KANNUR UNIVERSITY

Regulation, Scheme of Examination and Syllabus of

Bachelor of Computer Application (2007 Admission)

Objective:

On completion of the BCA Programme, the student should:

- Have sound knowledge of the theory behind the core subjects like, computer architecture, operating systems and system software, algorithms data structures, data bases, computer networks.
- Have sound skills in selected procedural and visual programming languages, designing databases and managing them, software engineering and web-based applications
- Be in a position to develop industrial applications.

Regulations:

1. **Eligibility:** Candidate of admission to the BCA programme should have passed the Higher secondary/Technical higher secondary /Vocational Higher secondary examinations of Govt. of Kerala or CBSE or ICSE or any other examinations recognized as equivalent there to by the Kannur University with ***Mathematics*** or **Computer Science** or **Computer Applications** as one of the optional subjects.

2. **Duration**: Duration of the course shall be 3 years. Each year should have 180 instructional days with 6 hours of instruction per day 5-days a week system. The Kannur University will conduct year-end examination.

3. **Admission:** Admission to the BCA shall be made on the basis of the total marks obtained for qualifying examination **plus** marks for Mathematics **plus** 20% of marks obtained in Computer Science (if the candidate studied Computer Science in the qualifying exam)

4. **Reservation of seats**: The rules applicable for reservation of seats for candidates belonging to various categories laid down by the University from the time to time shall be observed.

Examinations:

1) There shall be University examination at the end of every year in subject as prescribed under the scheme of examination.
2) Supplementary examinations will be conducted in the end of the academic year and middle of the academic year.
3) Candidate who failed in any paper need to appear only for that paper.
4) Practical examination will be conducted at the end of each year by the chairman of the Board of Examination in consultation with the principals of the colleges..
5) There shall be no improvement examination.

Eligibility for Degree

No candidate is eligible for degree of BCA unless one has passed all the papers in the scheme with a minimum of 50% mark in each paper.

Classification of Successful Student

Candidate who qualifies for the degree by passing all the paper prescribed paper in the first chance and secure an aggregate of not less than 75% shall be declared to have passed in the first class with distinction. The candidate who qualifies for the degree by passing all the papers with the aggregate of 60% mark shall be declared to have passed in first class. All other successful candidate shall be declared to have passed in the second class.

Ranking

Only those candidate who have passed all the papers including practical in the first appearance shall be considered for the purpose of ranking.

Question paper pattern for theory papers (External)

1. Part1. answer any five questions out of eight questions each question carries six mark
2. Part 2. answer any questions out of eight questions each questions carries ten marks.

3. Total mark is 80, Duration 3 hours.

The marks distribution for continuous assessment is as follows

a**) Theory Paper**

Attendance	4 marks
Assignment/Seminar	8 marks
Test paper	8 marks (Best two out of three)
Total	**20 marks**

b) **Practical Papers**

Attendance	4 marks
Regularity in completing Experimental assignment	4 marks
Record work	6 marks
Practical Test & Viva-voce	6 marks
Total	**20 marks**

Attendance:

The same marks will be awarded for all papers on the basis of the average attendance of the student concerned. The weightage of attendance for awarding marks shall be as follows.

c) **Attendance**

Below 75%	Nil
Between 75% and 79%	2 marks
Between 80% and 89%	3 marks
90% and above	4 marks

Condonation

Condonation of shortage of attendance to a minimum of 24 days in a year may be granted by the university on the health ground, for participating in University Union activities, meeting of the University bodies and participation in extracurricular activities.

Assignment:

Each student shall be required to do two or more assignment for each paper. Valued assignment shall be returned to the student.

Test paper:

A minimum of three tests for each paper should be conducted of which the best two performances will be counted for continuous assessment of each paper.

Seminar:

Seminar is compulsory. One seminar for each paper. Marks are awarded on the basis of the script (2 marks) and presentation (2 marks).

The seminar /assignment/test paper will be held at regular intervals to be notified in advance by the Department. These will be marked and returned to students with in two weeks of the conduct of the same.

One teacher nominated by the Head of the department by rotation will act as the coordinator for consolidating the mark list of continuous assessment. The consolidated mark list in the prescribed format will be published in the department notice board on the completion of the classes for that particular year under the seal and signature of Coordinator, Head of the department and the Principal.

PROJECT EVALUATION:

Internal Assessment

There shall be six components that will be considered in assessing a project work with weightage as indicated.

