks-Security in Ad hoc networks. Case Studies: Automatic transfer of Plans- Identifying the callee.

TOTAL 45

TEXT BOOKS

1. Jochen Schiller, "*Mobile Communications*", Addison Wesley , 2000.
2. C.Siva Ram Murthy and B.S Manoj "*Ad hoc Wireless Networks*", Pearson Education, 2007.

REFERENCE BOOKS

1. *Mobile Computing* Principles-Reza B'Far-Cambridge University Press-2005
2. Uyless Black, "*Mobile and Wireless Networks*", Prentice Hall, 1996.
3. Willian C.Y.Lee, *Mobile Communication Design Fundamentals*, John Wiley, 1993.

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www.**free**bookcentre.com/Networking/**Wireless**Lan**Books**.html
www.cambridge.org/us/catalogue/catalogue.asp

		L	T	P	C
PCS427	**NETWORK SECURITY**	**3**	**0**	**0**	**3**
	Prerequisite				
	Nil				

PURPOSE

This course provides a way to understand the various security techniques in network.

INSTRUCTIONAL OBJECTIVES

1. Encryption techniques and key generation techniques
2. Authentication and security measures
3. Intrusion and filtering analysis

UNIT 1 CONVENTIONAL AND MODERN ENCRYPTION **10**

Model of network security – Security attacks, services and attacks – OSI security architecture – Classical encryption techniques – SDES – Block cipher Principles- DES – Strength of DES - Block cipher design principles – Block cipher mode of operation – Evaluation criteria for AES – RC5 - Differential and linear crypto analysis – Placement of encryption function – traffic confidentiality

UNIT 2 PUBLIC KEY ENCRYPTION **10**

Number Theory – Prime number – Modular arithmetic – Euclid's algorithm - Fermet's and Euler's theorem – Primality – Chinese remainder theorem – Discrete logarithm – Public key cryptography and RSA – Key distribution – Key management – Diffie Hellman key exchange – Elliptic curve cryptography

UNIT 3 AUTHENTICATION **8**

Authentication requirement – Authentication function – MAC – Hash function – Security of hash function and MAC – MD5 – SHA - HMAC – Digital signature and authentication protocols – DSS

UNIT 4 SECURITY PRACTICE **9**

Authentication applications – Kerberos – X.509 Authentication services - E-mail security – IP security - Web security

UNIT 5 SYSTEM SECURITY **8**

Intruder – Intrusion detection system – Virus and related threats – Countermeasures – Firewalls design principles – Trusted systems – Practical implementation of cryptography and security

TOTAL 45

TEXT BOOK

1. William Stallings, "*Cryptography & Network Security*", Pearson Education, 4th Edition 2006.

REFERENCE BOOKS

1. Charlie Kaufman, Radia Perlman, Mike Speciner, " *Network Security, Private communication in public world*" PHI 2nd edition 2002
2. Bruce Schneier, Neils Ferguson, "*Practical Cryptography*", Wiley Dreamtech India Pvt Ltd, 2003
3. Douglas R Simson "*Cryptography – Theory and practice*", CRC Press 1995

ONLINE REFERENCES

1. www.williamstallings.com/**Security**2e.html
2. www.ocw.mit.edu/OcwWeb/Electrical-Engineering-and-Computer-Science/6-857Fall2003/**Course**Home/index.htm

		L	T	P	C
PCS429	**FAULT TOLERANT COMPUTING**	**3**	**0**	**0**	**3**
	Prerequisite				
	Nil				

PURPOSE

This course gives a detailed design of fault tolerant systems and self checking systems

INSTRUCTIONAL OBJECTIVES

1. Basics of failures and faults
2. Fault tolerant design and Fail safe design
3. Designing testable combinational logic circuits

UNIT 1 BASIC CONCEPTS **9**

Failure and Faults, Reliability and failure rate, relation between eligibility and Mean-time Between failures, maintainability and availability , reliability of series and parallel systems, Modeling of faults, stuck at, Bridging (short-circuit), stuck open , transient and intermittent faults.

Test Generation: Fault diagnosis of digital systems, Test generation for combinational logic circuits – conventional methods, Random testing, transition count testing and signature analysis.

UNIT 2 FAULT TOLERANT DESIGN **9**

Basic concepts – static, dynamic, Hybrid, and self-purging redundancy, shift-over Modular Redundancy (SMR). Triple Modular redundancy, SMR. Reconfiguration, use of error correcting codes. Time redundancy, software redundancy, fail soft-operation, examples of practical fault tolerant systems, Introduction to fault Tolerant Design of VLSI Chips.

UNIT 3 SELF CHECKING CIRCUITS & FAIL SAFE DESIGN **9**

Design of Totally self-checking checkers, checkers using m-out of –n codes, Berger codes and low cost residue code. Self-checking sequential Machines, partially self checking circuits. **Fail Safe Design:** Strongly fault secure circuits, failsafe Design of sequential circuits using partition theory and Berger codes, totally self-checking PLA design.

UNIT 4 DESIGN FOR TESTABLE COMBINATION LOGIC CIRCUITS **9**

Basic concepts of test ability, controllability and observability. The read-muller expansion technique, three level OR-AND-OR design, use of control logic and syndrome-testable design.

UNIT 5 DESIGN OF TESTABLE SEQUENTIAL CIRCUITS **9**

The scan-path technique – level sensitive scan design (LSSD) and Random Access scan technique, built-in-test, built-in-test of VLSI chips, design for autonomous self-Test, Designing Testability into logic Boards.

TOTAL 45

TEXT BOOK

Parag K. Lala, "*Fault Tolerant and Fault Testable, Hardware design"* PHI 1985.

REFERENCE BOOKS

1. LALA, " *Digital systems design using PLD's"*, PHI 1990.
2. N. N. Biswas, "*Logic Design theory*", PHI 1990.
3. Shem , toy Levei , Ashok K.Agarwala , "*Fault Tolerant System design*", Tata McGraw Hill, 1994.
4. Pradhan K.K., "*Fault Tolerant Computing – Theory and Techniques*", Vol – I and II , PHI 1986.

ONLINE REFERENCE

http://books.google.co.in

		L	T	P	C
PCS431	**WINDOWS INTERNALS**	**3**	**0**	**0**	**3**
	Prerequisite				
	Nil				

PURPOSE

The purpose of this course is to make the students familiar with Windows programming techniques and concepts in windows environment.

INSTRUCTIONAL OBJECTIVES

1. Windows architecture
2. Windows Programming 2000
3. Windows driver programming
4. DLL and Security

UNIT 1 OVERVIEW OF WINDOWS **8**

Windows 2000 overview- DLL's Multiple file system, Windows 2000 fundamentals- Programming perspective, Components of window, windows 2000 Applications Basics, Windows 2000 skeleton.

UNIT 2 MENUS, CONTROLS AND PROGRAMS **10**

Application essentials- messages & basic I/O, Menu basics, Menu programming, Dialog box and sample programs, scroll bar programs, Listbox, radiobutton and static controls, Working with Bitmaps, solving the repaint problem.

