



ANNAMALAI UNIVERSITY
ANNAMALAINAGAR

FACULTY OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE AND
ENGINEERING

B.E. Computer Science and Engineering
(Four Year Degree Programme)
(Choice Based Credit System)
(FULL-TIME)

HAND BOOK
2011 – 2012 ONWARDS

ANNAMALAI UNIVERSITY
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
B.E. COMPUTER SCIENCE AND ENGINEERING
(Four Year Degree Programme)
(Choice Based Credit System)
(FULL-TIME)
REGULATIONS AND SYLLABUS
REGULATIONS

CREDITS

Each course is normally assigned one credit per lecture/tutorial per week and one credit for two periods or part thereof for laboratory or practical per week.

Each semester curriculum shall normally have a blend of theory and practical courses. In the first year the total number of credits will be 32. For Semesters III to VIII the average credits per semester will be 28 and total credits for the entire degree course will be 200. For the award of the degree a student has to

- Earn a minimum of 200 credits,
- Serve in the NSS or NCC for at least one year, and
- Enrol as student member of a recognised professional society.

DURATION OF THE PROGRAMME

A student is normally expected to complete the B.E. Computer Science and Engineering programme in four years but in any case not more than seven years from the time of admission.

REGISTRATION FOR COURSES

A newly admitted student will automatically be registered for all the courses prescribed for the first year, without any option.

Every other student shall submit a completed registration form indicating the list of courses intended to be credited during the next semester. This registration will be done a week before the last working day of the current semester. Late registration with the approval of the Dean on the recommendation of the Head of the Department along with a late fee will be done up to the last working day.

Registration for the project work shall be done only for the final semester.

ASSESSMENT

The subjects of study, scheme of assessment and syllabus are enclosed

The break-up of assessment and examination marks for theory subjects is as follows.

First assessment	:	10 marks
Second assessment (mid semester test)	:	10 marks
Third assessment	:	5 marks
Examination	:	75 marks

The break-up of assessment and examination marks for practical subjects is as follows.

First assessment (test)	:	15 marks
Second assessment (test)	:	15 marks
Maintenance of record book	:	10 marks
Examination	:	60 marks

The project work will be assessed for 40 marks by a committee consisting of the guide and a minimum of two members nominated by the Head of the Department. One of the committee members will be nominated as the chairman by the Head of the Department. The Head of the Department may himself be a member or the Chairman. 60 marks are allotted for the project work and viva voce examination at the end of the semester.

STUDENT COUNSELLOR

To help the students in planning their course of study and for general advice on the academic programme, the Head of the Department will attach a certain number of students to a member of the faculty who shall function as student counsellor for those students throughout their period of study. Such student counsellors shall advise the students, give preliminary approval for the courses to be taken by the students during each semester and obtain the final approval of the Head of the Department.

CLASS COMMITTEE

For all the branches of study during the first year, a common class committee will be constituted by the Dean of the faculty.

From among the various teachers teaching the same common course to different classes during the first year, the Dean shall appoint one of them as course co-ordinator.

The composition of the first year class committee will be as follows.

- Course co-ordinators of all common courses.
- Teachers of all other individual courses.
- All Heads of the Departments, among whom one may be nominated as chairman by the Dean.
- The Dean may opt to be a member or the chairman.

For each of the higher semesters, separate class committees will be constituted by the respective Heads of Departments.

The composition of the class committees from third to eighth semester will be as follows.

Course co-ordinators of the common courses, if any, who shall be appointed by the Head of the Department from among the staff members teaching the common course.

A project co-ordinator (in the eighth semester committee only) who shall be appointed by the Head of the Department from among the project supervisors.

Teachers of other individual courses.

One Professor or Reader, preferably not teaching the concerned class, appointed as Chairman by the Head of the Department.

The Head of the Department may opt to be a member or the Chairman.

All student counsellors of the class, and the Head of the Department (if not already a member) or any staff member nominated by the Head of the Department may opt to be special invitees.

The class committee shall meet four times during the semester.

The first meeting will be held within two weeks from the date of class commencement in which the type of assessment like test, assignment etc. for the first and third assessment and the dates of completion of the assessments will be decided.

The second meeting will be held within a week after the completion of the first assessment to review the performance and for follow-up action.

The second assessment will be the mid-semester test.

The third meeting will be held within a week after the second assessment is completed to review the performance and for follow-up action.

The fourth meeting will be held after all the assessments except the examinations are completed for all the courses, and at least one week before the commencement of the examinations. During this meeting the assessment on a maximum of 40 marks for practical and 25 marks for theory will be finalised for every student and tabulated and submitted to the Head of the Department (to the Dean in the case of first year) for approval and transmission to the controller of examinations.

WITHDRAWAL FROM A COURSE

A student can withdraw from a course at any time before a date fixed by the Head of the Department prior to the second assessment, with the approval of the Dean of the Faculty on the recommendation of the Head of the Department.

TEMPORARY BREAK OF STUDY

A student can take a one-time temporary break of study covering the current year/semester and/or the next semester with the approval of the Dean on the recommendation of the Head of the Department, not later than seven days after the completion of the mid-semester test. However, the student must complete the entire programme within the maximum period of seven years.

SUBSTITUTE ASSESSMENTS

A student, who has missed, for genuine reasons accepted by the Head of the Department, one or more of the assessments of a course other than the examination, may take a substitute assessment for any one of the missed assessments. The substitute assessment must be completed before the date of the fourth meeting of respective class committees.

A student who wishes to have a substitute assessment for a missed assessment must apply to the Head of the Department within a week from the date of the missed assessment.

ATTENDANCE REQUIREMENTS

To be eligible to appear for the examination in a particular course, a student must put in a minimum of 80% of attendance in that course. However, if the attendance is 75% or above but less than 80% in any course, the authorities can permit the student to appear for the examination in that course on payment of the prescribed condonation fee.

Students who withdraw from or does not meet the minimum attendance requirement in a course must re-register for and repeat the course.

PASSING AND DECLARATION OF EXAMINATION RESULTS

All assessments of all the courses on an absolute marks basis will be considered and passed by the respective results passing boards in accordance with the rules of the University. Thereafter, the controller of examinations shall convert the marks for each course to the corresponding letter Grade as follows, compute the Grade Point Average (GPA) and Cumulative Grade Point Average (CGPA) and prepare the Grade cards.

90 to 100 marks	:	Grade 'S'
80 to 89 marks	:	Grade 'A'
70 to 79 marks	:	Grade 'B'
60 to 69 marks	:	Grade 'C'
55 to 59 marks	:	Grade 'D'
50 to 54 marks	:	Grade 'E'
Less than 50 marks	:	Grade 'RA'
Insufficient attendance	:	Grade 'I'
Withdrawn from the Course	:	Grade 'W'

A student who obtains less than 24 marks out of 60 in the practical examination and 30 marks out of 75 in theory or is absent for the examination will be awarded Grade 'F'.

A student who earns a Grade of S, A, B, C, D or E for a course is declared to have successfully completed that course and earned the credits for that course. Such a course cannot be repeated by the student.

A student who obtains letter Grade F in a course has to reappear for the examination in that course.

A student who obtains letter Grades I or W in a course must reregister for and repeat the course.

The following Grade Points are associated with each letter Grade for calculating the Grade Point Average (GPA) and Overall Grade Point Average (OGPA).

S - 10; A - 9; B - 8; C - 7; D - 6; E - 5; F - 0.

Courses with Grades I and W are not considered for calculation of Grade Point Average or Overall Grade Point Average. F Grade will be considered for computing GPA and OGPA.

A student can apply for retotalling of one or more of his/her examination answer papers within a week from the date of issue of Grade sheet to the student on payment of the prescribed fee per paper. The application must be made to the controller of examinations with the recommendation of the Head of the Department.

After results are declared, Grade cards will be issued to the students.

The Grade card will contain the list of courses registered during the year/semester, the Grades scored and the Grade Point Average (GPA) for the year/semester.

GPA is the sum of the products of the number of credits of a course with the Grade Point scored in that course, taken over all the courses for the year/semester, divided by the sum of the number of credits for all courses taken in that year/semester. OGPA is similarly calculated considering all the courses taken from third semester.

After successful completion of the programme, the degree will be awarded with the following classifications based on OGPA.

For First Class with distinction the student must earn a minimum of 200 credits within four years from the time of admission, pass all the courses in the first attempt and obtain an OGPA of 8.25 or above.

For First Class the student must earn a minimum of 200 credits within five years from the time of admission and obtain an OGPA of 6.75 or above.

For Second Class the student must earn a minimum of 200 credits within seven years from the time of admission.

ELECTIVES

Apart from the various elective courses offered in the curriculum of the branch of specialisation, a student can choose a maximum of two electives from any specialisation under the faculty during the entire period of study, with the approval of the Head of the Department and the Head of the Department offering the course.

COURSES OF STUDY AND SCHEME OF EXAMINATIONS

FIRST YEAR (ANNUAL PATTERN)

Course Code	Course Title	L	T	P	D	Marks			Credit Points
						Ex	CA	Total	
THEORY (Duration of Examination – 3 Hrs)									
101	Technical English	3	-	-	-	75	25	100	3
102	Engineering Mathematics – I	3	1	-	-	75	25	100	4
103	Engineering Physics	3	-	-	-	75	25	100	3
104	Engineering Chemistry	3	-	-	-	75	25	100	3
105	Engineering Mechanics	3	-	-	-	75	25	100	3
106	Basic Engineering (Civil, Mech. & Elect.)	6	-	-	-	75	25	100	3
107	Environmental Studies	3	-	-	-	75	25	100	3
PRACTICAL (Duration of Examination – 3 Hrs)									
108	Engineering Drawing	-	-	-	3	60	40	100	2
109	Physics Laboratory	-	-	3	-	60	40	100	2
110	Chemistry Laboratory	-	-	-	-	60	40	100	2
111	Computer Programming	1	-	2	-	60	40	100	2
112	Workshop Practice	-	-	3	-	60	40	100	2
Total		25	1	8	3	825	375	1200	32

L – Lecture; T – Tutorial; P – Practical; D – Drawing; Ex. – Examination; CA – Continuous Assessment.

THIRD SEMESTER

Course Code	Course Name	L	T	Lb	D	Sessional Marks	Exam Marks	Total Marks	Credits
83108	Engineering Mathematics – II	3	1	-	3	25	75	100	4
83208	Digital Principles and System Design	3	1	-	3	25	75	100	3
83308	Computer Architecture	3	1	-	3	25	75	100	3
83408	Basics of Electrical and Electronics Engineering	3	1	-	3	25	75	100	4
83508	C Programming	3	1	-	3	25	75	100	4
83608	Principles of Programming Languages	3	1	-	3	25	75	100	4
83708	Electrical and Electronics Lab	-	-	6	3	40	60	100	3
83808	C Programming Lab	-	-	6	3	40	60	100	3
TOTAL		18	6	12	24	230	570	800	28

FOURTH SEMESTER

84108	Theory of Computation	3	1	-	3	25	75	100	3
84208	Object Oriented Programming and C++	3	1	-	3	25	75	100	4
84308	Data Structures and Algorithms	3	1	-	3	25	75	100	3
84408	Data Base Management Systems	3	1	-	3	25	75	100	4
84508	Operating System	3	1	-	3	25	75	100	4
84608	Discrete Mathematics	3	1	-	3	25	75	100	4
84708	OS and DBMS Lab	-	-	6	3	40	60	100	3
84808	C++ and Data Structures Lab	-	-	6	3	40	60	100	3
TOTAL		18	6	12	24	230	570	800	28

L – Lecture; T – Tutorial; Lb – Laboratory; D – Duration of the Examination.

FIFTH SEMESTER

Course Code	Course Name	L	T	Lb	D	Sessional Marks	Exam Marks	Total Marks	Credits
85108	Microprocessor and Micro Controllers	3	1	-	3	25	75	100	3
85208	Internet and Java Programming	3	1	-	3	25	75	100	4
85308	Numerical Mathematics and Operation Research	3	1	-	3	25	75	100	3
85408	Unix and Windows Programming	3	1	-	3	25	75	100	4
85508	Elective – I	3	1	-	3	25	75	100	4
85608	Elective – II	3	1	-	3	25	75	100	4
85708	Microprocessor Lab	-	-	6	3	40	60	100	3
85808	Unix and Java Programming Lab	-	-	6	3	40	60	100	3
TOTAL		18	6	12	24	230	570	800	28

SIXTH SEMESTER

86108	Computer Graphics and Multimedia	3	1	-	3	25	75	100	3
86208	Web Technologies	3	1	-	3	25	75	100	4
86308	Visual Programming	3	1	-	3	25	75	100	3
86408	C# and .Net programming	3	1	-	3	25	75	100	4
86508	Elective – III	3	1	-	3	25	75	100	4
86608	Elective – IV	3	1	-	3	25	75	100	4
86708	Visual Programming, C# and .Net Lab	-	-	6	3	40	60	100	3
86808	Computer Graphics, Multimedia and Web Technologies Lab	-	-	6	3	40	60	100	3
TOTAL		18	6	12	24	230	570	800	28

SEVENTH SEMESTER

87108	System Software and Compiler Design	3	1	-	3	25	75	100	4
87208	Data Communication and Computer Networks	3	1	-	3	25	75	100	3
87308	Object Oriented Analysis and Design	3	1	-	3	25	75	100	3
87408	Ethics in Engineering	3	1	-	3	25	75	100	4
87508	Elective – V	3	1	-	3	25	75	100	4
87608	Elective – VI	3	1	-	3	25	75	100	4
87708	Compiler Design and Networks Lab	-	-	6	3	40	60	100	3
87808	CASE Tools Lab	-	-	6	3	40	60	100	3
TOTAL		18	6	12	24	230	570	800	28

EIGHTH SEMESTER

88108	AI and Fuzzy Systems	3	1	-	3	25	75	100	3
88208	Security in Computing	3	1	-	3	25	75	100	4
88308	Principles of Management	3	1	-	3	25	75	100	3
88408	Elective – VII	3	1	-	3	25	75	100	4
88508	Elective – VIII	3	1	-	3	25	75	100	4
88608	Elective – IX	3	1	-	3	25	75	100	4
88708	Project Work and Viva-voce	-	-	6	3	40	60	100	6
TOTAL		18	6	6	21	190	510	700	28

L – Lecture; T – Tutorial; Lb – Laboratory; D – Duration of the Examination.

LIST OF ELECTIVES

8XX08A	: Unix Networking
8XX08B	: Embedded Systems
8XX08C	: RDBMS (Oracle and DB2)
8XX08D	: J2EE Programming
8XX08E	: Neural Networks and Fuzzy Systems
8XX08F	: Speech Technology
8XX08G	: Image Processing
8XX08H	: Data Mining and Data Warehousing
8XX08I	: Software Testing and Quality Assurance
8XX08J	: Enterprise Resource Planning
8XX08K	: Ad-hoc and Sensor Networks
8XX08L	: Client Server Computing
8XX08M	: Parallel Algorithms
8XX08N	: E-Commerce
8XX08O	: Natural Language Processing
8XX08P	: Pervasive Computing
8XX08Q	: Mainframe Computing
8XX08R	: Mobile Computing
8XX08S	: Software Project Management
8XX08T	: TCP/IP Network Components
8XX08U	: Distributed Objects-COM / DCOM
8XX08V	: Distributed Operating Systems
8XX08W	: Software Engineering
8XX08X	: Unified Modelling Language
8XX08Y	: JSP and EJB
8XX08Z	: Windows Phone 7 Programming
8XX08AA	: Open CL Programming

SYLLABUS**THIRD SEMESTER****COURSE : 83108 – ENGINEERING MATHEMATICS – II**

Aim: The course aims to develop the Skills of the Students in the areas of boundary value problems and transform techniques. This will be necessary for their effective studies in a large number of engineering subjects like heat conduction, Communication systems, Electro – Optics and Electromagnetic theory. The Course will also serve as a prerequisite for post graduate and specialized studies and research.

Objectives

- At the end of the Course the students would be capable of mathematically formulating certain practical problems in terms of partial differential equations, solve them and physically interpret the results.
- Have gained a well founded knowledge of Fourier series, their different possible forms and the frequently needed practical Fourier analysis that an engineer may have to make from discrete data.
- Have obtained capacity to formulate and identify certain boundary value problems encountered in engineering practices, decide on applicability of the Fourier series method of solution, solve them and interpret the results.
- Have grasped to concept of expression of a function, under certain conditions, as a double integral leading to identification of transform pair, and specialization on Fourier transform pair, their properties, the possible special cases with attention to their applications.
- Have learnt the basics of Z transform in its applicability to discretely varying functions, gained the skill to formulate certain problems in terms of difference equations and solve them using the Z – transform technique bringing out the elegance of the procedure involved.

Unit-I : Partial Differential Equations

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions – Solution of standard types of first order partial differential equations – Lagrange's linear equation – Linear partial differential equations of Second order with Constant coefficients.