- Timely completion of assigned tasks as evidenced by team meeting minutes 20%
- Individual involvement, team work and adoption of industry work culture 10%

- Quality of project documentation (Precision, stylistics etc) 10%
- Achievement of project deliverables 20%
- Effective technical presentation of project work 10%
- Viva 20%

Based on the above 6 components internal mark (20)can be awarded.

External assessment

Dissertation /Project to be submitted at the end of third year shall be valued by two examiners appointed by University for the conduct of practical exam. A viva –voce exam based on the project work shall also be conducted by the same examiners. The Board of examiners shall award 60 marks based on the following components

Project Work

Achievement of project deliverables	20 marks
Effective technical presentation of project work	30 marks
Project Viva	30 marks
Total	**80 marks**

There shall be a common written exam conducted for the entire candidate in each group together for a minimum of 10 minutes. There shall be questions from any of the following areas: (i) project done by the student (ii) Objective of the project (iii) summery of the project.

Laboratory Record

Even though the evaluation of practical record is made through Internal Assessment (6 marks), a candidate shall be permitted to attend the practical exam only if he/she submit a certified bonafied record of practical work at the time of practical examinations.

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Result of each year

A candidate who have been registered for examination at the end of the first year and second year shall permitted to continue the course of study in the second year class and third year class respectively irrespective of the results of the first year and second year examination.

Grievance Redressel Mechanisms for Internal Evaluation.

There shall be provision for grievance redressel at three levels. Department level, College level and university level.

a) Department level committee: A committee consisting of the Head of the department and 2 senior teachers of the department nominated by the Principal shall monitor the evaluation of BCA course. The complaints regarding evaluation of students if any shall examined by the committee.

b) College level committee: A committee consisting of the Principal and 2 senior Head of the U.G department and 2 other senior teachers both nominated by the Principal constitute the college level committee. The principal shall be the chairman and a member nominated by the Principal shall serve as the convenor. This committee shall responsible for monitoring the U.G programme in Science subjects. The college level committee shall be reconstituted every year by the Principal.

c) University level committee: There shall be a University level committee appointed by the Vice-Chancellor, if need be to go the grievances not settled at the college level.

Scheme of Examination for BCA

Year	Paper	Subject	Internal	External	Total
First	1.1	Technical English	20	80	100
	1.2	Discrete Structures and Numerical Analysis	20	80	100
	1.3	Digital Computer Fundamentals	20	80	100

	1.4	C Language & Unix	20	80	100
	1.5	Data Base Management System	20	80	100
	1.6	Environmental Science	20	80	100
	1.7	LAB I - C and Unix	20	80	100
	1.8	LAB II - SQL and pg PL/SQL	20	80	100
Second	2.1	C++ and Data Structures	20	80	100
	2.2	Mathematics	20	80	100
	2.3	Operating System	20	80	100
	2.4	Java Language and AWT programming	20	80	100
	2.5	Assembly Language Programming	20	80	100
	2.6	Data Communication & network	20	80	100
	2.7	LAB III - C++ and Data Structures	20	80	100
	2.8	LAB IV - JAVA and AWT	20	80	100
Third	3.1	Internet Programming and XML	20	80	100
	3.2	Enterprise Java Programming	20	80	100
	3.3	Software Engineering	20	80	100
	3.4	Graphical User Interface Programming	20	80	100
	3.5	Linux System Administration	20	80	100
	3.6	Project	20	80	100
	3.7	LAB VI - IP and EJP	20	80	100
	3.8	LAB VII - VB and VC++	20	80	100
TOTAL MARKS					2400

FIRST YEAR

Paper 1.2 Discrete Structures and Numerical Analysis

Unit 1

Mathematical Logic:- Connectives : Negation .conjunction, disjunction, statements formulas and truth tables, conditional and biconditional, tautologies, duality laws,

two-state devices and statement logic; Normal Forms: Disjective normal forms, conjective normal forms, ordering uniqueness of normal forms; Theory of inferences: rules of inferences, consistency of premises and indirect method of proof; Predicate calculus ^Predicates, the statement function, '.variables and qualifiers, predicate formulas free and bound variables, universe of discourse.