UNIT 3 TEXT AND CONTROLS **10**

Working with text, using graphics- drawing arcs, rectangles, world-coordinate transforms, mapping modes to view ports, experiments with GDI, More common controls- up-down control, Track bars, Progress bar, status windows, tab controls, tree views.

UNIT 4 MULTITASK VS MULTIPROGRAM **9**

Multi Programming, multi tasking concepts, Thread-based Multitasking, Using Header month, calendar control programs, Property sheets & Wizards.

UNIT 5 WINDOWS HELP PROGRAMMING AND DLL SECURITY **8**

Context Sensitive vs Reference Help, WM_Help, WinHelp demonstration program, printer device context, system registry and creation of screen savers, DLL's and Security.

TOTAL 45

TEXT BOOK

1. Herbert Schildt ,"*Windows 2000 Programming from ground up",* Tata McGraw-Hill — 2002.

REFERENCE BOOKS

1 Steve Roman ,"*Win32 API Programming with Visual Basic*", O'Reilly and Associates, Inc. – - 1999 (Chapter – 9) (Unit -1)

2 Penny Orwick; Guy Smith ,"*Developing Drivers with the Microsoft Windows Driver Foundation* "–- MS Press – 2007 (Unit 5)

ONLINE REFERENCES

http://www.microsoft.com/technet/archive/ntwrkstn/evaluate/featfunc/winarch.mspx
http://www.microsoft.com/whdc/driver/wdf/wdf-intro.mspx
www.chapters.indigo.ca/.../item/books-978007212189/0072121890/Windows-2000-Programming-from-the-Ground-Up
www.mbalat.blogspot.com/2007/01/how-to-secure-windows-2000-xp.html
www.codepedia.com/1/Herbert+Schildt
www.ecampus.com/isbnbrowser2/isbnstart/00721

		L	T	P	C
PCS433	**LINUX INTERNALS**	**3**	**0**	**0**	**3**
	Prerequisite				
	Nil				

PURPOSE

To study the basic and administration concepts in linux .

INSTRUCTIONAL OBJECTIVES

1. To provide a general introduction to linux server.
2. To teach user administration, internet and intranet services.
3. To introduction of process and shell programming .

UNIT 1 INSTALLING LINUX AS A SERVER **9**

History of Linux operating system – Difference between windows 2000 and Linux distribution – Installing Linux in a server configuration – Dual booting issues – methods of installation - GNOME and KDE – X windows system – KDE Basics – Installing software.

UNIT 2 SINGLE – HOST ADMINISTRATION **9**

Managing users – User properties – user database – utilize user management tools setUID & getUID - Command Line – Booting and Shutting down –Boot loaders, GRUB, Bootstrapping - File System – Core System services – Compiling Linux kernel Securing an individual server.

UNIT 3 INTERNET SERVICES **9**

Internet Services – understanding naming services – BIND configuration file and database file - DNS – FTP – Setting up web server using Apache – SMTP - Install, configure and run postfix server –POP – conflicts between pop and other protocols- SSH public key cryptography – creating a secure tunnel.

UNIT 4 INTRANET SERVICES **9**

Intranet Services – NFS – enable and configure NFS server and client - NIS – configure NIS Client – setup secondary NIS server – NIS tools - SAMBA – Administrating samba Printing – Install cups – add and manage print jobs - DHCP network configuration configure network interfaces - use routers.

UNIT 5 LINUX PROCESS CONTROL & SHELL PROGRAMMING **9**

Linux process environment – login process – parent child relationship – process variable process monitoring – invoking foreground and background process – terminating process Daemons –Introduction to Shell programming – Shell scripts – executing shell scripts creating scripts – simple examples

TOTAL 45

TEXT BOOK

1.Steven Graham, Steve Shah ,"*Linux Administration A Beginners Guide"* ,3rd edition, Dreamtech press , 2003.

REFERENCE BOOKS

1. Mc Kinnon , Mc Kinnon , "*Installing and Administrating Linux* ", 2nd edition ,Wiley Dreamtech ,2002
2. Sandip Bhattacharya, Panancrazio De Mauro,Shishir Gundavaram, Mark Mamone,Kapil Sharma, Deepak Thomas,Simon Whiting "*Beginning Red Hat Linux 9* ", 5th edition , Wiley Dreamtech. ,2003
3. Christopher Negus , "*Red Hat Linux 9 Bible* ", Wiley Dreamtech India Pvt Ltd.2002

ONLINE REFERENCES

www.linuxhomenetworking.com
www.google.com/linux
www.linux.org
http://www.oreillynet.com/linux/cmd/
http://tldp.org/FAQ/Linux-FAQ/

		L	T	P	C
PCS435	**COMPUTER VISION**	**3**	**0**	**0**	**3**
	Prerequisite				
	Nil				

PURPOSE

To study important concepts in Computer Vision

INSTRUCTIONAL OBJECTIVES

1. To provide a general introduction in the field of Computer Vision
2. To teach mathematical concepts and techniques
3. To solve real vision problems

UNIT 1 IMAGE FORMATION AND IMAGE MODELS **9**

Geometric Camera Models - Geometric Camera Calibration - Radiometry - Measuring Light – Shadows and shading - Color

UNIT 2 EARLY VISION - MULTIPLE IMAGES **9**

The Geometry of Multiple Views - Stereopsis - Affine Structure from Motion - Projective Structure from Motion

UNIT 3 MID LEVEL VISION **9**

Segmentation by Clustering - Segmentation by Fitting a Model - Segmentation and Fitting using Probabilistic Methods - Tracking with Linear Dynamic Models

UNIT 4 HIGH LEVEL VISION – GEOMETRIC METHODS **9**

Model-Based Vision - Smooth Surfaces and their Outlines - Aspect Graphs -Range Data

UNIT 5 HIGH LEVEL VISION -PROBABILISTIC AND INFERENTIAL METHODS **9**

Recognition by Relations between Templates - Geometric Templates from Spatial Relations – Application – Image Based Rendering

TOTAL 45

TEXT BOOKS

1. Forsyth D A and Ponce J ," *Computer Vision : A Modern Approach* "– Prentice Hall 2003
2. Horn B K P," Robot Vision", Cambridge MIT press 1986

REFERENCE BOOKS

1. Y Shirai,"*Three Dimensional Computer Vision",* Springer Verlag 1987
2. Wechsler ,"*Computational Vision",* Academic Press 1987
3. Haralick R M And Shapiro L G ,"*Computer And Robot Vision* Vo I and II", Addison Wesley 1993
4. Jain R C Kasturi *R ,"Machine Vision",* McGrawHill 1995

ONLINE REFERENCES

http://kercd.free.fr/linksKCD.html
http://www.cs.ubc.ca/spider/lowe/vision.html
http://www.teiath.gr/seyp/optics/Vision.htm
http://www.visionscience.com/

		L	T	P	C
PCS437	**ADVANCED JAVA PROGRAMMING**	**3**	**0**	**0**	**3**
	Prerequisite				
	Nil				

PURPOSE

To learn the different concepts of Advanced Java and techniques

INSTRUCTIONAL OBJECTIVES

1. To learn Java Applets, Beans and Networking concepts
2. To learn Advanced Java Networking concepts
3. To learn the JDBC and Graphics in Java

UNIT 1 INTRODUCTION TO ADVANCED JAVA **8**

Java Streaming – Components and events handling – Threading concepts – Networking features – Byte code interpretation – Media Techniques.