Unit-II : Fourier Series

Dirichlet's Conditions – General Fourier Series – Odd and even functions – Half range sine series – Half range cosine Series – Complex form of Fourier series – Parseval's identity.

Unit-III : Boundary Value Problems

Solutions of one dimensional Wave equation – One dimensional heat equation (without derivation) – Fourier series solutions in Cartesian Co-ordinates.

Unit-IV : Fourier Transform

Fourier integral theorem(without proof) – Fourier transform pair Sine and Cosine transforms – Properties – Transforms of simple functions – Convolution theorem – Parseval's identity.

Unit-V : Z – Transform and Difference Equations

Z – transform – Elementary Properties – Inverse Z – transform – Convolution theorem – Solution of difference equations using Z – transform.

Text Books

- 1) Kandasamy, P., K. Thilagavathy and K. Gunavathy, "Engineering Mathematics" Series, S. Chand & Co. Ltd., New Delhi, 2004.
- 2) Venkatraman, M.K., "Engineering Mathematics" Series, The National Publication Company, Chennai, 2003.

Reference Books

- 1) Veerarajan, T., "Engineering Mathematics Series", Tata McGraw Hill, Publication Company Ltd, New Delhi, 2002.
- 2) Singaravelu, A., "Engineering Mathematics Series", Meenakshi Publication, Chennai, 2004.
- 3) Wylie C. Ray and C. Barrett Louis, "Advanced Engineering Mathematics", McGraw Hill Inc., New York.

COURSE : 83208 – DIGITAL PRINCIPLES AND SYSTEM DESIGN

Aim: To learn the Basic Concepts of Boolean Algebra, Combinational logic and sequential Logic circuits which are important in describing the Operations among various modules in digital system.

Unit-I : Binary Systems and Boolean Algebra

Signed binary numbers – Binary arithmetic in computers – BCD arithmetic – Data representation – Fixed and floating point representation – Exponent representation of floating point binary numbers – Weighted and non weighted binary codes – alphanumeric codes – Error detection and correction codes – Laws of boolean algebra – Boolean expansions and logic diagrams – Negative logic – Introduction to mixed logic.

Unit-II : Logic Families

Specifications of a logic circuit – Operation and characteristics of RTL – DTL – HTL – TTL – ECL – MOS – CMOS and logic families – Comparison of logic families – Open collector – totem pole – Schottky and tristate TTL gates – wire – ANDing – strobed gate – expanders and expandable gates – Logic packages SSI – MSI – LSI – VLSI – and VVLSI.

Unit-III : Combinational Logic

Introduction – Minterms and Maxterms – Truth tables and maps – Solving digital problems using maps – Sum of products and Product of sums reduction – Tabular minimization – Hybrid functions – Incompletely specified functions –

Multiple output minimization – Implementation of expressions using AOI gates.
 Fault diagnosis in combinational circuits – Classical method – Boolean difference method.

Unit–IV : Sequential Logic

Flip – flops – Counters – Types of counters – Type T – Type D and type JK design
 – Design using state equations – Shift registers – Asynchronous sequential circuits
 – Fault diagnosis in sequential circuits – Initial and final state identification.

Unit–V : Digital Integrated Circuits

Multiplexer – Demultiplexer – Decoder – code converter – Arithmetic functions –
 D/A – A/D converters. Memory circuit and systems – ROM – PROM – EPROM –
 EEPROM – RAM – DRAM – Memory Subsystems – PLA – PAL series PLD's –
 architecture – notations – design methodology – FPGA – logic blocks – Architecture
 – programming technologies.

Text Books

- 1) Samuel C. Lee, "Digital Circuits and Logic Design", PHI, 1984.
- 2) Morris Mano, "Digital Logic and Computer Design", PHI, 1994.

Reference Books

- 1) Kohonen, "Switching and Finite Automata Theory", TMH 1978.
- 2) Jacob Millman and Arvin Grabel, "Microelectronics" McGraw Hill 1987.
- 3) William I. Fletcher "An Engineering Approach to Digital Design", PHI 1996.

COURSE : 83308 – COMPUTER ARCHITECTURE

Aim: To study about the design of instruction set, pipelining, memory system and multiprocessors and multicomputers.

Unit–I : Introduction

Overview and History – The Cost Factor – Performance Metrics and Evaluating
 Computer Design – Memory Hierarchy – System Buses – Bus Inter Connection –
 PCI – Future bus. Overview of CPU (ALU and control unit) design.

Unit–II : Instruction Set Design

Assembly/Machine Language – Von Neumann Machine Cycle –
 Microprogramming – Firmware – Memory Addressing – Classifying Instruction Set
 Architectures – RISC Vs. CISC.

Unit–III : Pipelining

Comparison of Pipelined and non Pipelined Computers – Instruction and
 Arithmetic Pipelines – Structural Hazards and Data Dependencies – Branch Delay
 and multicycle instructions – Superscalar Computers.

Unit–IV : Memory System Design

Cache Memory – Basic Cache structure and Design – Fully associative – Direct
 and Set Associative Mapping – Analyzing Cache Effectiveness – Replacement
 Policies – Main Memory – Virtual Memory Structure and Design – Paging –
 Replacement Strategies – Secondary Memory.

Unit-V : Multiprocessors and Multicomputers

SISD – SIMD and MIMD architectures – Centralized and Distributed Shared Memory – Architectures – Cache Coherence.

Text Book

- 1) J. Hennessy and D. Patterson – Morgan and Kaufmann “Computer Architecture – A Quantitative Approach”, Second Edition, 1996.

Reference Books

- 1) John P. Hayes, “Computer Architecture and Organization”, Tata McGraw Hill, 1996.
- 2) Hamacher, V.C., et al., “Computer Organization”, Tata McGraw Hill, 1996.

COURSE : 83408 – BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING

Aim: To learn the basic concepts of Circuit theory, Electrical machines and Semiconductor devices.

Unit-I : Electrical Circuits

Review of Kirchoff's laws – Mesh and nodal analysis – Star delta transformation – Network theorems, Superposition, Thevenin's, Norton's and Maximum power transfer theorem – AC circuits – Power and energy relations – Series and parallel resonance – Introduction to three phase systems.

Unit-II : DC Machines and Transformers

Construction – Principle of operation – EMF and torque equations – Characteristics of different types of dc motors – Starter – speed control – Applications. Transformers – EMF equation – Losses – efficiency Voltage regulations – Auto transformer – Introduction to three phase transformers.

Unit-III : AC Machines

Principle of operation of three phase induction motors – Starting methods – Torque slip characteristics – Speed control – Single phase induction motors – Principle of operation of synchronous generators and motors – Servo motor – Variable reluctance and permanent magnet stepper motor.

Unit-IV : Semiconductor Devices

Functional aspects of a semiconductor – PN junction diodes – Bipolar junction transistors – Field effect transistors – Unijunction transistors – Silicon controlled rectifiers – Basics of IC devices – IC technology – Linear and digital IC's.

Unit-V: Electronic Circuits (Qualitative Treatment Only)

Half wave and full wave rectifiers – Filters – Zener regulator – IC regulators – Transistors, amplifiers – CB,CE,CC configurations – FET amplifiers – Feedback amplifiers – Power amplifier classification – Class A and Class B pushpull configuration – Oscillators – Backhanuen criterion – Colpitts, Weinsbridge and phase shift oscillators – Operational amplifier comparators.

Text Books

- 1) Gupta, B.R., "Principles of Electrical Engineering", S. Chand and Co., New Delhi, 2002.
- 2) Nagrath, I.J. and D.P. Kothari, "Electrical Machines", Tata McGraw Hill Publishing Company Ltd., 1980.
- 3) Allen Mottershed "Electrical Device and Circuits", Prentice Hall of India, 1999.

Reference Books

- 1) Edminister, J.A., "Theory and Problems of Electric Circuits", Schaum's Outline Series, McGraw Hill Book Company, 2nd Edition, 1983.
- 2) Sudhakar, A. and S.P. Shyam Mohan, "Circuits and Networks Analysis and Synthesis", Tata McGraw Hill Publishing Company Ltd., New Delhi, 1994.

COURSE : 83508 – C PROGRAMMING

Aim: To learn character set, data types, statements, functions, structure, input/output operations, pointers, files etc., available in 'C' language in order to write 'C' programs.

Unit-I

Introduction – The C Character set – Constants – Variables and Keywords – Types of C Constants – Integer Constants – Rules for constructing Real Constants – Rules for constructing Character Constants – Types of C Variables – Variable names – C Keywords – Receiving Input – C Instructions – Type Declaration Instruction – Arithmetic Instruction – Integer and Float Conversions – Type Conversion in Assignments – Hierarchy of operations – Associativity of operators – Control Instructions in C.

Unit-II

Data Types – Integers – long and short Integers – signed and unsigned – Characters – signed and unsigned – Floats and doubles – Enumerated data types – Uses of Enumerated Data Type – Renaming Data types with typedef – Type casting – Arrays – Definition – Declaring Array – Array Initialization – Bounds Checking – Two Dimensional Arrays – Initializing a 2 – Dimensional Array – Multidimensional Array – Initialization – Storage Classes in C – Automatic – Register – Static – Externals – The Decision Control Structure: The If statement – The If-else Statement – Use of Logical Operators – conditional operator – Loop Control Structure: The break statement – Continue statement – Decisions Using switch – switch Versus If-else Ladder.

Unit-III

Functions and Structure – Function Declaration – Passing Values between Functions – Scope Rule of Functions – calling convention – and prototypes – Call by Value and Call by reference – Structures - Declaring a Structure – Accessing Structure Elements – Array of Structures – Additional Features of Structures – Uses of Structures – Strings – Standard Library String Functions – Two Dimensional Array of characters.

Unit-IV

File Input/Output – File Operations – opening a File – Reading From a file – Trouble in Opening a File – Closing the file – A File – Copy Program – Writing to a File – File Opening Modes – String (line) I/O in Files – The Awkward Newline – Record I/O in Files – Text Files and Binary Files – Bitwise Operators – Right Shift Operator – Left Shift Operator – Bitwise AND Operator – Bitwise or Operator – Bitwise XOR Operator.

Unit-V

Introduction to Pointers: The & and * Operators – Pointer expressions – The Jargon of pointers – char – int and float pointers – Passing addresses to functions – Function returning pointers – pointers and Arrays – Passing an Entire Array to a Function – Passing Array Elements to a Function – Pointers and Two Dimensional Arrays – Pointer to an Array – Passing Two Dimensional Array to a Function.

Text Books

- 1) Yashavant P. Kanetkar, "Let us C", Sixth Edition BPB Publications, 2002.
- 2) Yashavant P. Kanetkar, "Understanding Pointers In C", third edition BPB Publications, 2002.

Reference Books

- 1) Kerningham, B.W. and D. Ritchie, "The C Programming Language", PHI, Ltd., 1988.
- 2) Balagurusamy, E., "Programming in ANSI C", TMH Ltd., 1995.
- 3) Ravichandran, D. "Programming in ANSI C", New Age International (P) Ltd., 1989.
- 4) Geoff Dromey, "How to Solve it by Computer?", PHI Ltd., 1988.

COURSE : 83608 – PRINCIPLES OF PROGRAMMING LANGUAGES

Aim: To understand the principles of programming languages such as COBOL, C, C++, Java, LISP and PROLOG.

Unit-I

Evaluation – Design and applications of programming languages – Using L and R values_Von Neumann bottleneck – Basics of logic and functional programming. Data types in Ada_parameter passing mechanism – Scope of a variable – Binding – Storage allocation of multidimensional arrays in a computer – Control structures like If statement – While statement etc – Data abstraction.

Unit-II

Data types – Simple statements like (assignment statement – if statement – switch statement) – Control statement like (for loop – while and do – while loops – break and continue statements etc.) – Arrays – Functions and pointers in C, C++ and Java.

Unit-III

Introduction to object oriented programming. Concepts of objects – Classes and instances – Various types of classes like base class – Derived class – Abstract class – class hierarchy – Difference between public – Private and protected class – Inheritance – multiple Inheritance and its problem – Public and private Inheritance in C++ and Java.

Unit-IV

Introduction to applicative languages – Study of LISP – Programming style – lamda calculus – Property list and macro expansion in LISP and LISP programming. Data types and data structures in PROLOG – Basic statements – control structures and input – output statement used in PROLOG – Recursion and iteration used in PROLOG – programming in PROLOG.

Unit-V

Introduction to COBOL – Various divisions and sections used in COBOL – Simple type of statements like ADD – SUBTRACT – COMPUTE – OPEN – CLOSE – MOVE in COBOL – Loop type statements in COBOL – Table handling – sequential file processing – File sorting and merging in COBOL. Comparative study of various programming Languages like C, C++, Java, LISP, PROLOG, ADA and COBOL.

Text Books

- 1) Ellis Horowitz, "Fundamentals of Programming Languages", Galgotia Publications Pvt. Ltd.
- 2) Allen B. Tucker, "Programming Languages", McGraw Hill International Edition, 2nd Edition, 1987.

Reference Books

- 1) Robert Lafore, "Object Oriented Programming in Turbo C++", Galgotia Pub, 1998.
- 2) Herbert Schildtz & Patrick Naughton, "The Complete Reference JAVA", Tata McGraw Hill, 1997.
- 3) Lawrence R. Newcomes, "Programming with Advanced Structured COBOL", Schaum's Outline Series, McGraw Hill Book Company, 1987.

FOURTH SEMESTER**COURSE : 84108 – THEORY OF COMPUTATION**

Aim: To learn different types of grammars and their automatons.

Unit-I

Regular expression – Properties – Construction of deterministic and non – deterministic finite automata – Minimization of finite automata – Equivalence of finite automata and regular expressions – Construction of Finite automata from the regular expression – Construction of Moore and Mealy machines – Equivalence of Moore and Mealy machines. Regular set: Pumping lemma – Properties – Decision algorithms.

Unit-II

Context Free Grammar (CFG): Derivation – Parse tree – Ambiguity – Chomsky Normal Form – Greibach Normal Form. Push Down Automata (PDA): Definition – Construction of PDA from the language – Construction of PDA from the CFG. Equivalence of PDA and Context Free Language (CFL) – Pumping lemma for CFL – Properties – Decision algorithms.

Unit-III

Turing Machine(TM): Basic model – Construction of TM – Modifications of Turing Machine – Church's hypothesis – Restricted TM equivalent to the basic model.

Unit-IV

Undecidability: Decidable and Undecidable problems – Properties of recursive and recursively enumerable languages – Universal TM – Halting Problem – Rice's Theorem and its application – Undecidability of Post's correspondence problem – Applications.

Unit-V

Chomsky Hierarchy: Regular Grammar (RG) – Right Linear and Left Linear Grammar – Equivalence of RG and Finite automata. – Unrestricted Grammar(URG) – Equivalence of URG and TM – Context Sensitive Grammar(CSG) – Construction of Linear Bounded Automata (LBA) – Equivalence of CSG and LBA – Comparison of grammars and their associated automaton – Applications.

Text Book

- 1) John E. Hopcraft and J.D. Ullaman, "Introduction to Automata Theory, Languages and Computation", Narosa Publishing House, 1997.

Reference Book

- 1) Martin, "Introduction to Languages and Theory of Computation", TMH, 1998.

COURSE : 84208 – OBJECT ORIENTED PROGRAMMING AND C++

Aim: To learn and implement the basic concepts of OOPS using C++.

Unit-I : Object Oriented Programming

Objects and Classes – Methods – Messages – Encapsulation – Abstraction – Inheritance – Polymorphism – Dynamic Binding. Traditional Approach Versus Object Orientation: The Benefits of Object Orientation – Flexibility in Software Development – Reusability – Extensibility and Maintainability.

Unit-II : C++

Classes – Member Functions – Reference Variables – Constructor and Destructor Functions – Inline Functions – Overloaded Functions and Operators – Inheritance and Derived Classes – Streamed I/O operators – Creating Data types in C++ – Classes in Action – Data Hiding – Introducing friend function – Techniques for Creating and Initialising Objects – Initialising and Cleaning Objects – Deriving Classes – Virtual Functions.

Unit-III

Components of C++ functions – Function Prototypes – Calling C++ Functions – Passing Arguments – Reference Arguments – Default Arguments – Inline Functions – Member Functions – Iterative Functions and Objects – Virtual Functions and Polymorphism.

Unit-IV

Function and Operator Overloading – Operator Overloading Using friend functions – Examples of Operator Overloading – Constructor and Destructor Functions – Initialising Objects – Calling Constructors – Creating Static, Dynamic and Automatic Objects – Different Types of Constructors.

Unit-V

Inheritance and Class Hierarchies Using Constructors and Destructors in Derived Classes – C++ Stream I/O Systems – Using the Stream Operators – Initialising istream, ostream Objects – Record Oriented File I/O.

Text Book

- 1) Bjarne Stroustrup, "The C++ Programming Language", Addison Wesley Publications, Second Edition, 1991.