Unit 2

Set Theory: Notation , inclusion and equality of sets ; Power set ; operations of sets ; Cartesian products ; relation ; types of relations ; Partial order relation, Partial order set ; Boolean algebra .Introduction ; definition ;duality ; basic theorems ; order and Boolean algebras ; Boolean expressions ; sum - of - Products form; minimal Boolean expressions; Karnaugh map simplifications

Unit 3

Numerical Methods: Root finding for nonlinear equations, Bisection method, Newton's method, Secant method *;* Interpolation Forward and backward finite differencing *;* divided differencing ; Newton's forward and backward interpolation methods ; Lagrange's interpolation formula ; Numerical integration : Trapezoidal rule *;* Simpson’s method *;* Newton - cotes integration formula; Numerical Differentiation : Numerical methods for solving ordinary differential equations ; Euler's method ; Picards method Runge Kutta method ; Taylor series method.

Unit 4

Graph : Definition, walks, path, trails, connected graph, regular and bipartite graph, cycles and circuits, Tree and rooted tree, spanning tree, eccentricity of vertex, radius and diameter of graph, central graph, center(s) of a tree. Hamiltonian and Eulerian graph, planar graph.

Unit 5

Topological Sort, Graph Propagation Algorithm, depth-first, breadth-first searches,

shortest-path algorithm, directed, acyclic graphs.

References

- An introduction to Numerical Analysis, Kendall E. Atkinson.
- Discrete Mathematical Structures with application to computer science, J P Tremblay, R. Manohar
- Discrete Mathematics for computer Scientists, Perason Edn 2002
- Essential Computer Mathematics, Seymour Lipschutz.

Paper 1.3 Digital Computer Fundamentals

Unit 1

Number Systems ; Conversion from one system to another, complements: 1's, 2's, 9's, 10's; Binary codes; Binary storage and registers; Binary logic;Logic gates, truth tables.

Unit 2

Boolean algebra; axioms; truth table simplification of Boolean function; Map method; Mc-Clausky tabulation method(2-variable, 6-variable); sequential logic; Flip flops; Registers; Shift Registers; Counters; Processor design; design of an accumulator; Introduction to computer design system configuration.

Unit 3

Block diagram of a digital computer: Input unit, Output Unit; Combinational logic adders, subtracters, decoders, encoders, multiplexers, demultiplexers.

Unit 4

Processor design; arithmetic logic unit; design of arithmetic circuit , design of logic circuit; status register; design of accumulator.

Unit 5

Computer design; System configuration; Computer instructions; Design of computer registers; Design of control; Computer console.

Reference:

- Digital Logic & Computer Design, Morris Mano
- Digital Principles & Applications, Malvino Leech
- Digital Circuits & Logic Design, Prentice Hall, Samuel C.Lee

Paper 1.4 C Language and UNIX

Unit 1

Introduction to UNIX: login, password, hostname; creating an account; Virtual consoles; shell and commands; logout; changing password; Files and Directories; pathname; Directory Tree; current working directory; relative pathname; referring to home directories; Commands to move around; creating new directories; copying files; moving files; Deleting files and directories; looking at files: cat, more; Getting online help; manual pages;

Unit 2

Fundamentals of C programming: Structure of a C Program; Data types: int, float, char, double, void; Operators and expressions: arithmetic operators, logical operators, expressions; Control Constructs: if, for, while; Arrays: declaration, multi-dimensional arrays; Functions: general form, arguments, return value; 11/0: formatted and unformatted input/output;

Unit 3

Advanced programming techniques: Control Constructs: do-while, switch

statements, break and continue, exit () function, go to and label; Scope Rules: local and global variables; Static and dynamic variables; Functions: parameter passing, call-by-value, call-by-reference, calling functions with arrays, argc and argv; Recursion. Pointers: The & and * operators; Pointer expression; Pointer assignments; Pointer arithmetic; Pointer comparison; The dynamic allocation functions: malloc and calloc; Pointers Vs Arrays; Arrays of pointers; Pointers to pointers; Initialing pointers; Pointers to functions; Function returning pointers; Functions with variable number of arguments.

Unit 4

Structures and Unions: Basics of ~structures; Declaring a structure; Referencing structure elements; Array of structures; Passing structure to functions; Structure pointers; Arrays and structures with in structures; Unions: declaration and use; Enumerated data-types; Typedef; Linked list: single and double, insertion and deletion of elements; Binary trees.

Unit 5

Miscellaneous Features: File-Handling: File pointer; File accessing functions: fopen, fclose, putc, getc, fpr itf, fscanf; C Preprocessor: #define, #include, #undef; Conditional compilation directives: #if, #else, #elif, #endif, #ifdef, #ifndef: Standard Library and header files; I leader files: stdio.h, ctype.h, string.h, math.h, stdlib.h, stdarg.h, time.h; Standard library functions; String functions; Mathematical functions; Date and time functions.