UNIT 2 JAVA APPLETS AND BEANS **9**

Applets and HTML – Bean Concepts – Events in Bean Box – Bean customization and persistence – JavaScript – Combining scripts and Applets – Applets over web - Animation techniques – Animating images.

UNIT 3 ADVANCED NETWORKING **10**

Client-Sever computing – Sockets – Content and Protocols handlers – Developing distributed applications – RMI – Remote objects – Object serialization

UNIT 4 JAVA DATABASE PROGRAMMING **9**

Connecting to Databases – JDBC principles – Databases access – Interacting – Database search – Accessing Multimedia databases – Database support in Web applications.

UNIT 5 RELATED JAVA TECHNIQUES **9**

3D graphics – JAR file format and creation – Internationalization – Swing Programming – Advanced Java Scripting Techniques.

TOTAL 45

TEXT BOOKS

1. Jame Jaworski, "*Java Unleashed*", SAMS Techmedia Publications, 1999.
2. H.M.Deitel and P.J.Deitel, "*Java how to program with an Introduction to Visual J++*", Pearson Education, 1998.

REFERENCE BOOKS

1. Campione, Walrath and Huml, "*The Java Tutorial*", Addison Wesley, 1999.
2. Duane A.Bailey, "*Java Structures*", McGraw-Hill Publications, 1999.
3. Jeff Frentzen and Sobotka, '*Java Script*", Tata McGraw-Hill, 1999.
4. Jamie Jaworski, "*Java Unleashed*", SAMS Techmedia Publication, 1999.
5. Jason Blooberg. Jeff Kawski, and Paul Treffers, "*Web Page Scripting Techniques"*,Hayden books, 1996.

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http://javaboutique.internet.com/tutorials/Basics
http://java.sun.com/developer/onlineTraining/Programming/JDCBook
http://lists.xcf.berkeley.edu/mailman/listinfo/advanced-java
http://java.sun.com/docs/books/tutorial/networking/TOC.html

		L	T	P	C
PCS439	**COMPONENT BASED TECHNOLOGY**	**3**	**0**	**0**	**3**
	Prerequisite				
	Nil				

PURPOSE

The course contains concepts of software components and deals with the design of ORB applications.

INSTRUCTIONAL OBJECTIVES

The main aim of this course is to teach the students

1. Fundamentals of COM and DCOM
2. Advanced concepts of COM
3. Concepts of CORBA, building ORB applications in Java

UNIT 1 COM BASICS **9**

Components-Components benefits-components requirements-COM-interface-implementing COM interface-Behinds interface-Query interface- Query interface rules and regulating- query interface defines the component-handling new versions of components- Dynamic linking-Distributed COM.

UNIT 2 ADVANCED CONCEPTS OF COM **9**

Class factory- Cocreate instance – Class features-Implementing the class factory-Multiple components in DLL-Unloading the DLL- Component reuse: Containment and aggregation – Implementing containment – Implementing interface-Implementing aggregation-Multiple threads-COM threads-Implementing apartment and free threading.

UNIT 3 JAVA VS CORBA **9**

Benefits of java programming with CORBA – CORBA overview-object management group- object management architecture, CORBA –OMG IDL

UNIT 4 JAVA ORB **9**

Overview of java and java ORB's- Interface, class, and object –Java applets – Java servlets- java beans- Java ORB terminology-Clients and servers as Java application- Client as Java applets- Client as Servlets- servers as Java Applets-Clients and servers implemented using non-java ORB-First java ORB application -OMG IDL Java mapping.

UNIT 5 SERVICES AND EVENTS **9**

Discovering services: CORBA naming service- Trading service-Overview of trading- Overview of trading service interface-Binding application-Advanced features- The any type and type codes- Interface repositioning and dynamic invocation and interface-Dynamic skeleton interface-Events-CORBA event service concepts-Notifications service-Java events and CORBA**.**

TOTAL 45

TEXT BOOKS

1. Dale Rogerson, "*INSIDE COM* ", Microsoft COM, Third edition: 2003
2. Gerald Brose, Andreas Vogel, Kerth Duddy ,"*Java programming with CORBA*", 3rd edition, Wiley computer publications.,2003

REFERENCE BOOKS

1. George Shepard Brad Kisg ,"*INSIDE COM, Inside ATL* " ,Microsoft press- 2000 ., WP publishers and distributors.
2. Clemens Szperski ,"*Component Software – Beyond Object Oriented Programming* –, Pearson Education- 2nd edition ,2004

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http://www.sei.cmu.edu/str/descriptions/com_body.html
http://en.wikipedia.org/wiki/Component_Object_Model
http://java.sun.com/developer/technicalArticles/RMI/rmi_corba/
http://ei.cs.vt.edu/~cs6704/CORBA.ppt

ELECTIVES FOR SEVENTH SEMESTER

		L	T	P	C
PCS422	**ATM NETWORKS**	**3**	**0**	**0**	**3**
	Prerequisite				
	Nil				

PURPOSE

This course provides an introduction to ATM Networks, various layers in ATM,ATM Protocols and routing issues.

INSTRUCTIONAL OBJECTIVES

1. To study the various topologies, Protocol Architectures and basics of ATM cells.
2. To learn about the routing issues and various algorithms to control congestion.
3. To study about wireless ATM and the current trends in ATM.

UNIT 1 INTRODUCTION **9**

ATM – Historical perspective – Protocol Architecture – Logical connections – Cells – Transmission of ATM cells – SDH /SONET architecture.

UNIT 2 ATM PROTOCOL **9**

Routing,Switching,Signaling techniques- ATM Service categories – QOS parameters – ATM Adaptation Layer.

UNIT 3 ROUTING ISSUES **10**

Routing for high speed networks – RSVP, Traffic and Congestion control – Traffic shaping – Peak cell rate algorithms – Rate based congestion control – Connection admission control.

UNIT 4 HIGH SPEED LANS **7**

Fast Ethernet – ATM LAN's – LAN Emulation(LANE)

UNIT 5 PROTOCOLS OVER ATM **10**

Multiple protocols over ATM, IP over ATM, TCP over ATM – Real time transport protocol – Wireless ATM – Current trends.

TOTAL 45

TEXT BOOK

1. William Stallings, "*High Speed Networks TCP/IP and ATM Design Principles*", Prentice Hall International, 1998.

REFERENCE BOOKS

1. William Stalling, "*ISDN with Broad Lane ISDN with frame relay and ATM*", PHI,4th edition,1999.
2. Rainer Handel, Manfred N. Huber, Stefan Schroder, "*ATM Networks*", Addison Wesley,1999.
3. Uyless Black, "*ATM* Vol.1 and 2", PHI, 1999.