Reference Books

- 1) Balagurusamy, E., "Object Oriented Programming in C++", TMH, Delhi, 1997.
- 2) Neill Graham, "Learning C++", McGraw Hill, 1991.
- 3) Keith Wleiskamp and Bryan Flamig, "The Complete C++ Primer", Academic Press Inc, 1990.

COURSE : 84308 – DATA STRUCTURES AND ALGORITHMS

Aim: To understand the concepts of data structures such as stack, queue, linked list, tree, graphs and searching and sorting algorithms.

Unit-I : Arrays

Representation of arrays. Stacks and Queues: Fundamentals – Evaluation of expression – Infix to Postfix Conversion – Multiple Stacks and Queues – Performance Analyze of the algorithms.

Unit-II : Linked List

Singly Linked List – Linked Stacks and Queues – Polynomial Addition – More on Linked List – Sparse Matrices – Doubly Linked List and Dynamic – Storage Management – Garbage Collection and Compaction.

Unit-III : Binary Trees

Trees – Binary Tree – Binary search Trees – Implementation of Binary Trees – Searching a Binary search Tree – Tree Traversal – Insertion – Deletion – Balancing a Tree – Self – Adjusting Trees – Heaps – Polish notation and Expression Trees.

Unit-IV : Graphs

Terminology and Algorithms. Hashing – Hashing Functions – collision Resolution Techniques. Sorting and Searching algorithms: Bubble sort – Selection

Sort – Insertion Sort – Quick sort – Merge Sort – Heap sort – Radix Sort – Binary search and Sequential search.

Unit–V : Case Study

Recursion – Towers of Hanoi – Simulation of an Airport – Pattern Matching in strings – Game Trees.

Text Book

- 1) Aho Alfred, V., E. Hopperoft John, D. Ullman Jeffrey, "Data Structures and Algorithms", Addison Wesley, 1987.

Reference Books

- 1) Tremblay Sorenson, "An Introductions to Data Structures with Applications", 2nd edition, Tata McGraw Hill Pub, Company Ltd.,1991
- 2) Yedidyah Langsam, Moshe J. Augenstein, Aaron M. Tenenbaum, "Data Structures Using C", Prentice Hall, 1996.

COURSE : 84408 – DATA BASE MANAGEMENT SYSTEMS

Aim: To study about the fundamentals of database management systems, models of databases and applications.

Unit–I : Introduction

File System Vs. DBMS – Views of data – Data Models – Database Languages – Database Management System Services – Overall System Architecture – Data Dictionary – Entity – Relationship (E – R) – Enhanced Entity – Relationship Model.

Unit–II : Relational Approach

Relational Model – Relational Data Structure – Relational Data Integrity – Domain Constraints – Entity Integrity – Referential Integrity – Operational Constraints – keys – Relational Algebra – Fundamental operations – Additional Operations – SQL – Basic Structure – Set operations – Aggregate Functions – Null values – Nested Sub queries – Derived Relations – Views – Modification of the database – Joined Relations – Data Definition Language – Triggers.

Unit–III : Database Design

Functional Dependencies – Pitfalls in Relational Database Design – Decomposition – Normalization using Functional Dependencies – Normalization using Multi – valued Dependencies – Normalization using Join Dependencies – Domain – Key Normal form.

Unit–IV : Implementation Techniques

Overview of Physical Storage Media – Magnetic Disks – RAID – Tertiary storage – File Organization – Organization of Records in Files – Indexing and Hashing – Ordered Indices – B+ tree Index Files – B tree Index Files – Static Hashing – Dynamic Hashing – Query Processing Overview – Estimation of Query Processing Cost – Join strategies – Transaction Processing – Concepts and States – Implementation of Atomicity and Durability – Concurrent Executions –

Serializability – Implementation of Isolation – Testing for Serializability – Concurrency control – Lock Based Protocols – Timestamp Based Protocols.

Unit–V : Current Trends

Distributed Databases – Data Storage – Network Transparency – Query processing – Transaction Model – Commit Protocols – Coordinator selection – Object Oriented Databases – Object Oriented Data Model – Object Oriented Languages – Persistent Programming languages – Persistent C++ Systems – Object relational Databases – Nested Relations – Complex types and Object Orientation – Querying with complex types – Creation of complex values and objects.

Text Book

- 1) Abraham Silberschatz, Henry F. Korth and S. Sudharshan, "Database System Concepts", Fourth Edition, Tata McGraw Hill, 2002.

Reference Books

- 1) Ramez Elmasri, Shamkant B. Navathe, "Fundamentals of Database Systems", Fourth Edition, Addison Wesley, 2002.
- 2) Raghu Ramakrishnan, "Database Management Systems", Third Edition, McGraw Hill, 2002.
- 3) Peter Rob and Carlos Coronel, "Database Systems – Design, Implementation and Management," Fifth Edition, Thompson Learning, Course Technology, 2003.

COURSE : 84508 – OPERATING SYSTEM

Aim: To understand the different functions of the operating system.

Unit–I : Basics of OS

Introduction – Fundamental Concepts – Overview of Operating Systems – Classes of operating systems – Batch processing systems – Multiprogramming systems – Real time operating systems – Distributed operating systems.

Unit–II : Concurrency Issues

Processes and threads – Scheduling – Preemptive and non preemptive scheduling – Real time scheduling – Disk scheduling – Disk scheduling Algorithm – Scheduling in Unix – OS/2 and windows NT – Deadlock – Prevention – Detection Avoidance and Recovery.

Unit–III: Memory Management

Memory Management – Levels of Management Static and Dynamic memory allocation – contiguous and non contiguous memory allocation – Paging and segmentation – Fragmentation and compaction – swapping – overlays – virtual memory – Demand paging – Page Replacement Algorithm – Shared pages – memory mapped files.

Unit–IV : File Management – Mutual Exclusion and Synchronization

File systems – File system and IOCS – File operation – File Protection – Interface between file system and IOCS – Allocation – File access – File sharing – Security and Protection – File system of MSDOS and window NT – Mutual Exclusion and

synchronization – Principles of concurrency – Mutual exclusion – Software Approaches – Hardware Support – Semaphore – Monitors – Message Passing.

Unit–V : Implementation Issues

I/O and resource management – I/O System Software – Disk Device Driver access Strategies – Modeling of disks – Unification of files and I/O devices – Generalized Disk drives – Disk caching – SCSI Device drivers – Resources in OS – Protection of resources – User authentication – Mechanism for protecting Hardware and software resources – External security.

Text Books

- 1) Dhamdhere, D.M., "Operating Systems, A Concept Based Approach", Tata McGraw Hill, 2nd edition, 2006.
- 2) Sibarshaz, Z., Peterson and Galvin, "Operating system concepts", Addison Wesley, Third Edition, 1991.
- 3) William Stallings, "Operating systems – Internals and Design principles", Prentice Hall, Third edition 1998.

Reference Books

- 1) Andrew S. Tenenbaum, "Modern Operating Systems", PHI, 2nd Edition 2001.
- 2) Achut, S. Godbole and Kahata Atul, "Operating Systems and Systems Programming", Tata McGraw Hill, 2003.
- 3) Charles Crowley, "Operating Systems – A Design Oriented Approach", Tata McGraw Hill, 1999.

COURSE : 84608 – DISCRETE MATHEMATICS

Aim: The Course is aimed at developing skills of Discrete Mathematics. Discrete Mathematics is a bridge connecting various branches of Computer Science and Mathematics. The topics introduced will serve as basic tools for to develop the various concepts of Computer Science.

Objectives

On completion of the Course the Students are expected to know the following.

- The theory of sets which is the most fundamental concept in modern mathematics.
- The Idea of a relation between the elements of two sets.
- The Idea of Functions.
- Logic that deals with the methods of reasoning with studying arguments and conclusions.
- Detailed study of Semi groups, monoids and groups.
- Group codes and procedure for generating group codes.
- The study on ordering relations, Lattices and Boolean algebra.
- Graphs, especially trees and binary trees are used widely in the representation of data structures.

Unit-I

Set Theory: Introduction – Sets – Notation and Description of sets – subjects – Operations on Sets – Properties of Set operations – The principle of Duality.

Relations: Cartesian product of two Sets – Relations – representation of a relation – Operations on relation – equivalence relation – Closures and warshall's Algorithm – Partitions and Equivalence Classes.

Functions: Functions and operators – one-to-one, onto functions – special type of functions – invertible functions – composition functions.

Unit-II

Logic: Introduction – Connectives – Atomic and Compound statements Well formed formulae – Tautology – implications – Equivalence – Functionally complete sets of Connectives and duality Law – Normal forms – Theory of Inference – Quantifiers – valid formulae and Equivalence – Theory of Inference for Predicate Calculus.

Unit-III

Algebraic Systems: Binary operation – Algebraic Systems – Semi groups and monoids – Homomorphism and Isomorphism of semi groups and monoids – Groups – order of a Group – Subgroup of a group – Cyclic groups.

Coding Theory: Introduction Hamming Distance Encoding a message – Group codes – procedure for Generating Group codes – Decoding and Error correction – simple Error correcting code.

Unit-IV

Lattices and Boolean Algebra: Lattices – Some properties of lattices – New lattices – Modular and Distributive lattices – Boolean Algebras – Boolean Polynomials – Karnaugh Map.

Unit-V

Graph Theory: Basic concepts – matrix representation of Graphs – Trees – Spanning trees – Shortest path problem – Directed trees, Binary Trees – Cutsets and cut – Vertices – Eulerian and Hami Honian Graphs – Networks – Planar graphs.

Text Books

- 1) Dr. M.K. Venkataraman, Dr N. Sridharan and N. Chandrasekaran, "Discrete Mathematics", The National Publishing Company Chennai, (Chapters I, II, III, VII (1 to 10), VIII, IX, X and XI).

Reference Books

- 1) Trembley, J.P. and R.P. Manohar, "Discrete Mathematical Structures with Applications to Computer Science", Tata McGraw Hill, New Delhi.
- 2) Bernard Kolman, Robert C. Busby and Shoran Ross, "Discrete Mathematical Structures", Prentice Hall of India Ltd, New Delhi.

FIFTH SEMESTER**COURSE : 85108 – MICROPROCESSOR AND MICROCONTROLLERS**

Aim: To understand about microprocessor, microcontroller, design methods and interfacing techniques to digital systems.

Unit-I : 8 – BIT Microprocessor

Introduction – Evolution of Microprocessor 8085 Architecture and Memory – interfacing I/O devices – Instruction set – Addressing Modes – Assembly language programming – Counters and time delays – Interrupts – Timing diagrams – Microprocessor applications.

Unit-II : Microcontroller

Intel 8031/8051 Architecture – Special Function Registers (SFR) – I/O pins – ports and circuits – Instruction set – Addressing Modes – Assembly language programming – Timer and counter programming – Serial Communication – Connection to RS 232 – Interrupts Programming – External Memory facing – Introduction to 16 bit Microcontroller.

Unit-III : 8086 Processors

8086 Architecture – Pin Configuration – 8086 Minimum and Maximum mode configurations – Addressing modes – Basic Instructions – 8086 Interrupts – Assembly levels programming – Introduction to 80186 – 80286 – 80386 – 80486 and Pentium processors.

Unit-IV : Peripherals and Interfacing

Serial and Parallel I/O (8251 and 8255) – Programmable DMA Controller (8257) – Programmable interrupt controller (8259) – Keyboard display ADC/DAC interfacing – Inter integrated circuits interfacing (I2C standard).

Unit-V : Microprocessor Based Systems Design – Digital Interfacing

Interfacing to alpha numeric displays – Interfacing to liquid crystal display (LCD 16x2 line) – High power Devices and Optical motor shaft encoders – Stepper motor interfacing – Analog interfacing and Industrial control – Microcomputer based small scale – Industrial process control system – Robotics and Embedded control – DSP and Digital Filters.

Text Books

- 1) Ramesh S. Gaonkar, "Microprocessor Architecture Programming and Applications with 8085", Fourth Edition, Penram International Publishing, 2000.
- 2) Muhammad Ali Mazidi, Janice Gillespie Mazidi, "The 8051 Microcontroller", Prentice Hall, 2000.
- 3) Douglas V. Hall, "Microprocessor and Interfacing, Programming and Hardware", Tata McGraw Hill, Second Edition, 1999.

Reference Books

- 1) Kenneth J. Ayala., "The 8051 Microcontroller Architecture Programming and Applications", Penram International Publishing (India). 1996.

- 2) Kenneth J. Ayala., "The 8086 Microprocessor, Programming and Interfacing the PC", Penram International Publishing, 1995.
- 3) Barry B. Brey, "The Intel Microprocessor 8086/8088, 80186, 80286, 80386 and 80486 Architecture Programming and Interfacing". Prentice Hall of India Pvt. Ltd., 1995.
- 4) Ray, A.K. and K.M. Bhurchandi, "Advanced Microprocessor and Peripherals", Tata McGraw, Hill, 2002.

COURSE : 85208 – INTERNET AND JAVA PROGRAMMING

Aim: To study about Internet, Core java. Java swing, JDBC, Java Beans and Servlets.

Unit-I : Internet

Internet – Connecting to Internet: Telephone – Cable – Satellite connection – Choosing an ISP – Introduction to Internet Services – E-mail Concepts – Sending and Receiving secure E-mail – Voice and Video Conferencing.

Unit-II : Core Java

Introduction – Operators – Data types – Variables – Arrays – Control Statements – Methods and Classes – Inheritance – package and interface – Exception handling – Multithread programming – I/O – Java Applet – String handling – Networking – Event Handling – Introduction to AWT – AWT controls – Layout managers – Menus – Images – Graphics.

Unit-III

Java Swing: Creating a swing Applet and Application – Programming using Panes – Pluggable Look and feel – Labels – Text fields – Buttons – Toggle Buttons – Checkboxes – Radio Buttons – View Ports – Scroll Panes – Scroll Bars – List – Combo Box – Progress bars – Menus and Toolbars – Layered Panes – Tabbed Panes – Split Panes – Layouts – Windows – Dialog Boxes – Inner frame.

JDBC: The connectivity Model – JDBC/ODBC Bridge – Java. SQL package – connectivity to remote database – navigating through multiple rows retrieved from a database.

Unit-IV : Java Beans

Application Builder tools – The bean developer kit (BDK) – JAR files – Introduction – Developing a simple bean – using bound properties – The java Beans API – Session Beans – Entity Beans – Introduction to Enterprise Java Beans (EJB) – Introduction to RMI (Remote Method Invocation): A simple client – server application using RMI.

Unit-V : Java Servlets

Servlet basic – Servlet API basic – Life cycle of a Servlet – Running Servlet – Debugging Servlet – Thread – safe Servlet – HTTP Redirects – Cookies – Introduction to Java server pages (JSP).

Text Books

- 1) Margaret Levine Young, "The Complete Reference Internet", Tata McGraw Hill, 1999.
- 2) Herbert Schidt, "The Complete Reference JAVA2", Tata McGraw Hill, 5th edition, 2002.
- 3) Balagurusamy, E., "Programming with A Perimer 3e Java", Tata McGraw Hill, 2007.
- 4) Dustin R. Callway, "Inside Servlets", Addison Wesley., 1999.
- 5) Mark Watka "Using Java 2 Enterprise Edition", Que, 1st edition, 2001.
- 6) Setven Holzner, "Java2 Black Book" – Coriolis Group Books, 2001.

COURSE : 85308 – NUMERICAL MATHEMATICS AND OPERATIONS RESEARCH

Aim: To enable the Students to gain a vast Knowledge in numerical methods and Resource Management Techniques.

Objectives

- To develop the Skills of the students in method of finite differences, interpolation, Solution of algebraic equations, Solution of Simultaneous equations, Numerical Solution of Ordinary and Partial differential equations.
- To gain a knowledge about Linear and Non – linear programming Problems, PERT and CPM.

Unit–I : Numerical Methods

Interpolation: Newton's Forward and Backward interpolation formulae – Strlings interpolation formula – Lagrange's interpolation formula for unequal intervals.

Numerical differentiation Using Newton's forward and backward formulae.

Numerical integration: Trapezoidal Rule – Simpson's one – third and three – eighth rules.

Unit–II

Solution of algebraic and Transcendental equations: Bisection method – Regula falsi method – Newton Raphson method – Groeffe's root Squaring method.

Solution of Simultaneous linear algebraic equations: Gauss elimination method – Gauss Seidel iterative method – Crout's method.

Unit–III

Numerical solution of Ordinary differential equations: Taylor's Series method – modified Euler's method – Runge – Kutta method of fourth order – Milne's Predictor – Corrector method.

Numerical solution of partial differential equations: Solution of Laplace equation – Liebmann's Process – solution of parabolic equation – Bender – Schmidt recurrence relation – Solution of Hyperbolic equation.

Unit-IV : Operation Research

Linear Programming problems – simplex method – Big – M method – Transportation and assignment problems.

Unit-V

Scheduling by PERT and CPM – Non linear programming Problems – Lagrangian method – Kuhn Tucker Conditions.