Reference

- Programming Language, Kernighan & Richie, Prentice-Hall of India Pvt Ltd
- Computer Programming in C, Rajaraman, Prentice-Hall of India Pvt Ltd
- Data Structures using C and C++ Tenenbaum, Prentice-Hall of India Pvt Ltd
- Understanding UNIX, Srirengan Prentice-Flail of India.

Paper 1.5 Database Management System

Unit 1

Database concepts, ER model, basic concepts, constraints, Keys, ER diagram, Reduction of ER schema, UML, design of an ER database schema, relational model, relational algebra, views, tuple relational calculus, domain relational calculus, relational database, SQL- basic structure, set operations, sub queries, joint relation, DDL, DML, embedded SQL, QBE.

Unit 2

Integrity and security, domain constraints, referential integrity, assertion, triggers, authorization in SQL, relational database design- 1st, 2nd, 3rd, 4th, BCNF, 5th Normal forms.

Unit 3

Object relational data model, nested relations, complex types, inheritance, reference types, querying with complex types, functions and procedures, object oriented vs object relational, storage and file structure, physical storage media, file organization, organization of records in file, data dictionary storage, storage for object oriented data bases.

Unit 4

Indexing and hashing, basic concepts, static hashing, dynamic hashing, multiple key accesses. Query processing, selection operation, sorting, join operation. Transaction concepts, state, atomicity and durability, serialisability, transaction definition in SQL. Concurrency control, protocols, deadlock handling.

Unit 5

Database system architecture, centralized and client server architecture, server system architecture, parallel systems, networks types, distributed database,

homogeneous and heterogeneous database, distributed data storage. Case study - PostgreSQL.

References

1. Silbersehatz, Korth and Sudarshan, Database system concepts, MGH 2002
2. Ramakrishnan and Gehrke, Database Management Systems, 3rd Edn, Me Graw Hill, 2003
3. A Leon & M Leon, Database Management Systems, Leon Vikas - 2003.
4. ELmasri and Navathe, Fundementals of Database systems, Pearson 2004
5. O'Reilly, Practical PostgreSQL Shroff Publishers(SPD) 2002.

SECOND YEAR

Paper 2.1 C++ and Data Structures

Unit 1

Concept of Object orientation – why related data and methods should be kept as a single unit – comparison with procedural and structured programming – Classes and objects – data abstraction, encapsulation, inheritance, polymorphism, dynamic binding, message passing. Advantages of object orientation – reusability, maintenance, security, comfort in programming. Evolution of OOP – history of C and C++. Review of features of C++ common with C and also minor variations; Input and output streams in C++; Basic data types and declarations.

Unit 2

Classes: Definition, member variables; member functions; Initialization; public and private member; friends; member name qualification; static members; class objects and members; Array of class objects; Derived Classes: Base class and derived class; constructor and destructor; Class hierarchies; virtual function; abstract class; multiple inheritance; Access control; private, public and protected base class; Multiple occurrences of a base class; Ambiguity resolution; Virtual Base class;

Unit 3

Operator functions: Operator functions; binary and unary operator functions; function overloading; operator overloading; increment and decrement Functions; predefined meanings for operators; 'new' constructor function; friends and members; templates;

Unit 4

Data Structures: Introduction; Arrays, List, Linked List – Singly Linked, doubly Linked, Circular, Circular Linked Lists. Representation of linked list in memory, Traversing linked list, Searching a linked list, Insertion into a linked list, Deletion from a linked list; Stack: Array representation, Linked list representation, Stack operations; PUSH and POP, Queues; Array representation, Linked list representation Queue Operations & Dequeues.

Unit 5

Trees: Binary trees, Representing binary tree in memory, Traversing binary tree, Binary search tree; Sorting: Insertion sort, Selection sort, Bubble sort; Searching: Binary search, Linear search; Hashing.

Reference

Programming in C++ by Balaguru Swamy

The C++ Programming Language by Bjarne Stroustrup, Addison Wesley publishing Company 1997.

Introduction to Data structures and Algorithms with C++, Rowe, Prentice-Hall of India Pvt Ltd

Practical C++ Programming, O'Reilly & Associates, Inc.