ONLINE REFERENCES

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http://williamstallings.com/DCC/DCC7e.html
www.cs.wisc.edu

		L	T	P	C
PCS424	**DATA MINING**	**3**	**0**	**0**	**3**
	Prerequisite				
	Nil				

PURPOSE

This course enable us to understand the concepts of Data Mining and its applications.

INSTRUCTIONAL OBJECTIVES

1. Data mining techniques and algorithms
2. Data Mining environments and applications
3. Spatial Mining, temporal Mining Algorithms.

UNIT 1 INTRODUCTION **9**

Data Mining Tasks, Data mining Issues,Decision Support System,Dimentional Modelling,Data warehousing,Data warehousing,OLAP & its tools,OLTP

UNIT 2 MINING TECHNIQUES & CLASIFICATION **9**

Introduction,statistical Perspective of data mining,Decision tree,Neural networks,Genetic algorithms,Issues in classification,Statistitical based algorithm(regression),Distance based algorithm(simple approach),Decision Tree based algorithm(C4.5),Neural network based(propogation)

UNIT 3 CLUSTERING AND ASSOCIATION RULES **9**

Introduction to clustering,Similarity and distance measures,Hierarchical algorithm(divisive clustering), partitional algorithm(Mininum Spanning tree,nearest neighbour), Clustering large database(CURE),Introduction to association,basic algorithm(Apriori),parallel & distributed(data parallelism),Incremental rules,Association rule techniques(Generalised,multiple level)

UNIT 4 ADVANCED MINING **9**

Web mining, Web content mining, Introduction to Spatial mining & its primitives, spatial classification algorithm(ID3 extension),Spatial clustering algorithm(SD),Introduction to temporal mining, Time series, Temporal association rule

UNIT 5 DATA MINING ENVIRONMENT **9**

Case study in building business environment, Application of data mining in Government, National datawarehouse and case studies

TOTAL 45

TEXT BOOK

1. Margaret H. Dunham, S. Sridhar "*Data Mining Introductory & Advance Topics*" (Unit – 1,2,3,4) -2006

REFERENCE BOOK

1. J.Han, M.Kamber,"D*ata mining concepts & techniques*",Academic press,Morgan Kanf Man Publishers,2003.

ONLINE REFERENCE

http://www.data-miners.com/

		L	T	P	C
PCS426	**GRID COMPUTING**	**3**	**0**	**0**	**3**
	Prerequisite				
	Nil				

PURPOSE

To understand the technology application and tool kits for grid computing

INSTRUCTIONAL OBJECTIVES

1. To understand the genesis of grid computing
2. To know the application of grid computing
3. To understand the technology and tool kits for facilitating grid computing

UNIT 1 INTRODUCTION AND OVERVIEW OF GRID COMPUTING **9**

Early Grid Activities-Current Grid Activities-An Overview of Grid Business Areas-Grid Applications-Grid Infrastructure

UNIT 2 WEB SERVICES AND RELATED TECHNOLOGIES **9**

Service – Oriented Architecture-Web Service Architecture-XML, Related Technologies, and Their Relevance to Web services-XML Messages and Enveloping-Service Message Description Mechanisms-Relationship between Web Service and Grid Service – Web Service Interoperability and the Role of the WS-I Organization

UNIT 3 DISTRIBUTED OBJECT TECHNOLOGY FOR GRID COMPUTING (OGSA) **9**

Introduction to Open Grid Services Architecture(OGSA)- Commercial Data Center- National Fusion Collaboratory- The OGSA Platform Components

UNIT 4 OPEN GRID SERVICES INFRASTRUCTURE (OGSI) **9**

Introduction-Grid Services-A High-Level Introduction to OGSI – Introduction to Service Data Concepts – Grid Service: Naming and Change Management Recommendations.

UNIT 5 OGSA BASIC SERVICES AND THE GRID COMPUTING TOOLKITS **9**

Common Management Model(CMM)-Security Architecture- GLOBUS GT3 Toolkit: Architecture- GLOBUS GT3 Toolkit: - Architecture, Programming model, High level services .

TOTAL 45

TEXTBOOK

1. Joshy Joseph & Craig Fellenstein, "*Grid Computing*", Pearson/PHI PTR-2003.

REFERENCE BOOK

1. Ahmar Abbas, "*Grid Computing: A Practical Guide to technology and Applications*", Charles River media – 2003.

ONLINE REFERENCES

http://www.cs.uiowa.edu/~jni/GC/
The TeraGrid: http://www.teragrid.org
The NSF Middleware initiative: http://www.nsf-middleware.org
The Globus Project: http://www.globus.org
The Grid Portal Toolkit (Grid Port): http://www.gridport.net
The Open Grid Computing Environments Consortium: http://www.ogce.org
The GridSphere Project: http://www.gridsphere.org
IBM Grid Pages: http://www-1.ibm.com/grid/
Univeristy of Texas UT Grid: http://utgrid.utexas.edu

GRID STANDARDS AND ORG

The Web Services Resource Framework:
OASIS: http://www.oasis-open.org/
WSRF Technical Committee: http://www.oasis-open.org/committees/wsrf/charter.php
Globus: http://www.globus.org
From the Oasis WSRF Pages:
The WSRF TC takes, as its starting point, the set of specifications and the papers:
http://www.ibm.com/developerworks/library/ws-resource/ws-modelingresources.pdf
http://devresource.hp.com/drc/specifications/wsrf/ModelingState-1-1.pdf
"The WS-Resource Framework" (http://www.ibm.com/developerworks/library/ws-resource/ws-wsrf.pdf, http://www-106.ibm.com/developerworks/library/ws-resource/ws-wsrf.pdf, http://devresource.hp.com/drc/specifications/wsrf/WSRF_overview-1-0.pdf) recently published by IBM, the Globus Alliance, HP, Fujitsu and CA.
The above papers describe how state associated with a Web service can be modeled in terms of a WS-Resource and give an overview of the specifications that comprise the framework.
World Wide Web Consortium (W3C): http://www.w3.org

		L	T	P	C
PCS428	**AGENT BASED SYSTEMS**	**3**	**0**	**0**	**3**
	Prerequisite				
	Nil				

PURPOSE

The purpose of this course is to impart concepts of agents and multi agent systems

INSTRUCTIONAL OBJECTIVES

1. To provide a comprehensive introduction to agents and multiagent systems.
2. It covers a broad range of distributed artificial intelligence topics including agent architectures, agent interaction and communication, and applications of agent-based systems.
3. It lays the foundations for advanced courses such as Multi-Agent Semantic Web Systems

UNIT 1 BASICS **9**

Basics: definitions of agency; properties of agents; agents vs. objects- **Agent Architectures:** reactive/deliberative/hybrid agents; BDI and practical reasoning agents; deductive reasoning agents.

UNIT 2 RATIONAL REASONING **9**

Rational Reasoning: decision-theoretic/game-theoretic foundations- bounded rationality; means-ends reasoning - planning

UNIT 3 INTERACTION **9**

Interaction: non-communicative interaction; agent communication languages; interaction protocols.