Text Books

- 1) Venkataraman, M., "Numerical Methods in Science and Engineering", The National Publishing Company, Madras, 2005.
- 2) Kanti Swarup, P.K. Gupta and Manmohan, "Operations Research", S. Chand & Company, New Delhi.

Reference Books

- 1) Kandasamy, P., K. Thilagavathy and K. Gunavathy, "Numerical Methods", S. Chand and Co. Ltd., 2005.
- 2) Taha, H.A "Operation Research", Prentice Hall of India, New Delhi.
- 3) Sharma, S.K., "Mathemeatical Models in Operation Research," Tata McGraw Hill Publishing Company Ltd., New Delhi.

COURSE : 85408 – UNIX AND WINDOWS PROGRAMMING

Aim: To learn about Windows SDK programming and Unix programming.

Unit-I

Unix operating System: Unix Philosophy – login & Password – Commands: date, who, user, list, cat, wc, exit – The file system – General purpose utilities – the Bourne shell – The vi editor.

Unit-II

Programming with the shell – Advanced features of the shell – Simple filters – advanced filters – Line editing with Examples – System administration.

Unit-III

Building a program – Types and names – Creating a main window – Event driven programming – Window messages – Displaying text Resources and projects – Menus.

Unit-IV

File common dialogue – Disk files – Text: Stock fonts – Text size – Text position – Scroll bars – Text input – Character strokes – Noncharecterstrokes.

Unit-V

The resource workshop – Invoking dialog boxes – Radio button and check boxes – List boxes and combo boxes – Displaying menu items – Menu accelerator – Icons and cursors, Graphics, Debugging.

Text Books

- 1) Sumithabha Das "UNIX System v.4 Concepts and Applications", Tata McGraw Hill Publications, Third Edition, 1994 [units 1 and 2].
- 2) Robert Lafort "Windows Programming Made Easy", The Waite Group, Galgoita Publications (P) Ltd., First Edition, 1993.[units 3 – 5].

Reference Books

- 1) Richard Stevens, W., "Advanced Programming in the Unix Environment" Addison Wesley Publications, First Reprint, 1998.
- 2) Charles Petzold, "Programming Windows", Microsoft Press, Fifth Edition, 1999.
- 3) Yashavant Kanetkar, "Unix Shell Programming", BPB publications, 1996.
- 4) Brian W. Kernighan, "The Unix Programming Environment", Fourteenth Indian Reprint, 1999.
- 5) Marc. J. Rozhkind, "Advanced Unix Programming", Prentice Hall Software Series, 1985.
- 6) Tare, R.S., "Unix Utilities", McGraw Hill, First Edition, 1988.

SIXTH SEMESTER**COURSE : 86108 – COMPUTER GRAPHICS AND MULTIMEDIA**

Aim: To understand the concept of computer graphics and its applications.

Unit– I : Introduction

Overview of Graphics System – Bresenham technique – Line Drawing and Circle Drawing Algorithms – DDA – 2D Clipping.

Unit–II : 2D Transformations

Two dimensional transformations – Interactive Input methods – Polygons – Splines – Bezier Curves – Window view port mapping transformation.

Unit–III : 3D Transformations

3D Concepts – Projections – Parallel Projection – Perspective Projection – Visible Surface Detection Methods – Visualization and polygon rendering – Color models – XYZ – RGB – YIQ – CMY – HSV Models – animation – Key Frame systems – General animation functions – morphing.

Unit–IV : Overview of Multimedia

Multimedia hardware & software – Components of multimedia – Text – Image – Graphics – Audio – Video – Animation – Authoring.

Unit–V : Multimedia Systems and Applications

Multimedia communication systems – Data base systems – Synchronization Issues – Presentation requirements – Applications – Video conferencing – Virtual reality – Interactive video – video on demand.

Text Books

- 1) Hearn, D. and M.P. Baker, "Computer Graphics – C Version", 2nd Edition, Pearson Education, 2004, (Unit-I, II and III)

- 2) Ralf Steinmetz, Klara Steinmetz, "Multimedia Computing, Communications and Applications", Pearson Education, 2004 (Unit-IV & V).

Reference Books

- 1) Siamon J. Gibbs and Dionysios C. Tsihrizis, "Multimedia Programming", Addison Wesley, 1995.
- 2) John Villamil, Casanova and Leony Fernanadez, Eliar, "Multimedia Graphics", PHI, 1998.
- 3) William M. Newman, Robert F. Sproull, "Principles of Interactive Computer Graphics", II Edition, McGraw Hill, 1989.
- 4) Steven Harrington, "Computer Graphics A Programming Approach", McGraw Hill, 1987.

COURSE : 86208 – WEB TECHNOLOGIES

Aim: To Study about Web environment, HTML, XML, Java Script and JSP.

Unit-I : Web Environment

WWW – HTTP – Web Server and its deployment – N - Tier Arch. – Services of Web Server – Mail server – News server – Proxy server – Multimedia server.

Unit-II : HTML

Formatting – tags – links – list – tables – frames – forms – comments in HTML.

Unit-III : XML

Introduction – displaying an XML Document – Data interchange with an XML Document – Document type definition – Parsers using XML – Client – side usage – Server – side Usage.

Unit-IV : Java Script

Introduction – Documents – forms – Statements – Functions – Objects in Java scripts – events and event handling – arrays – FORMS – Buttons – Checkboxes – Text fields and text areas.

Unit-V : JSP

JSP overview – JSP language basics – JSP translation and compilation directives – Standard java objects from JSP – JSP configuration and deployment – actions and tags of JSP; Java servlets – Arch – servlet interface – applications of servlets.

Text Books

- 1) Phil Hanna, "Instant Java Servlets", Tata McGraw Hill, 2000.
- 2) William B. Brogden, Bill Brogden – Chris Minnick, "Java Developer's Guide to E-Commerce with XML and JSP", Sybex Book, 2001.
- 3) Stephen Walther and Others, "Active Server Pages Unleashed", Wrox Press Ltd., 1998.
- 4) Linecker, "COM+ & XML: ASP.N on the Edge" John Bailey and Sons Unlimited edition 2001
- 5) Burdman, "Collaborative Web Development", Addison Wesley, 1999.

- 6) Sharma & Sharma, "Developing E-Commerce Sites", Addison Wesley, 2000.
- 7) Ivan Bayross, "Web Technologies Part II", BPB Publications, McGraw Hill, 2004.
- 8) Shishir Gundavarma, "CGI Programming on the World Wide Web", O'Reilly & Associate, 1996.
- 9) DON Box, "Essential COM", Addison Wesley, 1998.
- 10) Greg Buczek, "ASP Developer's Guide", Tata McGraw Hill, 2000.

COURSE : 86308 – VISUAL PROGRAMMING

Aim: To understand Windows, Visual Basic and Visual C++ programming.

Unit-I

Windows Programming: Conceptual Comparison of Traditional Programming Paradigms – Overview of Windows Programming – Event driven programming – Data Types – Windows Messages – An introduction to GDI – Dynamic Linking Libraries.

Unit-II

Visual Basic Programming: Introduction – VB environment – Customizing a Form – Data Types – Variables – Scope of Variables – Arrays – Statements in VB – Functions and Procedures – Properties – Methods and Events – Modules.

Unit-III

Toolbox Controls – Control arrays – Flex Grid Control – Dialog Boxes – Common Dialog Control – Menus – MDI Forms – Accessing database with data control – Communicating with other Windows applications – VB and the Internet.

Unit-IV

Visual C++ Programming: VC++ Components – Microsoft foundation Classes – Event Handling – Document View architecture – Menus – Dialog Boxes – Using VBX Controls – Using ActiveX Controls – Reading and Writing documents – SDI and MDI environments.

Unit-V

Splitter windows and Multiple views – MFC File Handling – Exception Handling – Debugging – Object Linking and Embedding – DLL – Database Management with ODBC.

Text Books

- 1) Charles Petzold, "Windows Programming", Microsoft Press, 1999.
- 2) Garry Cornell, "Visual Basic 6 from the Ground Up", TMH, 1999.
- 3) Steven Holzner, "Visual C++ Programming", Second Edition, PHI Publishers, 1997.

Reference Books

- 1) Robert Lafore, "Windows Programming Made Easy", Galgotia Publishers 1997.
- 2) David Krunglinski, J., "Inside Visual C++", Microsoft Press, 1993.

COURSE : 86408 – C# AND .NET PROGRAMMING

Aim: To study about the .NET Framework, C# Basics, Libraries and advanced features of C#.

Unit-I : .NET Framework

Introduction – Common Language Runtime – Common type system – Common language specification – The base class library – the NET class Library intermediate language – Just – in – time compilation – garbage collection – application installation and assemblies – web services – unified classes.

Unit-II : C# Basics

Introduction – Data types – Identifiers – Variable & constants – C# statements – Object Oriented Concepts – Object and classes – Arrays and Strings – System collections – Delegates and Events – Indexes Attributes – Versioning.

Unit-III : C# Using Libraries

Namespace – System – Input Output – Multi – Threading – Networking and Sockets – Data Handling – Windows forms – C# in web application – Error Handling.

Unit-IV : Advanced Features Using C#

Web Services – Windows services – messaging – Reflection – COM and C# – Localization.

Unit-V : Advanced Features Using C#

Distributed application in C# – XML and C# – Unsafe Mode – Graphical Device Interface with C# – Case Study (Messenger Application).

Text Book

- 1) Shildt, "C#: The Complete Reference", Tata McGraw Hill, 2002.

Reference Books

- 1) Shibi Panikkar and Kumar Sanjeev, "Magic of C# with NET Frame Work", Firewall Media, . 2005.
- 2) Jeffrey Richter, "Applied Microsoft Net Framework Programming", Microsoft Press, 2002.
- 3) Fergal Grimes, "Microsoft Net for Programmers", Manning Publication, 2002.
- 4) Tony Baer, Jan D. Narkiewicz, Kent Tegels, Chandu Thota, Neil Whitlow, "Understanding the Net Framework", Wrox Press, 2002.
- 5) Balagurusamy, "Programming with C#", Tata McGraw Hill, 2002.

SEVENTH SEMESTER**COURSE : 87108 – SYSTEM SOFTWARE AND COMPILER DESIGN**

Aim: This course aims to give some basic idea about system software such as assembler, linker, loader, editor and macros and design of compiler.

Unit-I : Introduction to Systems Programming

Introduction to Assembler: databases used in assembler design – design of assembler – single and two pass. Introduction to Macros: various types of macros – design of macro processor – single and two Pass. Introduction to Loaders: functions of loader – types of loaders – databases used in loaders – design of loaders – DLL. Introduction to software tools: text editors – interpreters – program generators – debug monitors.

Unit-II : Introduction to Compilers

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.

Unit-III : Syntax Analysis

Role of the parser – Context free grammars – Top – down parsing – Bottom – up parsing – operator precedence parsing – LR parsers (SLR – Canonical LR – LALR) – parser generators.

Unit-IV : 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 nonlocal names – parameter passing symbol tables.

Unit-V: Intermediate Code Generation

Intermediate – languages declaration – assignment statement – boolean expression – procedure calls – code optimization – introduction to 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.

Text Books

- 1) Dhamdhere, D.M., "System Programming and Operating Systems", 2nd Ed., Tata McGraw Hill, 2000.
- 2) Alfred V. Aho, Ravi Sethi & Jeffrey. D. Ullman, "Compilers Principles, Techniques & Tools", Addison – Wesley, 1988.

Reference Books

- 1) Aho, A.V. & J.D. Ullman, "Principles of Compiler Design", Narosa Publishing House, 1990.
- 2) Muchnick, S.S., "Advanced Compiler Design Implementation", Morgan Kaufman Publishers, 1997.

- 3) Andrew W. Appel, "Modern Compiler Implementation in C", "Cambridge Uty. Press.
- 4) Alan I. Holub, "Compiler Design in C", PHI, 1993.
- 5) Kenneth C. Louden, "Compiler Construction, Principle and Practice", PWS Publishing Company, 1997.
- 6) Leland L. Beck, "System Software An Introduction to System Programming", Addison Wesley, 1990.
- 7) Donovan, "System Programming", McGraw Hill, 1972.

COURSE : 87208 – DATA COMMUNICATION AND COMPUTER NETWORKS

Aim: To Study the concepts and principles involved in data communication, transmission methods and networking.

Unit-I

A communications model – Data Communications – Data Communications Networking – computer communication architecture – standards. Data Transmission – Concepts and terminology – Analog and Digital Transmission – Transmission Impairments – Transmission media.

Unit-II

Data encoding – Digital data Digital signals – Digital data Analog signals – Analog signals Analog data – Analog data Analog signals – Data Communications Interface: Asynchronous and synchronous Transmission – Line configuration – Interfacing.

Unit-III

Data link control: Flow Controls – Error Detection – Error Control – High Level Data Link Control (HDLC) – Multiplexing – Frequency Division multiplexing – Synchronous time – Division multiplexing – Statistical time division multiplexing.

Unit-IV

Wide Area Networks: ISO – OSI layered architecture – function of the layers – Data link protocols – HDLC – LAPB – LAPD – Inter networking devices – Repeaters – bridges – routers – routing algorithms – Distance vector routing – link routing – X.25 protocol – congestion control.

Unit-V

Local Area Networks: LAN topology – Ethernet – Token bus – Token ring – FDDI – Wireless LAN – ATM LAN – IEEE 802 Medium access control layer standard – Random access protocols – ALOHA – Slotted ALOHA.

Text Books

- 1) William Stallings, "Data and Computer Communications", Fifth Edition, Prentice Hall of India, 1997.
- 2) Forouzan, "Introduction to Data Communication & Networking", McGraw Hill, 1998.

- 3) Achyut S. Godbole, Atul Kahate, "Computer Communication Network", Tata McGraw Hill, New Delhi, 2004.

Reference Books

- 1) Ulysess D. "Black Data Communication and Distributed Networks", Third Edition, Prentice Hall of India, 1977.
- 2) Prakash C. Gupta, "Data Communications", Prentice Hall of India, 1996.
- 3) Andrew. S. Tanenbaum, "Computer Networks", PHI, Fourth Edition, 2002.
- 4) Stallings, W., "Data and Computer Communication", Second Edition, New York, McMillian, 1988.

COURSE : 87308 – OBJECT ORIENTED ANALYSIS AND DESIGN

Aim: To Study the OOPs concepts that are used in the object oriented system design (OOSD).

Unit-I : Complexity

Introduction – Object Basics – OOA – OOD – OO Modelling – Object Oriented Systems development life cycle – The Inherent Complexity of Software – The Structure of Complex Systems – On Designing Complex Systems.

Unit-II

Classes and Objects: The Nature of an Object – Relationships among Objects – The Nature of a Class – Relationships among Classes – The Interplay of classes and objects – On building quality classes and objects.

Classification: The Importance of Proper Classification – Identifying Classes and Objects – Key Abstractions and Mechanisms.

Unit-III

Notation: Elements of the Notation – Class Diagrams – State Transition Diagrams – Object Diagrams – Interaction Diagrams – Module Diagrams – Process Diagrams – Activity Diagram – Component Diagram – Deployment Diagram – Use Case Diagram – Applying the Notation.

Process: First Principle – The Micro Development Process – The Macro Development Process.

Unit-IV : Pragmatics

Management and Planning – Staffing – Release Management – Reuse – Quality Assurance and Metrics – Documentation – Tools – Special Topics – The Benefits and Risks of Object Oriented Development.

Unit-V : Analysis – Design – Evolution And Maintenance of

- 1) Data Acquisition: Weather Monitoring Station.
- 2) Frameworks: Foundation Class library and
- 3) Client/Server Computing: Inventory Tracking.

Text Book

- 1) Grady Booch, "Object Oriented Analysis and Design with Applications", The Benjamin/Cummings Publishing Company Inc., Second Edition, 1994.

Reference Books

- 1) Taylor, D., "Object Oriented Information Systems", John Wiley and Sons, 1992.
- 2) Pinson, L. and R. Wiener, "Application of Object Oriented Programming", Addison Wesley Publishing Company, 1990.
- 3) Ali Bahrami, "Object Oriented Systems Development", Irwin McGraw Hill, International Edition, 1999.

COURSE : 87408 – ETHICS IN ENGINEERING**Unit-I**

Introduction to Engineering Ethics – Senses of "Engineering Ethics" – Variety of Moral Issues – Three Types of Inquiry – Engineering Ethics and Philosophy.

Need for Engineering Ethics – Moral Dilemmas – Moral Autonomy – Kohlber's Theory – Gilligan's Theory – Consensus and Controversy.

Professions and Professionalism – Professions – Membership Criteria – Persuasive Definitions – Multiple Motives.

Model Reasoning and Ethical Theories – Theories about Virtues – Professional Responsibility – Integrity – Self – Respect – Senses of "responsibility".

Theories about Right Action – Utilitarianism – Duty Ethics – Rights Ethics – Testing Ethical Theories – Self – Interest, Customs, and Religion – Self – Interest and Ethical Egosim – customs and Ethical Relativism – Religion and Divine Command Ethics.