Schaum's Outline Series Theory and Problems of Data Structures

Fundamentals of Data Structures – Sahini, Horowitz

Introduction to Data Structures – Jean Trembly & Sorenson

Paper 2.2 Mathematics

Unit 1

DETERMINANTS:definition,Minors,Cofactors,Properties of Determinants

MATRICES: Definition, Types of Matrices, Addition, Subtraction, Scalar Multiplication and Multiplication of matrices, Adjoint, Inverse, Cramers rule, Rank of Matrix Dependence of Vectors, Eigen Vectors of a Matrix, Caley Hamilton Theorem(without proof).

Unit 2

PROBABILITY distributions, random variables, binomial distributions, hyper geometric distribution,, Mean and variance of a probability distribution, Chebyscheve's theorem , Poisson approximation to the Binomial, Poisson process, Geometric distribution, Normal distribution, Normal approximation to binomial distribution, Uniform distribution, Log-Normal distribution, Gamma distribution, Beta distribution, Weibull distribution

Unit 3

Sampling distributions and Inference concerning Means:-Population and samples, The smpling distribution of the mean(known and unknown),sampling distribution of variance, point estimation, Bayesian estimation, Tests of Hypothesis, The null hypotheses and the significance tests, Hypotheses concerning one mean, Operating characteristics curves, Inference concerning two means.

Unit 4

Correlation and regression analysis:-Curve fitting, the method of least squares, inference based on the least square estimators, curvilinear regression , correlation ,Fisher's transformation, inference concerning correlation coefficient

Unit 5

Stochastic process-Classification of stochastic process – Discrete parameter Markov Chains-Continuous parameter markov chains-Birth and death process-Queueing models and its characteristics – classification of queueing models-(M/M/I):(FCFS)Multi server model) and (M/M/C):(N/FCFS)

Reference

1. S Grewal, "Elementary Engineering Mathematics" 34th Ed. 1998
2. A textbook on Engineering Mathematics, by N P Bali Etal, laxmi Publications.
3. Probability and Statistics for Engineers, Johnson, R A Miller
4. Levin, R I & Rubin D S , Statistics for Managements
5. Statistics-Concepts of applications, Harry frank & Steven C Atheoen.

Paper 2.3 Operating System

Unit 1

Basic Structures: Introduction - mainframe systems, desktop systems, Multiprocessor systems, Distributed systems, Clustered systems, real time systems, Hand held systems, Computing environments. Computer System structures - Computer system operation, I/O Structure, storage structure, Storage hierarchy, Network structures. Operating system structures- System components, Operating systems services, System calls , system programs, system structure, Virtual machine, System design and implementation.

Unit 2

Process management : Processes - Process concepts , Process scheduling, Operations on Process. Cooperating Process, Inter Process communication in Client/ Server system. Threads- multi threading models, Threading issues, P thread, Linux and Java Threads. CPU Scheduling - Basic concepts, Scheduling criteria, Scheduling algorithms, Multiple processor Scheduling, Real time Scheduling, Algorithm evaluation. Process Scheduling models. Process Synchronization - Critical section Problem, Synchronization hardware, Semaphores, Classic problems of

synchronization, Critical region, monitors, OS Synchronization , Atomic transaction. Deadlocks - System models, Deadlocks characterization, Method for handling Deadlocks. Deadlock prevention, Deadlock avoidances, Deadlock detection, recovery from Deadlocks.

Unit 3

Storage Managements : Memory management- swapping, Contiguous memory allocation, Paging Segmentation, Segmentation with paging. Virtual memory- Demand paging, processes creation, page replacement, allocation of frames, thrashing. File system interface and Implementation- File concepts, access methods, directory structure, File system mounting. File sharing, Protection, File system structure, File system implementation, Directory implementation, allocation methods, free space managements, efficiency and performance, Recovery , Log-structured file system, NFS.

Unit 4

I / O Systems : I / O hardware, application I/O interface, Kernel I/O subsystem, Transforming I / O to hardware operations, STREAMS, Performances. Mass storage structure - Disk structure, Disk scheduling, Disk management, Swap space managements, RAID structure, Disk attachments, Stable storage implementation, Tertiary storage structure.

Unit 5

Protection and Security- goals and domain of protection, Access matrix and implementation revocation of access rights, security problem, user authentication, software threats , system threats intrusion and detection ,cryptography, classification

References

1. A. Silberschaw, P.B. Galvin, G. Gagne , Operating System Concepts, John Wiley and Sons, 2003.
2. Dhamdhere, Operating Systems, TMH 2002.