UNIT 4 AGENT COORDINATION **9**

Agent coordination: distributed problem solving, planning and task sharing; teamwork and coalition formation; negotiation (game-theoretic/heuristic/argumentation-based); matchmaking and brokering.

UNIT 5 ADVANCED TOPICS **9**

Advanced Topics: distributed search/distributed constraint satisfaction; multiagent learning; agent-oriented software engineering; trust/norms/institutions, organisational approaches.

TOTAL 45

TEXT BOOK

1. Michael J. Wooldridge, "*An Introduction to Multiagent Systems"*, John Wiley and Sons, 2002

REFERENCE BOOK

1. G. Weiss (ed.), "*Multiagent Systems: A Modern Approach to Distributed Artificial Intelligence"* , MIT Press, 1999

ONLINE REFERENCES

http://www.inf.ed.ac.uk/teaching/courses/abs/
http://www.sics.se/isl/abc/survey.html
http://en.wikipedia.org/wiki/Multi-agent_system
http://www.dcs.warwick.ac.uk/research/absg/

		L	T	P	C
PCS430	**HUMAN COMPUTER INTERACTION**	**3**	**0**	**0**	**3**
	Prerequisite				
	Nil				

PURPOSE

This course provides a thorough understanding of the user interaction with computers

INSTRUCTIONAL OBJECTIVES

1. Software process and Design rules
2. Implementation and user support
3. Different models for cognition and collaboration
4. Introduction to Ubiquitous computing

UNIT 1 FOUNDATIONS **9**

The Human – Input-output channels – Human Memory – Thinking – emotions – Psychology & design of interactive systems; Computer – Text entry devices- Positioning, Pointing & drawing – Display devices for Virtual reality, 3D; Interaction – models – Frameworks & HCI, Ergonomics – Interaction styles – WIMP Interfaces – context; paradigms for Interaction

UNIT 2 SOFTWARE PROCESS & DESIGN RULES **9**

Interaction design basics – user focus – scenarios – navigation – screen design & layout; HCI in software process – life cycle – Usability engineering – Interactive design & prototyping ; Design rules – Principles for usability – standards – guidelines – golden rules – HCI patterns

UNIT 3 IMPLEMENTATION & USER SUPPORT **9**

Implementation support – Windowing system elements – using tool kits – user interface management ; Evaluation techniques – goals – expert analysis – choosing a method; universal design principles – multimodal interaction; user support – requirements – Approaches – adaptive help systems – designing user support systems.

UNIT 4 COGNITIVE, COMMUNICATION & COLLABORATIVE MODELS **9**

Cognitive models – Goal & task hierarchies – Linguistic models – Physical & device models – architectures ; communication & collaboration models – Face-to-face communication – conversation – text based – group working; Task analysis – difference between other techniques – task decomposition – Knowledge based analysis – ER based techniques –uses

UNIT 5 UBIQUITOUS COMPUTING, HYPERTEXT, WWW **9**

Ubiquitous computing application research – virtual & augmented reality – information & data visualization ; understanding hypertext – finding things – Web Technology & issues – Static Web content – Dynamic Web content; Groupware systems – Computer mediated communication – DSS – Frameworks for groupware.

TOTAL 45

TEXT BOOK

1. Alan Dix , Janet Finlay, Gregory D.Abowd, Russell Beale, " *Human Computer Interaction"*, Third Edition, Pearson Education, 2004

REFERENCE BOOK

1. John M.Carrol, "*Human Computer Interaction in the New Millenium*", Pearson Education, 2002

ONLINE REFERENCES

www.scis.nova.edu/nova/hci/notes.html
http://courses.iicm.tugraz.at/hci/hci.pdf
www.ida.liu.se/~miker/hci/course.html

		L	T	P	C
PCS432	**REAL TIME SYSTEM DESIGN**	**3**	**0**	**0**	**3**
	Prerequisite				
	Nil				

PURPOSE

This course enables us to understand the concepts of Real time systems and its applications

INSTRUCTIONAL OBJECTIVES

1. Basics of Real time systems
2. Real time memory and design considerations
3. Integration of Hardware and software in real time applications

UNIT 1 INTRODUCTION **9**

Basic real time concepts - Introduction, Real-time Versus Conventional Software, Computer Hardware for Monitoring and Control, Software Engineering Issues.

UNIT 2 DESIGN TECHNIQUES **9**

Real time specification and design techniques – structure of an RTOS - real time kernels – intertask communication and synchronization.

UNIT 3 MEMORY MANAGEMENT **9**

Real time memory management. System performance analysis and optimization.

UNIT 4 QUEUING MODELS AND FAULT TOLERANT ARCHITECTURES **9**

Queuing models – Reliability,testing and fault tolerance, HW/SW faults, diagnosis, functional testing . Fault tolerant architectures: TMR systems - multiprocessing systems.

UNIT 5 APPLICATIONS **9**

Hardware/Software integration, real time applications- case studies

TOTAL 45

TEXT BOOKS

1. Laplante Philip.A, "*Real-time systems design and analysis: An engineer's handbook*",2nd Edition, PHI.,1994.
2. C.M.Krishna, Kang G.Shin, "*Real-time systems*" – McGraw Hill, 1997.

REFERENCE BOOKS

1. Alan C. Shaw , "*Real – Time Systems and software* ",John Wiley & Sons Inc,2001
2. Buhr R J and Bailey D L, "*An Introduction to Real-Time Systems*", Prentice-Hall 1999.
3. Burns, A and Well*ings, A,* "Real Time Systems and Programming Languages: Ada 95, Real-Time Java and Real-Time C/POSIX", Addison-Wesley. ISBN.,2001
4. Levi S.T. and Agarwal A.K., "*Real time System Design*", McGraw Hill International Edition, 1990.
5. Rajibmall "*Realtime systems, Theory & Practice* " , Pearson Education 2007.

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www.eventhelix.com/realtimemantra/basics
www.unix.ecs.umass.edu/~krishna
http://infoweb.vub.ac.be/infoef/ulbarch/
www.augustana.ab.ca/~mohrj/courses/2005.winter/cs380/slides.7e

		L	T	P	C
PCS434	**PATTERN RECOGNITION**	**3**	**0**	**0**	**3**
	Prerequisite				
	Nil				

PURPOSE

This course provide a way to learn the various pattern recognition techniques and their applications

INSTRUCTIONAL OBJECTIVES

1. Pattern features and Statistical techniques
2. Cluster analysis and synthetic pattern recognition
3. Feature extraction techniques and advances in the field

UNIT 1 INTRODUCTION **7**

Pattern and features – Training and learning in pattern recognition systems – Pattern recognition approaches – Statistical pattern recognition – Syntactic pattern recognition – Neural pattern recognition – Reasoning driven pattern recognition – Discriminant functions – Linear and Fisher's discriminant functions.

UNIT 2 STATISTICAL PATTERN RECOGNITION **10**

Gaussian model – Supervised learning – Parametric estimation – Maximum likelihood estimation – Bayesian parameter estimation – Perceptron algorithm – LMSE algorithm – Problems with Bayes approach – Pattern classification by distance functions – Maximum distance pattern classifier.