Uses of Ethical theories – Resolving Moral Dilemmas – Justifying Moral Obligations – Relating Professional and Ordinary Morality.

Unit-II

Engineering as Social Experimentation – Engineering as Experimentation – Similarities to Standard Experiments – Learning from the past – Contracts with Standard Experiments – Knowledge Gained.

Engineers as Responsible Experimenters – Conscientiousness – Relevant Information – Moral Autonomy – Accountability.

The Challenger Case – Safety issues.

Codes of Ethics – Roles of Codes – Codes and the Experimental Nature of Engineering – Limitations on codes.

A balanced outlook on law – A Regulated Society – The trend toward Greater Detail – Industrial Standards – Problems with the Law in Engineering – The Proper Role of Law in Engineering.

Safety and Risk – The concept of Safety – Risks – Acceptability of Risk – Lessons for the Engineer.

Assessment of Safety and Risk – Knowledge of Risk – Uncertainties in Design – Testing for Safety – When Testing is inappropriate.

Risk – Benefit analyses and reducing risk – Personal risk – Public risk and public acceptance – accounting publicly for benefits and risks – incentives to reduce risk – some examples of improved safety – liability.

Three Mile Island Chernobyl and safe exits – Three Mile Island – Prior warnings – Chernobyl – Three Mile Island, Chernobyl, and a Forerunner – Safe Exit.

Unit-III

Responsibilities to Employers – Collegiality and Loyalty – Collegiality – Two Senses of Loyalty – Obligations of Loyalty – Misguided Loyalty – Professionalism and Loyalty.

Respect for Authority – Institutional Authority – Morally Justified Authority – Accepting Authority – Paramount Obligations.

Collective Bargaining – Historical Note – Faithful Agent Argument – Public Service Argument – Conclusion.

Confidentiality – Definition – Justification and Limits – Changing Jobs – Management Policies.

Conflicts of Interest – Impairment of Judgment and Service – Gifts and Bribes – Interests in Other Companies – Insider Information – Moral Status.

Occupational Crime – Industrial Espionage – Price Fixing – Endangering Lives.

Unit-IV

Issues – Professional Rights – Basic Right of Professional Conscience – Institutional Recognition of Rights – Specific Rights: Recognition and Conscientious Refusal – Foundation of Professional Rights.

Whistle – Blowing – Definition – Three Cases – Moral Guidelines – Protecting Whistle – Blowers – Commonsense Procedures – The right to Whistle – Blow – Beyond Whistle – Blowing.

The Bart Case – Background – Responsibility and Experimentation – Controversy – Aftermath – Comments.

Employee Rights – Employee Bill of Rights – Choice of Outside Activities – privacy – Drug Testing – Due process.

Discrimination – Examples – Definitions – Antidiscrimination Laws – Moral Justification of Nondiscrimination Laws – Preferential Treatment – Sexual Harassment.

Multinational Corporations – Three Senses of “ Relative” Values – “When in Rome” – International Rights – Promoting Morally Just Measures – Technology Transfer and Appropriate Technology – Bhopal.

Environmental Ethics – Case Studies – The Commons and a Livable Environment – Guilty until Proven Innocent? – Internalizing Costs of Environmental Degradation – Technology Assessment – Philosophical View of Nature.

Computer Ethics – Power Relationships – Property – Privacy – Professional Issues.

Weapons Development – The Weapons Seesaw – The Engineer's Involvement in Weapons Work – Defense Industry Problems – Decommissioning Weapons and Lasting Effects.

Unit–V

Engineers as Managers, Consultants and Leaders – Engineers as Managers – Managers as Professional – Promoting an Ethical Climate – Managing Conflict.

Consulting Engineers – Advertising – Competitive Bidding – Contingency Fees – Safety and Client needs Provision for resolution of Disputes.

Engineers as Expert witness and Advisers – Experts Witnesses in the courts – Abuses – Advisers in Planning and Policy – making – Normative Models of Advisers.

Moral Leadership – Morally Creative Leaders – Participation in Professional Societies Leadership in Communities – Ideals of Voluntary Service.

Concluding Remarks. Integrity and Ingenuity – Citicorp Skyscraper.

Text Book

- 1) Mike W. Martin and Roland Schinzinger, "Ethics in Engineering", Third Edition Tata McGraw Hill Publishing Company Ltd., New Delhi, 2003.

EIGHTH SEMESTER

COURSE : 88108 – AI AND FUZZY SYSTEMS

Aim: To understand the essential topics of AI and its subfields.

Unit–I : Introduction

Introduction – AI. AI Problems and techniques – Problem spaces and searches – Search algorithms: Blind search – heuristic search – algorithmic search. State space representation of problems – Game playing: Two player games.

Unit–II : Knowledge Representation Issues

Procedural Knowledge – Declarative Knowledge – Logic: Using FOL – Unification – Resolution. Semantic nets – Frames: Inheritance – Scripts. Representing knowledge using rules – Rule based deduction systems.

Unit–III : Reasoning

Uncertainty: Introduction to uncertain knowledge – review of probability theory – Bayes's Theorem – Non monotonic reasoning.

Planning and Learning: Planning – Introduction – Partial order planning algorithm – Learning from examples – Discovery as learning – Learning by analogy – Explanation based learning.

Unit–IV : Fuzzy Sets

Definitions – Basic set – theoretic operations for fuzzy sets. Fuzzy measures and measures of fuzziness – fuzzy relations on sets and fuzzy sets – fuzzy functions on fuzzy sets – Fuzzy logic.

Unit-V : Applications

Principles of Natural Language Processing – Expert systems – Knowledge acquisition concepts – Introduction to Agents.

Text Books

- 1) Elaine Rich and Kevin Knight, "Artificial Intelligence", Tata McGraw Hill Publishing Company Limited, New Delhi, 1995.
- 2) Zimmerman, H.J., "Fuzzy Set Theory and its Applications", Allied Publishers Ltd., Second Edition, 1996.

Reference Books

- 1) Nils J. Nilsson, "Principles of Artificial Intelligence", Narosa Publishing House, 2000.
- 2) Stuart Russel and Peter Norvig, "Artificial Intelligence – A Modern Approach", Prentice Hall, 1995.
- 3) Patrick Henry Winston, "Artificial Intelligence", Addison Wesley, Third Edition, 2000.

COURSE : 88208 – SECURITY IN COMPUTING

Aim: To study the various issues involved in security in computing like security threats, program Security, operating system security, database and network security and ethical issues and security policies.

Unit-I : Introduction

Security problem in computing – Elementary Cryptography – DES – AES – Public Key Encryption – Uses of Encryption.

Unit-II : Program Security

Security Programs – Non – malicious Program Errors – Virus and other Malicious Code – Targeted Malicious Code – Control against program Threats.

Unit-III : Security in Operating Systems

Protected Objects and Methods of Protection – Memory and Address Protection – Control of Access generated Objects – File Protection Mechanisms – User Authentication – Trusted Operating Systems – Models of Security – Trusted.

Operating Systems Design – Assurance in Trusted Operating Systems.

Unit-IV : Database and Network Security

Database Security Requirements – reliability and integrity – Sensitive Data – Inference – Multilevel Databases and Multilevel Security – Threats in Networks – Network Security Controls – Firewalls – Intrusion Detection Systems – Secure E-Mail.

Unit-V : Administering Security and Ethical Issues

Security Planning – Risk Analysis – Organizational Security Policies – Physical Security – Protecting Programs and Data – Information and the Law – Software Failures – Computer Crime – Privacy – Ethical Issues.

Text Book

- 1) Charles B. Pfleeger, Shari Lawrence Pfleeger, "Security in Computing", Third Edition, Pearson Education, 2003.

Reference Books

- 1) Matt Bishop, "Computer Security – Art and Science", First Edition, Pearson Education, 2003.
- 2) William Stallings, "Cryptography and Network Security – Principles and Practices", Third Edition, Prentice Hall of India, 2003.
- 3) Atul Kahate, "Cryptography and Network Security", Tata McGraw Hill, 2003.

COURSE : 88308 – PRINCIPLES OF MANAGEMENT

Aim: To understand the functions of management giving an intensified focus and marketing management.

Unit-I : Forms of Business Organizations

Sole proprietorship, Company – Public and private sector enterprises – Principles of management – Evolution of management – Functions of a manager.

Unit-II : Functions of Management

Planning – Nature and purpose – Types of plans – Objectives, policies, procedures, rules, strategies, programmes, projects.

Unit-III : Staffing

Selection – Recruitment process – Decision making process – Types of decisions – Directing – Leadership – Motivation – Communication – Controlling – process, techniques – Budgetary and Non – budgetary.

Unit-IV : Financial Management

Short term and long term sources of funds – Financing decision – Investment decision – Introduction to financial statements – Production management – Planning and scheduling, purchasing, inventory control.

Unit-V : Marketing Management

Introduction to marketing mix – product, pricing, promotion and place – Personnel management – Performance appraisal, conflict – Identification and resolution – Training and development – Introduction to Total Quality Management, quality circles.

Text Book

- 1) Koontz, "Global Perspective in Management, McGraw Hill, 1995.

Reference Books

- 1) Nauhria, R.N. and Rajnish Prakash, "Management and systems", Wheeler Publishing, New Delhi, 1995.
- 2) Saxena, "Marketing Management", Tata McGraw Hill, 1998.
- 3) Tripathi, "Principles of Management", Tata McGraw Hill, 1992.

COURSE : 88708 – PROJECT WORK AND VIVA–VOCE

The topic for project work will be assigned by the Head of the Department of Computer Science and Engineering.

The project work should be taken during the VII Semester and the final report submitted by the students on a date fixed by the Head of the Department towards the end of the VIII Semester. There will be viva–voce examination on project.

ELECTIVES**COURSE : 8XX08A – UNIX NETWORKING**

Aim: To obtain knowledge on UNIX Networking system, Protocols, Sockets and Security.

Unit–I

Introduction: History – layering – OSI Model – Processes – A Simplified Model – Client Server Model.

The Unix Model: Introduction – Basic Definition – Input and Output – Signals – Process Control – Daemon Processes.

Unit–II : Interprocess Communication

Introduction – file and Record Locking – A simple Client – Server Example – Pipes – FIFOs – Streams and Messages – Name Spaces – System V IPC – queues – Semaphores – shared Memory – Sockets and TLI.

Unit–III : Communication Protocols

Introduction – TCP/IP – The internet protocols – XNS – Xerox Network System – systems Network Architecture – NetBIOS – OSI Protocols – UUCP – Unix – to – Unix Copy Protocol comparisons.

Unit–IV : Berkeley Sockets

Introduction – Overview – Unix Domain Protocols – Socket Addresses – elementary Socket System Calls – Advanced Socket System Calls – Reserved Ports Stream Pipes – passing File Descriptors – Socket Options – Asynchronous I/O – Input/Output Multiplexing – Out – of – Band Data – Sockets and Signals – Socket Implementation.

System V Transport Layer Interface.

Introduction – Overview – Transport Endpoint Addresses – Elementary TLI Functions – Advanced TLI Functions – Streams – TLI Implementation – Stream Pipes – Passing file descriptors – Input/Output multiplexing – Asynchronous I/O – Out-of-Band data.

Unit–V : Security

Introduction – 4.3 BSD Routines – Berkeley – Time and Date Routines: Introduction – Internet Time and Data Client – Networking Time Synchronization. Ping Routines: Introduction – Internet Ping Client – XNS Echo Client.

Text Book

- 1) Richard Stevens, W., "Unix Network Programming", Prentice Hall of India, New Delhi, 1994.

Reference Books

- 1) Henry McGilton, "Unix System Networking", Trilithon Pr, 1990.
- 2) Richard Stevens, W., "Advanced Networking in UNIX", Addison - Wesley Professional, 1992.

COURSE : 8XX08B – EMBEDDED SYSTEMS

Aim: To learn knowledge of embedded systems software and hardware platform and development. To aware the student about the real time operating system concepts and about networks for embedded system.

Unit-I : Introduction

Introduction to embedded system – Applications of embedded system – Characteristics of embedded computing applications – Challenges in embedded computing system design – Functional requirement – Non functional requirement – Choice of Processor – Embedded product design cycle.

Unit-II : Software Development

Linker – Locator – The Compilation process – Native and cross compilers – Downloading software in to target system – Emulation techniques – Debugging techniques – Concepts of programming in Assembly level language Vs. Higher level language.

Unit-III : Embedded Hardware

CPU Bus: Bus protocol – DMA – system bus configurations – Memory Devices: Memory Device organization – Random access memories – Read only memories – I/O Devices: Timers and counters – A/D and D/A converters – keyboards – LED's – PC as an embedded computing platform.

Unit-IV : Real Time Operating System

Real time without RTOS – choosing the hardware and software – Task states and data – Multitasking operating systems – context switches – kernels – Task swapping methods – Scheduler algorithms – Memory management and Translation.

Unit-V : Networks for Embedded System

I²C Bus – CAN bus – Ethernet – Embedded system design methodologies – Design Flows – Overview of embedded micro controllers: 8051 micro controller – Architecture – Software developing – compiling and downloading.

Case Study: Hardware and Software design of Telephone Answering Machine.

Text Books

- 1) Wayne Wolf, "Computers as Components, Principles of Embedded Computing System Design", Morgan Kaufmann Publishers, 2004.
- 2) Steve Heath, "Embedded Systems Design"(2ED), Newnes/An imprint of Elsevier, 2005.

Reference Books

- 1) David E. Simon, "An Embedded Software Primer", Pearson Education Asia, Addison Wesley, 2001.
- 2) Rajkamal, "Embedded Systems, Architecture, Programming and Design", Tata McGraw Hill, 2003.

COURSE : 8XX08C – RDBMS (Oracle and DB2)

Aim: To study the basic concepts of database systems, relational database and queries, object modeling and database design.

Unit-I : Database and Database Management Systems

Introduction – History of Database Management Systems – Characteristics of DBMS – Meaning and Definition of Database – objectives of database – advantages of database and disadvantages of traditional file environment systems – meaning and definition of Database Management Systems [DBMS] – Designing Databases – Hierarchical Data model – Network Data model – and Relational Data models – Database trends: Distributed Databases – data warehousing – and data mining – Object – oriented hypermedia Databases – linking databases to the web.

Unit-II : Relational Database [RDBMS]

The Relational Database Model – Techniques – Components of Relational Model – Definition of Relational Terms – Features of RDBMS – CODD 12 rules for a fully RDBMS. Relational implementation Primary and Foreign Keys – Relationships in the relational model Introduction to ER Model – one – to – one, one – to – many, many to many relationship – Examples of Data definition language.

Unit-III

Queries – Maintaining Integrity – Defining Data Integrity – Integrity Rules – Relational Integrity Rules – Referential Integrity – Entity Integrity – Domain Integrity – Entity Integrity – User – defined Integrity – Integrity Constraints – Domain Constraints – Normalisation – Benefits of normalization – Functional Dependency and Determinants – Normalisation Theory – Review of Normal Forms – Structured Language Query [SQL] – Characteristics of SQL. Types of SQL [DCL – DDI – DML] – Basic queries in SQL Single table – Multi table – Retrievals – Nested queries – Deletion – Insertion – and Update in SQL.

Unit-IV : Object Modeling and Database Design

Introduction – Types of Data Models (Conceptual – Logical and Physical Data modeling) – Model Development – Attributes of Modeling – ER model – the object – oriented model – record based models – physical data models – Stages of Data modeling – Modeling Three Schema Architecture – Entity Relationship [ER] model – Entities Attributes and Relation [EAR] models – Entity Relationship Diagrams – Other Styles of ER Diagram – The Data Dictionary – Transforming from Logical to Physical – Storage Structure types – Sorting and Indexes – Pointer chains – Advantages & Disadvantages of Pointer Chains – Sorting Data in a file – Necessity of files – Working parts of a DBMS – File Formats – Fixed Format Files – File

Processing Activities – File organization & Methods – Clustered Indexes – Non-Clustered Indexes – Covering Indexes – Index Selection.

Unit–V : Database Design

Selecting your data – normalization – identifying domains – naming standards – denormalisation and the rules of reconstruction – physical design of databases – rule of reconstruction – over normalization – Reverse Engineering of Databases.

Text Book

- 1) Silberschatz Korth Sudarshan, "Data Base System Concepts", 4th Edition Published by Tata McGraw Hill Publishing Company.

Reference Books

- 1) Alexis Leon & C.K. Thomas DB2 (IBM Database 2), "The Complete Book for Application Programmers", Comdex Computer Publication a division of Pustak Mahal.
- 2) Er. V.K. Jain, "Database Management Systems", Dreamtech Press, New Delhi.
- 3) Prof. S. Nandagopalan, "Database Management Systems, A Practical Approach", Sapna Book House, Bangalore.
- 4) James Martin, "Principles of Database Management", Prentice Hall of India New Delhi.

COURSE : 8XX08D – J2EE PROGRAMMING

Aim: To provide an exposure to J2EE.