3. A.S. Tanenbaum &, A.S. Wbodhull, Operating Systems, Pearson Edn, 2002.

Paper 2.4 Java Programming and AWT

Unit 1

Introduction: features of Java: - object oriented, distributed, interpreted, robust, secure,architectureneutral,portable,high-performance,multithreaded and dynamic; Applet and standalone programs; HTML tags to run applets; Java file name and directory structure; Java CLASSPATH; Globally unique package names; Packages of Java API.

Unit 2

C++ and Java Comparison: - Program Structure and Environment; Command line arguments; Exit value. Environment variables; Package statement; Import statement; Access to packages, classes, and class members; local variables; comments; constants; Unicode and Character Escapes. Primitive data types: - Boolean, char, byte, short, int, long, float, double; Reference data types; if/else, while and do/while statements; switch statement; for loop; labeled break and continue statements; exception handling:-try, catch, throw, throws and finally statement

Unit 3

Classes and Objects: Classes and objects; Creating and accessing objects;. Constructor definition; Multiple constructors; Method overloading; Class variables; Static methods; Object finalization; Subclasses and Inheritance; Extending a class; Super class and class hierarchy; Constructor chaining; Default constructor; Shadowed variables and methods; Overriding methods; Final methods; Abstract class and interfaces; Inner Classes; Multithreading; Exploring java.io package;

Unit 4

Abstract Windowing Toolkit: Introduction to GUI; widgets, controls and components; Java components and containers; component creation; standard components:-

button, canvas, checkbox, choice, file dialog, label, list, scrollbar, text area, text field; menu component: - Menu, Menu Bar, MenuComponent, MenuItem, PopupMenu; Containers:- Dialog, Frame, Panel, ScrolePlane, Window; Layout Management: - GridLayout, BorderLayout, Handcoded Layout; Dialogs;

Unit 5

Java 1.1 Event Model: - Java.awt.event package; event source and event listener; Event Classes: - Action Event, Focus Event, Item Event, Key Event, Mouse Event, Text Event and Window Event; Listener Interfaces:- Action Listener, Focus Listener, Item Listener, Key Listener, Mouse Listener, Mouse Motion Listener, Text Listener, and Windows Listener; Listener Methods action performed, focus gained, focus lost, key pressed, key typed, mouse clicked, mouse moved, window closed etc.; writing event driven applications in Java.

Reference

Java in a Nutshell A desktop quick Reference, 2 Edition David Flanagan, OReilly & Associates, Inc.

Using Java 1.2, Morgan, Prentice-Hall of India Pvt Ltd

Java 2 from Scratch, Haines, Prentice-Hall of India Pvt Ltd

The complete reference Java2, Herbert Schildt

Paper 2.5 Assembly Language Programming

Unit 1

Data representation - Data types- complements, fixed point and floating point representation and other binary codes - micro operations: Register transfer language, register transfer, bus and memory transfer, arithmetic, logic, and shift micro operations, arithmetic logic shift unit - micro programmed control - control memory - address sequencing - micro program example - Design of control unit.

Unit 2

Central Processing unit: General register and stack organizations, instruction format- addressing modes, data transfer and manipulation - program control, RISC- Pipe Lining- arithmetic instruction - Vector processing - array processor. Computer Arithmetic -addition and subtraction, multiplication and division, floating point and decimal arithmetic operations.

Unit 3

Input output organization - peripheral devices, I/O interface, asynchronous data transfer, modes of transfer, priority interrupt, direct memory access, I/O processor, serial communications. Memory organization: Memory hierarchy - main memory - auxiliary memory -associative, cache and virtual memory, memory management hardware -multiprocessor: interconnection structures, inter processor arbitration.

Unit 4

Machine Language instructions, Instruction execution timing, 8088. Assembler language Programming -Assembler instruction format, Data Instructions, Arithmetic instructions, Branch instructions, Loop instructions, Logical instructions, Shift & rotate instructions, Assembly process.

Unit 5

Modular Programming :- Linking & relocation, Stacks, Procedures, Interrupt & Interrupt routines, Macros, Program design, Program design examples. I/O Programming:- Fundamental I/0 considerations, Programmed I/O, Interrupt I/0, I/0 design examples.

References

1. Computer Architecture , Hamachure
2. The INTEL microprocessors 8086/8088,80186/80188,80286/80386,Pentium & Pentium Pro Processor Architecture, Programming & Interfacing, Barry B.Brey
3. Microcomputer Systems: The 8086/8088 Family Architecture, Programming & Design, Yu-cheng Liu & Glenn A. Gibson

Paper 2.6 Data Communication and Networks

Unit 1

Introduction, Network Hardware, Software, Reference Model, Internet, ATM, Physical Layer, Transmission Media, Wireless Transmission, Switching - circuit switching, packet switching, message switching, hybrid switching -j Communication satellites.