UNIT 3 CLUSTER ANALYSIS **8**

Unsupervised learning – Clustering for unsupervised learning and classification – C-means algorithm – Hierarchical clustering procedures – Graph theoretic approach to pattern clustering – Validity of clustering solutions.

UNIT 4 SYNTACTIC PATTERN RECOGNITION **8**

Elements of formal grammar – String generation as pattern description – Recognition of syntactic description – Parsing – Stochastic grammar and applications – Graph based structural representation.

UNIT 5 FEATURES EXTRACTION AND RECENT ADVANCES **12**

Entropy minimization – Karhunen –Loeve transformation – Neural network structures for pattern recognition – Unsupervised learning – Self organizing networks – Fuzzy pattern classifiers – Genetic algorithms – Application to pattern recognition.

TOTAL 45

TEXT BOOK

1. Robert J, Schalkoff, "*Pattern Recognition: Statistical, Structural and Neural Approaches*", John Wiley & Sons Inc., New York, 1992.

REFERENCE BOOKS

1. Duda R.O. and Hart P.E., "*Pattern Classification and Scene Analysis*", John Wiley, New York, 2001
2. Morton Nadler and Eric Smith P., "*Pattern Recognition Engineering*", John Wiley and Sons, New York, 1993.
3. Touand , Gonzalez R. "*Patten Recognition Principles*" Addision Wesley, 1974.
4. Earl Gose, Richard Johnsonbaugh, Steve Jost, "*Pattern Recognition and Image Analysis*", Prentice Hall of India Private Ltd., New Delhi – 110 001, 1999.
5. Duda R.O, Hart .P.E., D.G. Stal, " *Pattern Classification*",John Wiley, 2001
6. Sergious Theodoridis, Konstantinos Koutroumbus, "*Pattern Recognition*", Elsevier,2006

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www.oclc.org
www.electricalengineeringnetbase.com
iris.usc.edu
cgm.cs.mcgill.ca

		L	T	P	C
PCS436	**ROBOTICS**	**3**	**0**	**0**	**3**
	Prerequisite				
	Nil				

PURPOSE

To study some topics relevant to designing robots controlled by microcontrollers

INSTRUCTIONAL OBJECTIVES

1. To use microcontrollers for robotics
2. To use different type of sensors for robots
3. To design robots in a real time environment

UNIT 1 MICROCONTROLLERS IN ROBOTS **9**

Support Components – Memory and Device Programming – Interrupts – Built in Peripherals – Interfacing the controller to Robots

UNIT 2 SOFTWARE DEVELOPMENT **9**

Source files, Object Files, Libraries, Linkers and Hex files – Assemblers – Interpreters- Compilers – Simulators and Emulators – Integrated development Environments

UNIT 3 THE MICROCHIP PICmicro(R) MICROCONTROLLER **7**

Different PICmicro MCU devices and features – application development tools – Basic circuit requirements – The PIC16F627 – EL Cheapo PICmicro MCU Programmer Circuit

UNIT 4 THE MICROCONTROLLER CONNECTIONS **12**

Hardware Interface Sequencing – Robot C Programming Template – Protyping with the PICmicro Microcontroller – Intercomputer Communications – RS 232-
Hyperterminal RS 232 Terminal Emulator – RS 232 Interface Example between PC and PCmicro MCU – Bidirectional Synchronous Interfaces – Output devices – LEDS – PWM power level control – Sensors – Whiskers for Physical Object detection – iR collision detection sensors – IR Remote controls – Ultrasonic distance measurement – Light level sensors – Sound Sensors – Odometry for Motor control and navigation – Radio control servos

UNIT 5 BRINGING ROBOTS TO LIFE **9**

Real Time Operating Systems (RTOS) – Example application running in an RTOS – State Machines – Randomly moving a Robot application with IR Remote Control – Behavioral Programming – Neural Networks and Artificial Intelligence

TOTAL 45

TEXT BOOKS :

1. Myke Predko, "*Programming Robot Controllers* "– McGrawHill, 2002
2. Michael Slater, "*Microprocessor – based design: A Comprehensive Guide to Effective Hardware Design"*, Prentice Hall, 1989

REFERENCE BOOKS

1. Myke Predko, "*Programming and Customizing the 8051 micro-controller*", Tata McGraw-Hill, New Delhi, 2000
2. Kenneth J.Ayala, "The *8051 Micro-controller Architecture, programming and applications"*, Penram International Publishers, Mumbai, 1996
3. Murphy Robin R, "*Introduction to AI Robotics"*, MIT Press, 2000
4. Siegwart R. and Nourbakhsh I. R., "*Introduction to Autonomous Mobile Robots"* – Prentice Hall India, 2005
5. Roland Siegwart, Illah R. Nourbakhsh, "*Introduction to Autonomous Mobile Robots*", MIT Press,2005

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http://www.ifi.unizh.ch/groups/ailab/links/robotic.html
http://www.robotics.com/robots.html
http://prime.jsc.nasa.gov/ROV/olinks.html
http://www.idi.ntnu.no/grupper/ai/eval/lego_links.html

		L	T	P	C
PCS438	**DECISION SUPPORT SYSTEMS**	**3**	**0**	**0**	**3**
	Prerequisite				
	Nil				

PURPOSE

The purpose of this course is to impart concepts of decision, decision processes and its implementation

INSTRUCTIONAL OBJECTIVES

1. DSS and its Characteristics
2. Decision Makers and styles
3. Decision processes and its modeling
4. Executive Information System
5. Perspective of DSS
6. Implementation of DSS

UNIT 1 INTRODUCTION **9**

Introduction : DSS definition- characteristics- History of DSS- Components of DSS- Data and Model Management-DSS knowledge base- user interfaces- DSS user- categories and classes of DSS's- **Decision and Decision Makers :** Decision Makers- Decision styles- Decision effectiveness- Hardness of Decisions

UNIT 2 DECISION MAKING **9**

Typology of Decisions: Decision theory- Rational Decision Making- Bounded Rationality-Process of choice – Cognitive processes-Heuristics in Decision Making- Effectiveness and efficiency- **Decisions in the Organization**: Understanding the Organization- Organization culture- power and politics- organization Decision making

UNIT 3 DECISION PROCESSES **9**

Modeling Decision Processes: Problem definition and its structure – decision models- types of probability and its forecasting techniques- sensitivity analysis- Group Decision Support : Group Decision making- the problem with groups- concepts and definition of MDM technology – MDM activities- virtual workplace-**Executive Information system(EIS):**history of EIS-characteristics of executives- EIS components-making EIS work-future of executive Decision making and EIS.