Unit–I

J2EE Overview – The Beginning and Advantages of Java. – J2EE Multi – Tier Architecture – Distributives Systems – Real Time Transmission – Software Objects – Web Services. J2EE Design Patterns and Frameworks. The Pattern Concept – Pattern Catalog – Handler – Forward Pattern – Translator Pattern – Distributor Pattern – Broadcaster Pattern.

Unit–II

J2EE Database Concepts. Data – Database – Database Schema – JDBC Objects. – The Concept of JDBC – JDBC Driver Types – JDBC Packages – Overview of JDBC Process. Database Connection – The Connection – Time Out. JDBC and Embedded SQL – Tables – Indexing – Inserting Data into Tables.

Unit–III

J2EE Foundation: Java Servlets – A Simple Java Servlet. – Java Server Pages (JSP) – Installation. JSP Tags – Variables and Objects – Methods – Control Statements – Loops. Enterprise Java Beans – The EJB Container – EJB Classes – EJB Interfaces.

Unit–IV

J2EE Inter Connectivity: Java Mail API – Protocols – Exceptions – Email Messages: Send, Retrieving – Receiving Attachments – Java Message Service – JMS

Fundamentals – Flexibility – Components of a JMS Program – J2EE Security – Concepts Security Managements.

Unit–V

SOAP Basics – Java API for XML Messaging – Electronic Data Interchange – Electronic Business XML. The Java API for XML Registries (JAXR) – JAXR Client – The Process – Making a Query.

Reference Books

- 1) Herbert Schildt, "The Complete Reference Java 2", Fifth Edition, TMH, 2002.
- 2) Jim Keogh, "The Complete Reference J2EE", Tata McGraw Hill Publishing, Company Limited, 2002.

COURSE : 8XX08E – NEURAL NETWORKS AND FUZZY SYSTEMS

Aim: To learn basic concepts of neuron, different types of neural networks, application of neural networks, fuzzy logic operations and its applications.

Unit–I

Introduction – neural networks characteristics – terminologies – model of a neuron. Types of learning: Supervised – Unsupervised learning. Perceptron: Architecture of a Perceptron – Perceptron convergence algorithm. Linearly separable and Inseparable problems – Generalized delta rule. Backpropagation (BP) Training Algorithm – Learning Rate – Training Considerations – Characteristics of BP Learning Algorithm – Limitations of BP Learning – Accelerated convergence of BP through learning – rate adaptation.

Unit–II

Unsupervised Learning: Hebbian Learning – Competitive Learning – Boltzmann Learning. Supervised Learning: Error – Correction learning – Reinforcement Learning. Recurrent Network: Basic Concepts of Hopfield Network – Operation Features of Hopfield Network – Error Performance of Hopfield Network – Storage Capacity of Hopfield Network.

Unit–III

Radial basis function neural networks (RBFNN) – Basic learning laws in Radial basis function nets – Counter propagation networks – Adaptive resonance theory networks – Autoassociative neural networks (AANN) – Applications of neural networks such as pattern recognition – Optimization – Associative memories – speech and decision – making.

Unit–IV

Fuzzy Logic – Basic concepts of Fuzzy Logic – Fuzzy set versus Crisp Set – Linguistic variables – membership functions – operations of fuzzy sets – Fuzzy If – Then rules – fuzzy relations – fuzzy conditional statements – fuzzy rules – fuzzy learning algorithms – applications of fuzzy logic.

Unit-V

Neuro – fuzzy and fuzzy – neural control systems – adaptive fuzzy systems – optimizing the membership functions and the rule base of fuzzy logic controllers using neural networks – fuzzy transfer functions in neural networks.

Text Books

- 1) Haykin, S., "Neural Networks: A Comprehensive Foundation", 2nd Ed, Prentice Hall, 1999.
- 2) Timothy J. Ross, "Fuzzy Logic Engineering Applications", McGraw Hill, New York, 1997.

Reference Books

- 1) Wasserman, P.D., "Neural Computing Theory and Practice," Van Nostrand Reinhold, New York, 1997.
- 2) Riza C. Berkin and Trubatch, "Fuzzy systems Design Principles", Building a Fuzzy IF, THEN Rule Bases, IEEE Press ISBN 0 – 7803 – 1151 – 5.
- 3) Kosko, B, "Neural Networks and Fuzzy Systems: A Dynamical Approach to Machine Intelligence", Prentice Hall, New Delhi, 1991.

COURSE : 8XX08F – SPEECH TECHNOLOGY

Aim: To learn the basic concepts of speech production, analysis, coding, recognition and synthesis.

Unit-I : Speech Production

Speech production mechanism – articulatory phonetics – acoustic phonetics – acoustic theory of speech production – vocal tract models for speech analysis and synthesis – coarticulation – prosody. Speech perception: Perception mechanism – sound perception.

Unit-II : Speech Analysis

Short-time speech analysis – time – domain parameters – frequency – domain parameters – linear prediction analysis – cepstral analysis – other spectral estimation methods – pitch extraction.

Unit-III : Speech Coding

Introduction – quantization – speech quality measure – time – domain waveform coding – linear predictive coding – spectral coders – vocoders – vector quantization coders. Speech Enhancement: Introduction – speech enhancement techniques – spectral subtraction – filtering and adaptive noise cancellation.

Unit-IV : Speech Recognition

Introduction – dynamic time warping – hidden Markov model – language models – artificial neural network – expert – system approach to automatic speech recognition.

Unit-V : Speech Synthesis

Introduction – principles of speech synthesis – synthesizer methods. Speaker Recognition: Introduction – recognition techniques.

Text Book

- 1) D. O'Shaughnessy, "Speech Communications, Human and Machine", Second Edition, University Press (India), 2001.

Reference Books

- 1) Rabiner, L.R. and R.W. Schafer, "Digital Processing of Speech Signals", Pearson education, 2005.
- 2) Rabiner, L., and B.H. Juang, "Fundamentals of Speech Recognition", Pearson Education, 2003.

COURSE : 8XX08G – IMAGE PROCESSING

Aim: To learn the basic concept of image processing and its applications.

Unit-I

Digital Image Processing Systems: Introduction – Structure of human eye – Image formation in the human eye – Brightness adaptation and discrimination – Image sensing and acquisition – Storage – Processing – Communication – Display. Image sampling and quantization – Basic relationships between pixels.

Unit-II

Image Enhancement in the Spatial Domain: Gray level transformations – Histogram processing – Arithmetic and logic operations – Spatial filtering: Introduction – Smoothing and sharpening filters.

Image Enhancement in the Frequency Domain: Frequency domain filters: Smoothing and Sharpening filters – Homomorphic filtering.

Unit-III

Wavelets and Multiresolution Processing: Image pyramids – Subband coding – Haar transform – Series expansion – Scaling functions – Wavelet functions – Discrete wavelet transforms in one dimensions – Fast wavelet transform – Wavelet transforms in two dimensions.

Unit-IV

Image Data Compression: Fundamentals – Redundancies: Coding – Interpixel – Psycho – visual – Fidelity criteria – Image compression models – Error free compression – Lossy compression – Image compression standards: Binary image and Continuous tone still image compression standards – Video compression standards.

Unit-V

Morphological Image Processing: Introduction – Dilation – Erosion – Opening – Closing – Hit – or – Miss transformation – Morphological algorithm operations on binary images – Morphological algorithm operations on gray – scale images.

Image Segmentation: Detection of discontinuities – Edge linking and Boundary detection – Thresholding – Region based segmentation.

Image Representation and Description: Representation schemes – Boundary descriptors – Regional descriptors.

Text Books

- 1) Gonzalez, R.C. and R.E. Woods, "Digital Image Processing", Second Edition, Pearson Education, 2002.
- 2) Anil K. Jain, "Fundamentals of Image Processing", PHI, New Delhi, 2001.

Reference Book

- 1) William Pratt, "Digital Image Processing", John Wiley.

COURSE : 8XX08H – DATA MINING AND DATA WAREHOUSING

Aim: To learn about how to retrieve information using the concept of data mining in different fields like marketing, ethics and database. This course also aim in learning about data warehouse architecture, operations, security, service, testing of data warehouses etc.

Unit-I : Data Mining

Introduction – Information and production factor – Data mining vs. Query tools – Data and machine learning – Machine learning and statistics – Data Mining in marketing – Data Mining and ethics – Nuggets and data mining – Database Mining – A performance and database Perspective – Self learning computer systems – Concept learning – Data mining and the Data Warehousing.

Unit-II : Knowledge Discovery Process

Knowledge discovery process – Data selection – Cleaning – Enrichment – Coding – Preliminary analysis of the data set using traditional query tools – Visualization techniques – Knowledge representation – Decision trees – Classification rules – Association rules – Rules with exceptions – rules involving relations – Trees for numeric –Instance – based representation – Neural Networks – Genetic Algorithms – Clustering – KDD (Knowledge Discovery in Databases) Environment.

Unit-III : Data Warehouse – Architecture

Data warehouse Architecture – System Process – Process Architecture – Design – Database Schema – Partitioning Strategy – Aggregations – Data Marting – Meta Data – System and Data Warehouse Process Managers.

Unit-IV : Hardware and Operational Design

Hardware and operational design of Data Warehouse – Hardware Architecture – Physical Layout – Security – Backup and Recovery – Service – Level Agreement – Operating the Warehouse.

Unit-V : Planning – Tuning and Testing

Capacity planning – Tuning the Data Warehouse – Testing Warehouses – Data Warehouse Features.

Reference Books

- 1) Pieter Adriaans and Dolf Zantinge, "Data Mining", Pearson Education, 2007.
- 2) Ian H. Witten & Eibe Frank, "Data Mining – Practical Machine Learning Tools and Techniques, Morgan Kaufmann Publishers, 2006.

- 3) Sam Anahory and Dennis Murray, "Data Warehousing in the Real World – A Practical Guide for Building Decision Support Systems", Pearson Education, 2006.
- 4) Jiawei Han and Micheline Kamber, "Data Mining: Concepts and Techniques" Morgan Kaufmann Publishers, 2000.

COURSE : 8XX08I – SOFTWARE TESTING AND QUALITY ASSURANCE

Aim: To create an awareness about the significance of software testing and provide an understanding of the concepts of software testing – quality control and quality assurance.

Unit-I

Purpose of testing – A model for testing – Taxonomy of bugs – Path testing – Predicates – Path Predicates – Path sensitizing – Path Instrumentation – Implementation and Application of Path Testing.

Unit-II

Transaction flows – Transaction flow testing techniques – Data flow testing – Basics and Strategies – Domain and Paths – Domain Testing – Domain and Interface Testing – Domain and testability.

Unit-III

Syntax Testing – A grammar for formats – Test Case Generation – Implementation and Application – Logic based Testing – Overview – Decision Tables – Path Expression – KV Charts – Specifications.

Unit-IV

Implementation – Overview – Strategies for programmers – Strategies for Independent Testers – Tests as Software Products – Tools.

Unit-V

Concepts of Quality Control – Quality Assurance and Quality Management – Total Quality Management – Cost of Quality – QC Tools – 7 QC Tools and Modern Tools.

Models for Quality Assurance – ISO 9000 Series – CMM – SPICE.

Reference Books

- 1) Boris Beizer, "Software Testing Techniques", Second Edition, Dreamtech Press, New Delhi, 2003.
- 2) Edward Kit, "Software Testing in the Real World – Improving the Process", Pearson Education, 2004.
- 3) Watts Humphrey, "Managing Software Process", Addison, Wesley, 1998.

COURSE : 8XX08J – ENTERPRISE RESOURCE PLANNING

Aim: To study basic concept of enterprise resource planning model advantage and Architecture.

Unit-I : Introduction to ERP

Integrated Management Information System – Seamless Integration – Supply Chain Management – Integrated Data Model – Benefits of ERP – Business Engineering and ERP – Definition of Business Engineering – Principle of Business Engineering – Business Engineering with Information Technology.

Unit-II : Business Modelling for ERP

Building the Business Model – ERP Implementation – An Overview – Role of Consultant – Vendors and Users – Customisation – Precautions – ERP Post Implementation Options – ERP Implementation Technology – Guidelines for ERP Implementation.

Unit-III : ERP and the Competitive Advantage

ERP domain MFG/PRO – IFS/Avalon – Industrial and Financial Systems – Baan IV SAP – Market Dynamics and Dynamic Strategy.

Unit-IV : Commercial ERP Package

Description – Multi – Tier Client/Server Solutions – Open Technology – User Interface – Application Integration.

Unit-V : Architecture

Basic Architectural Concepts – The System Central Interfaces – Services – Presentation Interface – Database Interface.

Text Books

- 1) Vinod Kumar Garg and N.K. Venkita Krishnan, "Enterprise Resource Planning – Concepts and Practice", PHI, 2003.
- 2) Jose Antonio Fernandez, The SAP R/3 Handbook, TMH, 2006.

COURSE : 8XX08K – AD-HOC AND SENSOR NETWORKS

Aim: To provide the knowledge of ad-hoc network, sensor networks, routing protocols and distributed data processing.

Unit-I

Overview of Ad-HOC Networks – Introduction – Routing protocols proactive and reactive methods – backbone and position based and power efficient routing. Topology Discovery and clustering.

Unit-II

Sensor Networks – Introduction and applications. Design issues and architecture for wireless sensor Networks – Sensors Network operating system – Communications and routing in sensor Networks.

Unit-III

Routing protocols: data centric – hierarchical location based – energy efficient routing etc – Energy – Efficient and Power – Aware MCA – The protocol architectures and Implementations.

Unit-IV

Mobility Modeling and Mobile Ad-HOC Networks – Dynamic Radio Resource Management – Sensor deployment – Scheduling and coverage issues – self configuration and topology control.

Unit-V

Distributed data processing – Localization and time Synchronization – Querying – data collection – Collaborative information processing and group connectivity – target tracking – Future research – Security.

Text Books

- 1) Charles E. Perkins, "Ad Hoc Networking", Addison, Wesley, 2002.
- 2) Feng Zhao and Leon Guibas, "Wireless Sensor Networks", Morgan Kaufmann, 2004.
- 3) William Stallings, "Wireless communications and Networking", 1st Ed, Prentice Hall, 2002.

Reference Books

- 1) Jr. Edgar, H. Callaway, "Wireless Sensor Networks: Architecture and Protocols", Auerbach, 2003.
- 2) Raghavendra, C.S. and Krishna M. Sivalingam and Taieb Znati, "Wireless Sensor Networks", Springer, 2005.
- 3) Yi, Bing Lin and Imrich Chlamtac, "Wireless and Mobile Network Architectures", Wiley, 2001.

COURSE : 8XX08L – CLIENT/SERVER COMPUTING

Aim: To study about client/server computing and its characteristics. Role of the client and server Components, Type of server Network.

Unit-I : Introduction

Client Server computing and its Characteristics – Client Server Architecture – Benefits of Client Server Computing – Hardware Trends – Software Trends – Components of Client Server Applications – Classes of Client Server Applications – Categories of Client Server Applications.

Unit-II : The Client

Role of the Client – Client Components – Client Services – Client Operating Systems – GUI – GUI Environments – GUI Design Standards – Open GUI Standards – Database Access and Tools – Interface Independence – Testing Interfaces – Development Aids.

Unit-III : The Server

Role of the Server – Server Functionality in Detail – Features of Server Machines – Classes of Server Machines – Layers of Software – Network Management Environment – Network Computing Environment – Server Operating System – Transaction Processing – Connectivity – Intelligent Database – Stored Procedures – Triggers – Load Leveling – Optimizer – Testing and Diagnostic Tools – Reliability – Backup and Recovery Mechanisms – Data Management Software.

Unit-IV: The Network

Layers – Interfaces and Protocols – Standard Architectures – Network Characteristics – Network Management Standards – LAN Characteristics – LAN Hardware – Network Operating Systems.

Unit-V : Development Methodology and Tools

Convert Existing Screen Interfaces – Reengineering Existing Applications – Business Re_Engineering – Methodology Tools – EASEL Workbench – Ellipse – SQL Windows Power Builder – SQL Toolset – Future of Client Server Computing.

Text Book

- 1) Dewire and Dawna Travis, " Client/Server Computing", McGraw Hill, 1993.

Reference Books

- 1) Patric Smith and Steve Guengerich, "Client/Server Computing", Second Edition, PHI, 1997.
- 2) Robert Orfali, Dan Harley, Jeri Edward, " The Essential of Client/Server survival Guide", Second Edition, Galgotia, 1997.

COURSE : 8XX08M – PARALLEL ALGORITHMS

Aim: To learn about different parallel computer models and to study about different parallel algorithms designed for this parallel model. These parallel algorithms are compared with sequential algorithms for their time complexity.

Unit-I

Introduction to Parallel Computing: Supercomputers Modern Parallel Computers – Data Parallelism – Functional Parallelism – Pipelining and Data Clustering – Performance Analysis: Introduction – Speedup – Superlinear Speedup and Efficiency – Amdahl's Law.