Unit 2

Data Link Layer design issues, Error detection and correction, link protocols, Sliding Window protocols, Data Link Layer in the Internet

Unit 3

Medium access layer, Channel allocation problem, Multiple access protocols, Ethernet, Wireless LAN, Bluetooth.

Unit 4

Network Layer, design issues, Routing Algorithms, Congestion Control algorithms, Internetworking, Internet Protocol, IP address, Internet Control Protocol.

Units 5

Transport Layer, Design issues, Connection Management - addressing, establishing and releasing a connection, Simple Transport Protocol, Internet Transport protocol, E-mail, Network security, Cryptography.

Reference books:

1. A.S. Tanenbaum, Computer Networks, Fourth Edition, Pearson Education , 2003.

2. Fred Halsall, Data Communications, Computer Networks and Open Systems, 4th Edn, Pearson Education, 2003

3. B. Forouzan, Introduction to Data Communication and Networking, 3rd Edn, TMH, 2004

THIRD YEAR

Paper 3.1 Internet Programming and XML

Unit 1

Introduction to Internet and Web. HTTP – protocol:- introduction, elements of URL,HTTP request and HTTP response cycle request line , requst headers, status line, server headers, proxies, caching, content negotiation

Unit 2

Hypertext Markup Language: Structure of HTML document; Tags and attributes, syntax of tag, starting and ending tags, tags without ends; Document content, character entities, comments; HTML document elements, <html> tag, dir and lang attributes; <title> tag; Document body, <body> tag; Text basics, divisions and paragraphs, heading, physical style tags, action attributes, enctype attribute; Method attribute, post, get; <input> tag; Controls, check boxes, radio buttons, action buttons, submission buttons, hidden fields; labelling and grouping; Form elements; Tables: Table head, row, column; attributes align, colour, border, height, width, colspan, rowspan; Frames:Frame layout; <frameset> tag, row and cols attributes; Controlling frame; Borders and spacing; Frame contents; Attributes src, name, noresize, scrolling, margin width, margin height, frame border, border colour; <noframe> tag; Inline frames; Named Frames.

Unit 3

Introduction- CGI Environment, File handles – STDIN, STDOUT, STDERR , CGI Environment variables- auth type, content type , query string etc., Reading environment variables, CGI directory, Running simple CGI programs, CGI output-partial headers, ouputing documents, forwarding to another URL, specifying ,

status code, common status headers, User Authentication and Identification, Forms and CGI – Decoding form inputs: GET method and POST methods, CGI programs to generate dynamic documents based on user input data using GET and POST method, CGI and Database Functions, Application programs to interact with database in web server to select, insert, update, delete , Running the CGI database programs

Unit 4

Introducing XML: XML basics, gaps in html, what is XML, the components of XML. How is XML used, defining your own tag sets XML syntax fundamentals-tags, entity references, comments, processing instructions, document type declarations (DTD); Data Modeling: XML data modeling basics, modeling data with DTD's, modeling data with XML schemas, comparing the two data modeling approaches; DTD : Well-formed and valid document, document type declarations and document data structure, Internal and external DTD's. More about elements-empty element, element-only element, mixed elements, any element. More about attributes-string attribute enumerated attributes, tokenized attributes. Valid document from a DTD. Document structure and entities, character and entities, working with entities, declaring notations, using conditional sections

Unit 5

XML Namespace! Basics of namespace, Namespace declaration, default declaration, explicit declaration; Formatting XML with cascading style sheet (CSS) and XSL: Style sheets basics, CSS and XSL basics, Comparing XSL and CSS. Cascading style sheets- The display property, the width and height properties, the border properties, the margin properties, the color properties, the text properties, the font properties, making CSS style sheets. XSL- template and patterns, XSLT template and constructs. Working of XML document, need to parse XML document; XLINK and XPOINTER: linking in the html, Xlink, something bout Xpath, link attributes, Xpointer, location paths. XML Script, XML scripting option, Document object model.

Reference:

- Sandra ElEddy and John E.Schnyder, Teach your self XML. iDO books India

Michael Morrison, et al, XML, Techmedia

- HTML & XI-ITML the definitive guide, Chuch Musciano & Bill Kennedy O'Reilly & Associates, Inc.
- XML Complete Reference
- XML Bible

Paper 3.2 Enterprise Java Programming

Unit 1

Java Database Connectivity: JDBC architecture; Drivers, JDBC-ODBC bridge, native API partly java driver, Net Protocol all Java driver, Native protocol all Java driver; Connecting to Database; statements; Multiple result sets; Large data types; Handling Errors; SQL warning; Metadata, database meta data, result set meta data; Transactions; Stored procedure; Batch updates; Binary large objects; Character large objects.