UNIT 4 SYSTEM PERSPECTIVE OF DSS **9**

Perspective of DSS: System – DSS in the context of information system- Information quality issues in DSS design- DSS information system architecture- role of Internet in DSS development and use- Designing and Building DSS: Strategies of DSS Analysis and Design- DSS Developer-tools for DSS development- DSS user Interface Issues

UNIT 5 IMPLEMENTATION OF DSS **9**

Implementing DSS : DSS Implementation- Patterns of Implementation- System Evaluation-Importance of Integration-Creativity Decision making: Definition of creativity- occurrence of creativity- creative problem solving techniques-introduction to intelligent DSS (AI, Expert system and Knowledge based systems)– DSS in the 21st century-future of DSS, EIS and DSS technologies

TOTAL 45

TEXT BOOK

1. George M .Marakas , "*Decision Support Systems*",2nd Edition, Pearson Education, 2005.

REFERENCE BOOK

1. Efraim Turban, Jay E.Aronson, Ting-Peng Liang, "*Decision Support Systems and Intelligent Systems"*, 7th Edition, Pearson Education ,2006.

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http://en.wikipedia.org/wiki/Decision_support_system
http://www.uky.edu/BusinessEconomics/dssakba/bkpg1.htm
http://dssresources.com/history/dsshistory.html

		L	T	P	C
PCS440	**BIO INFORMATICS**	**3**	**0**	**0**	**3**
	Prerequisite				
	Nil				

PURPOSE

To explore how biological information could be stored in digital form to create bioinformatics resources and how the same may be processed.

INSTRUCTIONAL OBJECTIVES

1. To study the different coding techniques and standards
2. To know about the different biological network of resources available
3. To learn how to analyze DNA and Protein sequences
4. To learn and understand the multiple sequence analysis techniques
5. To understand protein classification and Structure prediction

UNIT 1 INTRODUCTION **9**

Definition – Overview- Major databases in Bio Informatics- Molecular biology – Central Dogma- Data retrieval tools – Data mining of Databases – Gene Analysis – Prokaryotic and Eukaryotic Genomes – Sequence Assembly – Gene mapping – Physical maps – cloning – ORF – amino acids – DNA, RNA sequences – Genetic code.

UNIT 2 DNA and PROTEIN SEQUENCES **9**

DNA: working with single DNA sequence : removing vector sequences- verifying restriction maps – PCR design – GC content – counting words – internal repeats – protein coding regions – ORFing – Genomescan
Protein: predicting properties – primary structure analysis – transmembrane segments – PROSITE patterns – interpreting scanprosite results- finding domains – CD server results – pfscan results.

UNIT 3 ALIGNMENT OF PAIR OF SEQUENCES **9**

Terminology – Global and Local alignment – Dot matrix – dynamic programming – using scoring matrices – PAM matrices – BLOSUM.
Working with FASTA – Algorithm – output – E-values – Histogram.
Working with BLAST – algorithm – output – services – gapped BLAST- PSIBLAST – comparison of FASTA and BLAST.

UNIT 4 MULTIPLE SEQUENCE ALIGNMENT **9**

Criteria for Multiple sequence alignment – applications – choosing the right sequences; FASTA, ClustalW, TCoffee methods – interpreting multiple sequence alignment – getting in right format – converting formats – using Jalview – preparing for publication.

UNIT 5 PROTEIN CLASSIFICATION & STRUCTURE PREDICTION **9**

Structure of amino acids – primary structure – secondary structure – folds and motifs – alpha and beta helix – structure based protein classification – protein structure Data bases – folding problem – PROPSEARCH – primary structure analysis and prediction – secondary structure analysis and prediction – motifs – profiles – patterns and fingerprints

TOTAL 45

TEXT BOOKS

1. S.C Rostogi , Mendiratta, P.Rasogi, " *BioInformatics: methods and applications*",second edition, PHI 2006.
2. Jean Mickel Clavere & Cadrienotredom "*Bio Informatics– A beginners guide*" Wiley DreamTech, 2003.

REFERENCE BOOKS

1. T.K. Attwood and D.J Perry Smith, " *Introduction to Bio Informatics*", Pearson Education, 1st Edition, 2001.
2. Dan E.Krane, Michael L.Raymer, "*fundamental concepts of BioInformatics* ", Pearson Education, 2004.

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1. Nucleotide Databases:
www.ncbi.nlm.nih.gov/Genbank
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www.ebi.ac.uk/trembl
www.expasy.uniprot.org
3. Protein Structure Databases
www.rcsb.org/pdb

		L	T	P	C
PCS442	**BLUETOOTH TECHNOLOGY**	**3**	**0**	**0**	**3**
	Prerequisite				
	Nil				

PURPOSE
To Study the concepts of Bluetooth Technology.

INSTRUCTIONAL OBJECTIVES
The students will learn how Bluetooth devices operate in the frequency band where other devices operate including wireless LAN, microwave ovens, cordless telephones, wireless video cameras, and others.

UNIT 1 THE BLUETOOTH MODULE **9**
Introduction-overview - the Bluetooth module-antennas-baseband-introduction-bluetooth device address – masters, slaves, and Pico nets-system timing-physical links-Bluetooth packet structure-logical channels-frequency hopping.

UNIT 2 THE LINK CONTROLLER **9**
The link controller-link control protocol-link controller operation-Pico net, scatter net operation-master/slave role switching-base band/link controller architectural overview -link manager-the host controller interface.

UNIT 3 THE BLUE TOOTH HOST **9**
The blue tooth host-logical link control and adaptation protocol –RFCOMM- the service discovery protocol – the wireless access protocol-OBEX and IrDA-telephony control protocol.

UNIT 4 CROSS LAYER FUNCTIONS **9**
Cross layer functions-Encryption and security-low power operations-controlling low power modes-hold mode-sniff mode-park mode-quality of service-managing Bluetooth devices.

UNIT 5 TEST AND QUALIFICATION **9**
Test and qualification- test mode-qualification and type approval-implementation – related standards and technologies.

TOTAL 45

TEXT BOOK
1. Jennifer Bray and Charles F Sturman," *Bluetooth: Connect Without Cables*",Pearson Education, 2002.

REFERENCE BOOKS
1. By Jennifer Bray, *Brain Senese*, Gordon McNutt, Bill Munday,"Bluetooth
2. *Application Developer Guide*",Syngress Media, 2001.
3. *Discovering Bluetooth* M.Miller (paperback 2001)
4. C S R Prabhu, P A Reddi, "*Bluetooth Technology and its applications with JAVA and J2ME",* PHI,2006

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safari.informit.com
www.pearsoned.com
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		L	T	P	C
PCS444	**SOFTWARE RELIABILITY**	**3**	**0**	**0**	**3**
	Prerequisite				
	Nil				

PURPOSE

This course gives a thorough knowledge of providing software reliability.