Unit-II

Model of Serial computation – Parallel Computational Models: PRAM – CRCW – CREW – EREW – Simulating CRCW on CREW & EREW – PRAM algorithms Processor organisations: Tree – Mesh – Linear Array – Ring – Star – Hypercube – Cube – connected – cycles – Perfect shuffle network – Butterfly – Pyramid.

Unit-III

Sorting: Sorting on a linear array – Sorting on a mesh – Sorting on EREW SIMD computer – MIMD enumeration sort – MIMD quick sort – Sorting on other networks.

Unit-IV

Matrix Operations: Mesh transpose – Shuffle transpose – EREW transpose – Mesh multiplication – Cube multiplication – Matrix by vector multiplication – Tree multiplication.

Unit-V

Numerical Problems: – Linear equations – SIMD algorithm – Roots of nonlinear equations – MIMD algorithm – Partial differential equations – Computing Eigen values.

Text Books

- 1) Michael J. Quinn, "Designing Efficient Algorithms for Parallel Computers" University of New Hampshire, McGraw Hill Book Company, 1987.
- 2) Michael J. Quinn, "Parallel Computing Theory and Practice" McGraw Hill, Second Edition, 1994.

Reference

- 1) Akl, S.G., "The Design and Analysis of Parallel Algorithms", Prentice Hall of India, 1989.

COURSE : 8XX08N – E-COMMERCE

Aim: To study the basic concepts of E-Commerce network infrastructure – information publishing technology security and search engine services.

Unit-I

Introduction to E-Commerce: Benefits – Impacts – Classification and Application of E-Commerce – Business Model – Architectural Frame Work.

Unit-II

Network Infrastructure: Local Area Network – Ethernet – Wide Area Network – Internet – TCP/IP Reference Model – Domain Name System – Internet Industry structure – Information Distribution and Messaging: FTP Application – Electronic Mail – World Wide Web Server – HTTP – Web Server Implementations.

Unit-III

Information Publishing Technology: Information Publishing – Web Browsers – HTML – CGI – Multimedia Content – Other Multimedia Objects – VRML – Securing the Business on Internet – Why Information on Internet is Vulnerable? – Security Policy – Procedures and Practices – Site Security – Protecting the Network – Firewalls – Securing the Web Service.

Unit-IV

Securing Network Transaction – Electronic Payment Systems: Introduction – Online Payment Systems – Pre-paid Electronic Payment System – Post-paid Electronic Payment System – Requirement Metrics of a Payment System.

Unit-V

Search Engines and Directory Services: Information Directories – Search Engines – Internet Advertising – Agents in Electronic Commerce: Needs and Types of

Agents – Agent Technologies – Agents Standards and Protocols – Agents Applications – Case Study.

Text Book

- 1) Bharat Bhasker, 'Electronic Commerce Framework Technologies and Applications', Tata McGraw Hill Publication, 2003.

Reference 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)

COURSE : 8XX080 – NATURAL LANGUAGE PROCESSING

Aim: To understand the concepts of natural language Processing: Language related algorithms and techniques, Computational morphology and Phonology, parsing and semantic interpretation.

Unit-I : Introduction

Speech and Language Processing – Ambiguity – Models and algorithms – Language – Thought – Understanding – Brief history – Regular Expressions – Automata – Morphology and Finite State Transducers – Computational Phonology and Text-to-Speech.

Unit-II : Probabilistic Models and Speech Recognition

Spelling – Bayesian method – Weighted Automata – N-grams – Smoothing – Entropy – HMMs and Speech Recognition – Speech Recognition Architecture – Hidden Markov models – Decoding – Acoustic processing – Speech recognizer – Speech synthesis.

Unit-III : Syntax

Word classes and Part-of-Speech Tagging – Tagsets – Transformation based tagging – Context free rules and trees – The noun phrase – Co-ordination – Verb phrase – Finite state and context free grammars – Parsing with context free grammars.

Unit-IV : Unification and Probabilistic Parsing

Features – Implementing unification – Unification constraints – Probabilistic context free grammars – Problems – Lexicalized context free grammars – Dependency grammars – Human parsing – Language and Complexity.

Unit-V : Semantics

Representing meaning – First order predicate calculus – Semantic analysis – Attachments – Idioms – Compositionality – Robust semantic analysis – Lexical semantics – Selectional restrictions – Machine learning approaches – Dictionary based approaches – Information retrieval.

Text Book

- 1) Daniel Jurafsky and James H. Martin, "Speech and Language Processing", Pearson Education, 2002.

Reference Books

- 1) Michael W. Berry, "Survey of Text Mining: Clustering, Classification and Retrieval Systems", Springer Verlag, 2003.
- 2) James Allen, "Natural Language Understanding", Benjamin Cummings Publishing Co., 1995.

COURSE : 8XX08P – PERVASIVE COMPUTING

Aim: To study concepts of pervasive computing, design and security of pervasive computing.

Unit-I : Architecture

Relationship of Wireless Computing – ubiquitous – internet Computing. Related ideas: Ambient Computing. Elements of Pervasive architecture. Requirements of computational infrastructure. Failure management. General issues: Security – performance – dependability. Web architectures. Local networks. Store and forward.

Unit-II : Devices Technology

Device and network technologies. Devices categories. Devices characteristic Heterogeneity and Interoperability. Mobile Agents. device management. Language localization issues for mobile device – User Interface design issues for mobile devices – Difference between UI design for mobile devices and conventional systems.

Unit-III : Sensor Networks and RFIDS

Introduction to Sensor networks. Types of sensor networks. Berkeley Motes. Sensor network organization. Sensor network routing mechanisms. Platforms for Wireless sensor networks – Sensor Node Architecture – Sensor Network Architecture.

Unit-IV : Local Area and Wide Area Wireless Technologies

Local area wireless networks. IEEE 802.11 technologies. Mobile IP. Infrared technologies. Bluetooth networks (OBEX Protocol). Messaging Systems. Personal Area Networks. Network Management. Quality of service. Wireless protocols. Establishing wide area wireless networks: Concept and structure of cell.

Unit-V : Protocols and Application

Protocols: Networking protocols. packet switched protocols. Routing Protocols for sensor Networks. Data Centric Protocols. Hierarchical Protocols. Location – based protocols. Multimedia Messaging Service (MMS) Protocols. Wireless Application Protocol (WAP). Application Mobile access to patient information in a hospital – sales support – retailing – service support – tracking applications – Designing for small screen devices – Search interfaces – Context – awareness – Determining "locality".

Text Book

- 1) Uwe Hansman, Lothar Merk, Martin S. Nicklous & Thomas Stober: "Principles of Mobile Computing", Second Edition, Springer, Verlag, New Delhi, 2003.

Reference Books

- 1) Rahul Banerjee: Internetworking Technologies: An Engineering Perspective, Prentice, Hall of India, New Delhi, 2003.
- 2) Rahul Banerjee: Lecture Notes in Pervasive Computing, Online Notes, BITS, Pilani, 2007.
- 3) Yi, Bing Lin & Imrich Chlamtac: Wireless and Mobile Network Architectures, John Wiley & Sons, New Delhi, 2004.

COURSE : 8XX08Q – MAINFRAME COMPUTING

Aim: To study the concepts of mainframe, structure command and file control.

Unit-I

MVS Overview – MVS Characteristics Program Development – System Initialization – Job Management – Storage Management – Data Management – Input/Output Management – Termination and Recovery – DASD – Volume Organization.

Unit-II

TSO/ISPF: TSO Commands – General Syntax of JCL Statements – JES (Job Entry System) – JCL Explanation of Job Statements – Explanation of EXEC Statements – Explanation of DD Statements – Additional Parameters on JOB – EXEC – DD Statements – IBM Utilities – Procedures – Procedures Overriding Parameters – Symbolic Parameters.

Unit-III

VSAM: VSAM data set Organization Structure – VSAM in Application Programming – Internal Organization – IDCAMS Comments – JCL for VSAM – Buffering – Alternative index – Repro – Backup and Recovery – Export and Import – KSDS – ESDS – RRDS – LDS.

DB2: Introduction to DBMS – RDBMS – Codd's Rule – Normalization Introduction to XDB – Data Base Design – SQL – Relationship – DB2 Objects – Locks – Program Preparation – Cursor – Null Indicators – Optimizer – Utilities.

Unit-IV

CICS: CICS Introduction – Role of CICS – CICS Operations – CICS Components – CICS Services – CICS Tables – EIP/EIB – CICS – Terminal Control – BMS map – Map Definition Macros – Map I/O Operations – Screen Definition Facility – Program Control – Application House Keeping – Exec – Interface block – Supplied Transactions – CESN – CESF – CEMT – CEDF – NMDS – BMS – Abend Codes – File Control – Program Control – TSQ – TDQ – Pseudo Conversation – LINK Command – XCTL – Recovery and Rollback.

Unit-V

File Control – Write Command – Browsing – Delete – Unlock – Accessing Relational Database – Temporary Storage Queue – TD – I/O – Dynamic Transaction Backout – CICS Supplied Transaction – Exception Handling in CICS.

Text Books

- 1) Yukihiisa Kargeyama, "CICS Hand Book", Tata McGraw Hill, 1997.
- 2) Craig S. Mullins, "DB2 (3rd Edition) – Developers Guide", Techmedia, SAMS Publishing, 1998.
- 3) Brown, "JCL Job Control Language," John Wiley, 1999.
- 4) Chander Rande, "JCL", McGraw Hill, 1994.
- 5) Doug Lowe, "MVS", Mike Murach Associates, 1994.

COURSE : 8XX08R – MOBILE COMPUTING

Aim: To study the concepts of mobile computing including access control, digital mobile phone systems, wireless LAN and the needed protocols.

Unit-I

Introduction to wireless communication – Wireless data technologies – Frequencies for radio signals – antennas and signal propagation – need and types of multiplexing techniques – modulation types – use of spread spectrum – cellular Systems.

Unit-II

Medium Access Control: Need for MAC algorithm – medium access methods and comparison of these methods.

Unit-III

Digital mobile Phone Systems – GSM: mobile services – system architecture – radio interference – protocols – localization and calling – hand over – security – new data services – other digital cellular networks – comparison with GSM.

Unit-IV

Wireless LAN: Introduction – advantages and design goals for wireless LAN – Infrastructure – ad-hoc networks – IEEE 802.11: system and protocol architecture – physical layer – HIPERLAN protocol architecture and physical layer and MAC – Blue tooth physical and MAC layer. Wireless ad-hoc networks.

Unit-V

Protocols for mobile computing: mobile network layer – mobile IP – Snooping TCP – Mobile TCP – Fast and selective retransmission and recovery – Transaction oriented TCP. Wireless Application Protocol. WAP architecture wireless datagram protocol – transport layer security – WML – script.

Text Books

- 1) Jachen Schiller, "Mobile Communications", Addison, Wesley, 2000.
- 2) Asoke K. Talukder, Roopa R. Yavgal, "Mobile Computing", TMH Publishing, 2005.

Reference Books

- 1) Reza, B., "Far, "Mobile Computing Principles:, Designing And Developing Mobile Application With UML and XML", Cambridge University Press, 2005.
- 2) William C.Y. Lee, "Mobile Communication Design Fundamentals", John Wiley, 1993.

COURSE : 8XX08S – SOFTWARE PROJECT MANAGEMENT

Aim: To study about software process project estimation, project scheduling, and quality standards.

Unit-I : Defining a Software Development Process

Identify the Software Model – Activities – and Relationship among Activities – document Information on each Activity – Tailoring – improving the process – Discipline need for implementing discipline – Attributes of successful leader. Communicating in Harmony – Personality Traits – Management Tools.

Unit-II : Software Project Estimation – Software

Metrics – Measuring Software – Software project estimation – Decomposition techniques – empirical estimation models – COCOMO – PUTNAM estimation model – Automated estimation tools – Planning – Risk analysis.

Software estimation – Empirical estimation models – Planning – Risk analysis.

Unit-III : Software Project Scheduling

Project Management – Resource Management – Organizational Form and Structure – Software Development Dependencies – Brain Storming – Scheduling Fundamentals – PERT and CPM – Leveling Resource Assignments – Map the schedule to a Real Calendar – Critical chain scheduling. Project Tracking: Overview of Project progress – Project outlook – Occurrence of tracking – tracking meetings ground rules Recovery plans – The role of Escalations.

Unit-IV : Requirements Engineering Specification Languages

ER Languages – PSL/PSA – SREM – SADT – RSL/REVS – SSA – GIST – Formal specification techniques: Relational and State Oriented Notations.

Software configuration management: Basic functions – Responsibilities – Standards – Configuration Audit.

Unit-V : Quality Considerations and Standards

Planning For Quality – Quality improvement teams – Quality recognition – ISO 9000 – ISO 9001 Standards.

Text Books

- 1) Neal Whitten, "Managing Software Development Projects, Formula for Success", John Wiley & Sons, Inc., 1995.
- 2) Robert T. Futrell, Donald F. Shafex, Linda I. Safer, "Quality Software Project Management ", Pearson Education, Asia, 2002.
- 3) Edward Yourdon, "Modern Structured Analysis", Prentice Hall Inc., 1989.

- 4) Pressman R.S., "Software Engineering, A Practioner's Approach", Tata McGraw Hill Book Company, 1977.
- 5) Pankaj Jalote, "Software Project Management in Practice", Addison Wesley, 2002.

Reference Books

- 1) Hughes, "Software Project Management, 3/E", Tata McGraw Hill 2004.
- 2) Walts Humphrey, "Managing the Software Process", Addison Wesley, 1989.
- 3) Richard Fairley, "Software Engineering Concepts", McGraw Hill Book Company, 1985.

COURSE : 8XX08T – TCP/IP NETWORK COMPONENTS

Aim: To know about practical implementation of ISO – OSI model as TCP/IP Protocol suite and its Component protocols.

Unit-I : Standards, Standard Organisations and OSI Model

ISO – ITU(T) – ANSI – IEEE – EI Internet standards – Maturity Levels – Requirement Levels Internet Administration – ISOC – IAB – IETF – IRTF – IANA – ICANN – NIC.

Layers in the OSI Model – Physical Layer – Data link Layer – Network Layer – Transport Layer – Session Layer – Presentation Layer – Application Layer.

TCP/IP Protocol suite – Physical and Data Link Layer – Network Layer – Transport Layer – Application Layer.

Unit-II : Addressing, Connecting Devices and Routing

Addressing – Physical Address – Logical Address – Port Address – IP Address – Address Space – Classful Addressing – Sub netting – Subnet Mask – Super netting.

Types of Address – Unicast, Multicast, Broadcast, Loopback address and anycast Address – Connecting devices – Repeaters – Hubs/Concentrators – Bridges – Routers – Gateways – Routing – Forwarding Techniques – Routing Techniques – Structure of a router.

Unit-III : Network Layer Components

IPv4 Header Format – IPV4 Options Field – IPV4 Flags – IPV4 Fragmentation.

IPv6 Header Format – IPV6 Extension Headers. – ICMP Message Format – Types of Messages – query – Checksum Calculation.

IGMP Message Format – IGMP Operation – Group Management – Encapsulation.

Unit-IV : Transport Layer Components

Process to Process communication – User Datagram Protocol Format – Checksum – UDP Operation. – TCP Services – TCP format – TCP features – TCP Connection – State transition diagram – Flow control – Error control – Congestion control – TCP timers – TCP options.

Unit-V : DNS and Network Management SNMP

DNS – Name space – Domain name space – Distribution of name space – DNS in the Internet – Resolution – DNS message Headers – Types of Records.

Network Management – SNMP – Managers and agents – Role of SNMP – Role of SMI – Role of MIB – SMI – MIB – SNMP PDU's – SNMP Format.

Text Book

- 1) Benrouz A. Forouzan, "TCP/IP Protocol Suite", TMH, Third Edition, 2006.

Reference Books

- 1) Richard Sterens, W. and G. Gabrani, "TCP/IP Illustrated, Volume 1, The Protocols", Pearson Education, 2006.
- 2) Douglas E. Comer, "Internet Working with TCP/IP, Volume I, Principles, Protocols and Architecture", PHI, 5th edition, 2006.

COURSE : 8XX08U – DISTRIBUTED OBJECTS – COM/DCOM

Aim: To know about fundamentals to programming in distributed objects using Microsoft's COM/DCOM architecture.

Unit-I

Fundamental programming architecture and IUNKNOWN – ICLASSFACTORY.

From OLE to DCOM – parallel processing – advantages of distributed computing – building distributed systems – COM background – three faces of COM – componentware – COM interfaces – types of components – the COM library – COM as a foundation – activex on COM.

The interface definition language – the component's client – the component – COM reuse mechanisms.

Unit-II

Type libraries, language integration, threading models and apartments.

Type libraries – C++ client utilizing type library – active template library – COM programming in visual basic – COM programming in java.

Threads – apartments – apartment interactions – implementing multithreaded components – the ten threading commandments.

COM facilities – automation and component categories – the Idispatch interface – building an automation client in C++ – building an automation client in visual basic – building an automation client in VBScript – scriptlets: building COM objects in HTML – error handling – component categories.