INSTRUCTIONAL OBJECTIVES

1. Software Reliability.
2. Reliability approaches
3. Reliability models

UNIT 1 INTRODUCTION TO RELIABILITY ENGINEERING **9**

Reliability — Repairable and Non Repairable systems — Maintainability and Availability — Designing for higher reliability — Redundancy — MTBF — MTTF MDT - MTTR— k out of in systems

UNIT 2 INTRODUCTION TO SOFTWARE RELIABLITY **9**

Software reliability - Software reliability Vs Hardware reliability – Failures and Faults - Classification of Failures – Counting – System Configuration – Components and Operational Models – Concurrent Systems – Sequential Systems – Standby Redundant systems

UNIT 3 SOFTWARE RELIABILITY APPROACHES **9**

Fault Avoidance — Passive Fault detection — Active Fault Detection — Fault Tolerance - Fault Recovery - Fault Treatment

UNIT 4 SOFTWARE RELIABILITY MODELING **9**

Introduction to Software Reliability Modeling – Parameter Determination and Estimation - Model Selection – Markovian Models – Finite and Infinite failure category Models – Comparison of Models – Calendar Time Modeling

UNIT 5 SPECIAL TOPICS IN SOFTWARE RELIABLITY **9**

Management Techniques for reliability - Organization and Staffing — Programming Languages and Reliability — Computer Architecture and Reliability — Proving Program correctness & Reliability Design - Reliability Testing – Reliability Economics.

TOTAL 45

TEXT BOOKS

1. John D. Musa, " *Software Reliability*", McGraHill, 1985
2. Glenford J. Myers, "*Software Reliability* ", Wiley Interscience Publication, 1976

REFERENCE BOOKS

1. Patric D. T.O connor, "*Practical Reliability Engineering*", 4th Edition, John Wesley & sons, 2003.
2. Anderson and PA Lee : "*Fault tolerance principles and Practice* ", PHI ,1981.
3. Pradhan D K (Ed.): " *Fault tolerant computing – Theory and Techniques",* Vol1 and Vol 2 , Prentice hall, 1986.
4. E.Balagurusamy ," *Reliability Engineering*", Tata McGrawHill, 1994

ONLINE RESOURCES

http://www.cs.colostate.edu/~cs630/software.html
http://www2.enel.ucalgary.ca/People/far/Lectures/SENG635/index.html

		L	T	P	C
PCS446	**FIREWALL ARCHITECTURE**	**3**	**0**	**0**	**3**
	Prerequisite				
	Nil				

PURPOSE

To study the firewall architecture and design concepts.

INSTRUCTIONAL OBJECTIVES:

1. Types of firewall architecture.
2. Design and implementation of firewall
3. Firewall maintenance.

UNIT 1 NETWORK SECURITY **9**

Internet firewalls- Internet services – security strategies – least privilege- Defense in depth - choke point – weakest link – fail safe stance – universal-Participation – simplicity.

UNIT 2 FIREWALL TECHNOLOGIES AND ARCHITECTURE **9**

Firewall technologies – definitions – packet filtering – proxy services – network Address translation – virtual private networks – firewall architectures – single Box – screened host – screened subnet - architecture with multiple screened Subnets – variations on firewall architectures - terminal servers and modem pools – internal firewalls.

UNIT 3 FIREWALL DESIGN **9**

Firewall design – packet filtering - configuring a packet filtering router – packet Filtering tips – rules – filtering by address – by service – choosing a packet Filtering router – implementations – where to do packet filtering and rules.

UNIT 4 PROXY SYSTEMS AND BASTION HOSTS **9**

Proxy systems – server terminology – SOCKS for proxying – TIS internal firewall toolkit for proxying – bastion hosts – principles – special kinds of bastion hosts – choosing machine and location – locating bastion hosts – selecting services - disabling user accounts – building a bastion host - securing disabling non required services – operating bastion hosts – protecting the machine.

Case study - screened subnet architecture – merged routers and bastion host.

UNIT 5 MAINTAINING FIREWALLS **9**

Maintaining firewalls - housekeeping – monitoring your systems – keeping up to date – two sample firewalls – screened subnet architecture - merged routers and bastion host using general purpose hardware.

TOTAL 45

TEXT BOOK

1. Elizabeth D.Zwicky, Simon Cooper and D. Brent Chapman "*Building Internet Firewalls*", second edition, Shroff publishers 2000

REFERENCE BOOK

1. John R. Vacca and Scott R. Ellis. "*Firewalls jumpstart for network and systems administrators* "Elsevier publications 2006.

ONLINE REFERENCES

www.okcforum.org
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		L	T	P	C
PCS448	**OPTIMIZATION TECHNIQUES**	**3**	**0**	**0**	**3**
	Prerequisite				
	MA0102, MA0211				

PURPOSE

To study design aspects of complex systems

INSTRUCTIONAL OBJECTIVES

1. To learn about Problem Formulation and set up
2. To learn the optimization and search methods
3. To learn multi objective and stochastic challenges
4. To study implementation issues and Real world applications

UNIT 1 OPTIMIZATION MODELS **9**

Mathematical Modeling – Design Optimization – Feasibility and boundedness – Topography of the design space – Modeling data – Modeling considerations prior to computation

UNIT 2 MODEL BOUNDEDNESS **9**

Bounds, Extrema and optima – Constrained Optimum – Underconstrained Models – Recognizing Monotonicity – Inequalities – Equality constraints – Nonmonotonic Functions

UNIT 3 OPTIMA **9**

The Weierstrass Theorem – Local approximation – Taylor Series – Optimality – nature of stationery points - Convexity – Local Exploration – Gradient descent – Searching along a line – curvature at the Boundary – Gradient Projection Method – KKT conditions – Lagrangian standard Forms – Basic Linear Programming algorithm

UNIT 4 PARAMETRIC AND DISCRETE OPTIMA **9**

Branching – Parametric tests – Functional monotonicity analysis – Discrete design activity and optimality – constraint derivation

UNIT 5 COMPUTATIONS **9**

Local and Global convergence – Quasi Newton Methods – Lagrange multipliers estimates – sequential quadratic programming – Lagrange Newton equations – Convex linearization – preparing models for numerical computation – scaling – Interpreting numerical results – selecting algorithms and software

TOTAL 45

TEXT BOOKS

1. Papalambros, Panos Y., and Douglass J. Wilde,"*Principles of Optimal Design – Modeling and Computation"*. 2nd ed. Cambridge, UK: Cambridge University Press, 2000.
2. Ravindran A, Ragsdell K M and Reklaitis," *Engineering Optimization – Methods and Applications*", Wiley India, 2006.
3. Steuer, R. E." *Multiple Criteria Optimization: Theory, Computation and Application"*. New York: Wiley, 1986.

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1. Goldberg, David E, "*Genetic Algorithms – in Search, Optimization & Machine Learning"*. Reading, MA: Addison-Wesley, 1989.
2. Alexandrov, N. M., and M. Y. Hussaini, eds. "*Multidisciplinary Design Optimization: State of the Art"*. Proceedings in Applied Mathematics Series, No. 80. Soc for Industrial & Applied Math, 1997.
3. Fogel, Owens, and Walsh. "*Artificial Intelligence Through Simulated Evolution"*. New York: John Wiley & Sons, 1966.
4. Statnikov, Roman B., and Joseph B. Matusov. *Multicriteria Optimization and Engineering*. New York: Chapman and Hall, 1995.

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http://www.ing.unlp.edu.ar/cetad/mos/geometric.html
http://www.stanford.edu/~boyd/cvxbook/