Unit-III

Connection points, type information, monikers and structured storage.

A simple version of a connectable object – a complete implementation of a connectable object – type information.

Initializing objects – monikers – the class moniker – the java monitor – the running object table – structured storage.

Remoting architecture – DLL surrogates – marshaling – executable components.

Unit-IV

Standard Vs custom marshaling, the IDL and security.

Marshalling interface pointers – standard marshaling – handler marshaling – custom marshaling – converting marshaled interface pointers to strings.

IDL types – directional attributes – arrays – pointers – interface design recommendations.

Security models – declarative security: the registry – programmatic security.

Unit-V

The network protocol, MTS and COM+.

Spying on the network protocol – calling all remote objects – marshalled interface pointers – the OXID resolver – DCOM garbage collection – channel hooks.

Three – Tier Architecture – MTS – OLE, Network OLE, COM, Activex, DCOM, COM+.

Text Books

- 1) Guy Eddon and Henry Eddon, "Inside Distributed COM", WP, Microsoft Press, 1998.
- 2) Dale Rogerson, "Inside COM, Microsoft Component Object Model", WP, Microsoft press, 1998.
- 3) Andrew S. Tanenbaum, "Distributed OS", Prentice Hall, First Edition, 1995.

Reference Books

- 1) Coulouris, G., J. Dollimore and T. Kinelberg, "Distributed systems concepts and Design", Third Edition, Addison – Wesley, 2001.
- 2) Andrew S. Tanenbaum, "Modern OS", Prentice Hall, Second Edition, 2001.
- 3) Marten Van Steen and Andrew S. Tanenbaum, "Distributed Systems", Prentice Hall, First Edition, 2001.

COURSE : 8XX08V – DISTRIBUTED OPERATING SYSTEM

Aim: To understand the basic concepts and other issues related to distributed operating systems.

Unit-I : Network Structures

Background – Motivation – Topology – Network Types – Communication – Design Strategies – Networking Example. Distributed System Structures – Networking Operating Systems – Distributed Operating System – Remote Services – Robustness – Design Issue.

Unit-II : Distributed File System

Background – Naming and Transparency – Remote File Access – Stateful versus Stateless Service – File Replication – Example System . Distributed Coordination: Event Ordering – Mutual exclusion – Atomicity – Concurrency Control – Deadlock Handling – Election Algorithms – Reaching Agreement.

Unit-III : Protection

Goals of Protection – Domain of protection – Access Matrix – Implementation of Access Matrix – Revocation of Access Rights – capability – based systems – Language Based System – Language Based protection.

Security: The Security Problem – Authentication – One – Time Passwords – Program Threats – System Threats – Threat Monitoring Encryption – Computer – Security Classifications – An Example Security Model: windows NT.

Unit–IV : Case Studies the Unix System

History – Design Principles Programmer Interface – User Interface – Process Management – Memory Management – File System – I/O System – Interprocess Communication.

Unit–V : Windows NT

History – Design Principles – System Components – Environmental Subsystems – File System – Networking – Programmer Interface.

Text Book

- 1) Silberschatz Galvin, "Operating System Concepts", Addison Wesley, Fifth Edition, 1997.

Reference Books

- 1) Charles Crowley, "Operating System – A Design Oriented Approach", IRWIN, 1997.
- 2) Deitel, "An Introduction to Operating System", Addison Wesley Publishing Co., 1985.
- 3) Milankovic, M., "Operating System Concept and Design", McGraw Hill, Second Edition, 1992.
- 4) Andrew S. Tannenbaum, "Operating System - Design and Implementation", Prentice Hall India, 1987.

COURSE : 8XX08W – SOFTWARE ENGINEERING

Aim: The subject aims to impart sound knowledge to design and implement an efficient software system and manage the resources.

Unit–I : Software Engineering Fundamentals

The system engineering process – Software process models – Process iteration – Software Specification – Software design and implementation – Software validation – Software Evolution – Project management activities – Project planning – Project scheduling – Risk management – Software requirements – Functional and non – functional requirements – User requirements – System requirements – software requirements document.

Unit–II : Requirements Engineering Processes

Feasibility studies – Requirements elicitation and analysis – Requirements validation – Requirements management – System Models – Context – Behavioral – Data and Object models – CASE workbenches – Software prototyping – Prototyping in the software process – Rapid prototyping techniques – User interface prototyping – Formal Specification – Formal specification in the software process – Interface specification – Behavioral specification.

Unit-III : Architectural Design

System structuring – Control models – Modular decomposition – Domain – specific architectures – Overview of design for Distributed systems – Object – oriented and Real – time software – Design with Reuse – Component – based development – Application families – Design patterns – User interface design – User interface design principles – User interaction – Information presentation – User support – Interface evaluation.

Unit-IV : Critical Systems

Overview of Dependability – System Specification – and System Development – Verification and validation – Planning – Software inspections – Automated static analysis – Cleanroom software development – Software testing – Defect testing – Integration testing – Object – oriented testing – Critical systems validation – Formal methods and critical systems – Reliability validation – Safety assurance – Security assessment.

Unit-V : Industry Standards

Overview of Managing software people – Software cost estimation – Productivity – Estimation techniques – Algorithmic cost modeling – Project duration and staffing – Overview of Quality management and Process Improvement – Overview of Legacy Systems – Software change and re – engineering – Configuration management – planning and managing change – version and release – Overview of SEI – CMM – ISO 9000 and Six Sigma – Over view of CASE tools.

Text Book

- 1) Ian Sommerville, "Software Engineering", Addison Wesley, 2004.

Reference Book

- 1) Roger S. Pressman, "Software Engineering", McGraw Hill, 2004.

COURSE : 8XX08X – UNIFIED MODELING LANGUAGE

Aim: The aim of this course is to provide the necessary knowledge for modeling object oriented software systems. It provides a strong and formal foundation in object-oriented analysis and design. It teaches the underlying principles of object-oriented analysis and design, including documentation of the design using UML and an UML-enabled CASE tool.

Unit-I

Why We Model: The Importance of Modeling – Principles of Modeling – Object Oriented Modeling: Introducing the UML: Overview of the UML – A Conceptual Model of the UML – Architecture – Software Development Life Cycle – Key Abstraction – Mechanism – Components. Classes: Modeling the vocabulary of a system – Modeling the Distributions of responsibilities in a system – Modeling System – Modeling primitive types. Relationships; Modeling Simple Dependencies – Modeling single Inheritance – Modeling Structural Relationships. Command Mechanism: Modeling New Building Blocks – Modeling comments – Modeling New Semantics – Modeling new properties – Diagrams: Modeling different Views of a

System – Modeling Different Levels of Abstractions – Modeling Complex Views. Class Diagrams: Modeling Simple Collaborations – modeling a logical database schema – forward and reverse engineering.

Unit-II

Advanced structural classes: advanced classes: modeling the semantics of a class. Advanced relationships – modeling webs of relationships. Interface, types, and roles: modeling the seams in a system – modeling static and dynamic types. Packages: modeling A group of elements – modeling architectural views. Instances: modeling concrete Instances – modeling prototypical instances. Object Diagram: modeling Object structures – Forward and Reverse Engineering.

Unit-III

Basic Behavioral Modeling: Interactions: Modeling a flow of control. Use cases: Modeling the behavior of an element. Use case diagram: modeling a context of a system modeling the requirements of system. Interaction diagram: modeling flows of control by time ordering – modeling flows of control by organization. Activity diagram: modeling a workflow – Modeling an Operation.

Unit-IV

Advanced behavioral modeling: events and signals: Modeling a family of signals – modeling exceptions. State machines: modeling the lifetime of an object. Process and threads: modeling multiple techniques – modeling Inter Process communication. Time and Space: modeling timing constraints – modeling the distribution of objects – modeling objects that migrate. State chart Diagrams: modeling reactive objects.

Unit-V

Architectural Modeling: Components: modeling executables and libraries – modeling tables, files and documents – modeling an API – modeling source code. Deployment: modeling processors and devices – modeling the distribution of components collaborations: modeling the realization of use case – modeling the realization of an operation – modeling a mechanism. Patterns and frameworks: modeling design patterns – modeling architectural patterns.

Components diagrams: modeling source code – modeling an executable release – modeling a physical database – modeling adaptable systems. Deployment diagrams: modeling as embedded system – modeling a Client/server system – modeling a fully distribution system. Systems and models: modeling The architecture of a system – modeling systems of systems.

Text Book

- 1) Grady Booch, James Rumbaugh, Ivar Jacobsan, "The Unified Modeling Language User Guide", Pearson Edition Asia, Seventh Indian Reprint 2002.

COURSE : 8XX08Y – JSP AND EJB

Aim: The aim of this course is to provide the complete skills on Internet programming paradigm. This includes the programming knowledge about J2EE such as JSP and EJB.

Unit-I

Introduction – J2EE – JSP basics – Elements – Directives – Scripting Elements – Web Application Server Architecture – Important Servlet API Features – JSP & Java beans – introduction – Java beans – JDBC – Sample Application.

JSP Session – Persistent Connections – Cookies & Java Sessions in Action – Sessions, HTTPS and SSL

Unit-II

Error Handling & Debugging – JSP Error Handling – Types- JSP Specific Exception Classes – Debugging – Handling different types of errors – Debugging Techniques.

Database Connectivity – RDBMS – Driver Types Creation of my SQL Database – Coding with JSP & JDBC Multiple users and connection pooling.

Unit-III

Tag Extensions and Libraries – Need – Simple Tags – Implementation of Body tag interface – Dynamic GUI – Introduction – Creation of Web Sites – Co- Branded Model. Web portal.

Unit-IV

Introduction – Transaction Process – Benefits and Models of Transaction – Two – Tier Architecture/Three - tier Architecture – Server – Side Component Architecture – Distributed Transaction Processing – The Java 2 Platform, Enterprise Edition – Enterprise Bean – Types of Bean – Logical Architecture – EJBs – Design and Implementation of a bean

Unit-V

Session Beans – Enterprise Bean Class – Life Cycle – Stateful Session Bean Example – Stateless Session Bean Example – session Contexts – EJB Security.

Entity Beans – Persistence Concept – Definition of an Entity Beans – Features of Entity Beans – Developing and using Entity Beans – Entity Contexts – Life cycle of Entity Beans – Container – managed Persistence – Bean – Managed Persistence – Debugging Problems.

Text Book

- 1) Karl Avedal, Danny Ayers et al, "Professional JSP", Wrox Press, May 2000 ISBN – 81-7366-211-8.
- 2) Simon Brown, Robert Burdick, Danko Cokor, et al, "Professional JSP", Wrox Press, Paperback, May 2001, ISBN 1861004958.
- 3) Richard Monson-Haefel, "Enterprise Java Beans" , O' Reilly, Shroffr Publishers & Distributors Pvt.Ltd, Mumbai, January 2001, ISBN-81-7366-2701-3.

Reference

- 1) Wrox Author Team, "Professional EJB", WROX Press July 2001. ISBN 1861005083.

COURSE : 8XX08Z – WINDOWS PHONE 7 PROGRAMMING**Unit-I**

Targeting Windows Phone 7 - The Hardware Chassis - Sensors and Services - File | New | Project - A First Silverlight Phone Program - The Standard Silverlight Files - Color Themes - Points and Pixels - The XAP is a ZIP - An XNA Program for the Phone - Silverlight and Dynamic Layout - Orientation Events - XNA Orientation - Simple Clocks (*Very Simple Clocks*) - Low-Level Touch Handling in XNA - The XNA Gesture Interface - Low-Level Touch Events in Silverlight - The Manipulation Events - Routed Events - Some Odd Behavior - XNA Texture Drawing.

Unit-II

Basic Navigation - Passing Data to Pages - Sharing Data Among Pages - Retaining Data across - - Instances - The Multitasking Ideal - Task Switching on the Phone - Isolated Storage - XNA Tombstoning and Settings - Testing and Experimentation - A TextBlock in Code - Property Inheritance - Property-Element Syntax - Colors and Brushes - Content and Content Properties - The Resources Collection - Sharing Brushes - x:Key and x:Name - An Introduction to Styles - Style Inheritance - Themes - Gradient Accents - Basic Shapes - Transforms - Animating at the Speed of Video - Handling Manipulation Events - The Border Element - TextBlock Properties and Inlines - More on Images - Playing Movies - Modes of Opacity - Non-Tiled Tile Brushes - The Single-Cell Grid - The StackPanel Stack - Text Concatenation with StackPanel - Nested Panels - Visibility and Layout.

Unit-III

The Problem Illustrated - The Dependency Property Difference - Deriving from UserControl - A New Type of Toggle - Panels with Properties - Attached Properties - Source and Target - Target and Mode Binding Converters - Notification Mechanisms - A Simple Binding Server - Setting the DataContext - Simple Decision Making - Converters with Properties - Give and Take - TextBox Binding Updates - Canvas and Grid - Overlapping and ZIndex - Caps, Joins, and Dashes - Polygon and Fill - The Stretch Property - Dynamic Polygons - The Path Element - Geometries and - Transforms - Grouping Geometries - The Versatile PathGeometry - The ArcSegment - Bézier Curves - The Bitmap Class Hierarchy - Animating Perspective Transforms - Animations and Property Precedence.

Unit-IV

Content Control and Data Template - Examining the Visual Tree - The Visual State Manager - Custom Controls in a Library - Variations on the Slider - The Ever-Handy Thumb - Custom Controls - Items Controls and Visual Trees - Customizing Item Displays - Binding to Items Source - Databases and Business Objects - Fun with DataTemplates - Sorting - Changing the Panel - The Data Template Bar Chart - A Card File Metaphor - Compare and Contrast - Music by Composer - The XNA

Connection - The XNA Music Classes: MediaLibrary - Displaying the Albums - The XNA Music Classes: MediaPlayer - The Naïve Approach - Moving Sprites with Vectors - Working with Parametric Equations - Fiddling with the Transfer Function - Scaling the Text - Two Text Rotation Programs - The Draw Variants - Another Hello Program - Driving Around the Block

Unit – V

Gestures and Properties - Scale and Rotate - Matrix Transforms - The *Pinch* Gesture - Flick and Inertia - The Mandelbrot Set - Pan and Zoom - Game Components - Affine and Non-Affine Transforms - More Game Components - The PhingerPaint Canvas - A Little Tour Through SpinPaint - The SpinPaint Code - The Actual Drawing - PhreeCell and a Deck of Cards - The Playing Field - Play and Replay - 3D Vectors - A Better Bubble Visualization - The Graphical Rendition - Follow the Rolling Ball - Navigating a Maze.

Text Book

- 1) Charles Petzold, "Programming Windows Phone 7", Microsoft Press, 2010.
- 2) Charles Petzold, "Applications = Code + Markup A Guide to the Microsoft Windows Presentation Foundation", Microsoft Press, 2006.

References

- 1) Henry Lee, Eugene chuyrov, "Beginning Windows Phone 7 Development", Apress Copyrighted Material, 2011.
- 2) Adan Nathan, "101 Windows Phone 7 Apps", Volume 1, SAMS, 2011.

COURSE : 8XX08Z - Open CL PROGRAMMING

UNIT I

Overview of pipelining and Instruction Level parallelism. Introduction to Multiprocessors, Shared memory architecture, Multi-threading, Interconnection networks and clusters. Architecture of recent CPUs and GPUs: Intel Dual and Quad core processors, NVIDIA Fermi and AMD Fusion processors.

UNIT II

Programming with MPI: Introduction, collective communication, programming model and GPU programming.

UNIT III

OpenCL programming on CPU/GPU/APU: Software and hardware overview. OpenCL for GPU/APU processor, memory access and architecture, communication between Host and GPU, device scheduling, terminology, programming model and example programs.

UNIT IV

Building and running OpenCL programs on GPU/APU: compiling, running calling conventions, predefined macros, debugging, setting the environment and breakpoint and sample GDP session.

UNIT V

OpenCL Applications on GPU/APU: Few examples of applications in Electromagnetic Estimations, Digital Signal Processing, Video processing and Image processing.

TEXTBOOK:

1. Aaftab Munshi, Benedict R. Gaster, Timothy G. Mattson and James Fung, "OpenCL Programming Guide", July 2011.

REFERENCES:

1. John L. Hennessy and David A. Patterson, "Computer Architecture – A Quantitative Approach", 3rd Edition, Elsevier Publications, 2003.
2. Peter S Pacheco, "A User's Guide to MPI"
3. Benedict Gaster, Lee Howes, David R Kaeli and Perhaad Mistry, "Heterogeneous Computing with OpenCL", August 2011.
4. AMD Accelerated Parallel Processing OpenCL Programming Guide, April 2011.

LABORATORIES

The experiments for the various laboratory courses for the B.E. (Computer Science and Engineering) programme will generally follow the theory subjects concerned, taking into account the needs of the course, the needs of the time and the technological advances.

The list of experiments will be prepared by the Head of the Department from time to time.