Unit 2

Remote Method Invocation: RMI architecture; RMI Object services; Naming/registry service, object activation service, distributed garbage collection; Defining Remote objects; Key RMI classes for remote object implementations; Stubs and skeletons; Accessing remote object as a client; Remote method arguments and return values; Factory classes; Dynamically loaded classes; Configuring clients and servers for remote class loading; Loading class from Applets; Remote object activation, persistent remote references; Defining an activatable remote object, activatable class, implementing an activatable object, registering activatable objects, passing data with the Marshalled object; Activation groups, registering activation groups, assigning activatable objects to groups; Activation daemon, dual personality.

Unit 3

Java Servlets: Life cycle; HTTP Servlets, forms **and** interaction; **POST,** HEAD and

other requests; Servlet responses; Servlet requests; Error handling, status codes; Security; Servlet chaining; Custom Servlet Initialisation; Thread safety; Server side includes; Cookies; Session tracking; Http session binding listener; session contexts; Databases and non-html content; Request dispatching; Shared attributes; Resource abstraction.

Unit 4

Common Object Request Broker Architecture: Introduction to CORBA, About Object management group, CORBA architecture, architectural similarities, CORBA versus Java RMI, CORBA services, CORBA facilities-Vertical CORBA facilities, Horizontal facilities. CORBA domains. IDL Compiler, Interface definition language, IDL stub, IDL Skelton interface , Repositories, Object request broker; Naming service;

Unit 5

Inter-ORB communication; Creating CORBA objects; IDL, modules, interfaces, data members and methods; IDL and Java; Simple server class, helper class, holder class, client and server stubs; Initializing ORB, Registering with a naming service; Adding objects to a naming context; Finding remote objects; Initial ORB references; Getting objects from other remote objects, Stringified object references; Dynamic invocation interface.

Reference:

- Java Enterprise in a nutshell by David Flanagan and Jim Parley, O'Reilly Associates Inc.

Paper 3.3 Software Engineering

Unit 1

Definition of Software and software engineering, Software problems-software is expensive, Late, Costly, and unreliable, problem of change and rework. Software

engineering problem- The problem of scale, cost, schedule and quality, the problem of consistency. Software engineering approach-phased development approach, project management and metrics. Software process-Characteristics of software process- predictability, support testability and maintainability, early defect removal and defect prevention;

Unit 2

Software development life cycles- Feasibility study, Requirement analysis, Design, Coding, Testing, Implementation & Maintenance. Feasibility study-Technical, Operational, Economical. Requirement analysis- Informal approach, structured analysis, Object oriented modeling, Prototyping. Software requirement specification-need for SRS, Characteristics of an SRS, and Components of an SRS. Validation-Requirement reviews;

Unit 3

Design principles-external design, internal design, problem portioning and hierarchy, abstraction, modularity, Top-down and Bottom up strategies, coupling, and cohesion. Structured design methodology-restate the problem as DFD, identify the most abstract input and output data, First level factoring, Factoring output and transform branches. Verification-design walkthroughs, critical design review, Consistency Checkers. Object oriented Design-OO analysis, OO Design, classes, objects, information hiding, inheritance, polymorphism, association, aggregation, UML diagrams;

Unit 4

Project management process- Phases of management process, metrics, Measurement and models, Risk management. Software development process-A process step specification, Waterfall model, prototyping, Iterative enhancement, Spiral model, component assembly model. Software configuration management-Configuration identification, Change control, Status accounting and auditing Process management process- Building estimation models, process improvement and maturity;

Unit 5

Testing- Testing fundamentals, White box, Black box testing. Software testing strategies- unit testing, integration testing, and system testing, Maintenance- Definition and characteristics, Corrective & Adaptive maintenance Reverse engineering and Re Engineering ;

Reference:

- Pressman, Software Engineering and applications, Fourth edition
- PANKAJ JALOTE, An integrated approach to software engineering, Second edition

Paper 3.4 Graphical User Interface Programming

Unit 1

Visual Basic: What is Visual Basic , Structure of a VB Application, Steps in developing Applcation, drawing the user interface and setting properties , setting properties of objects at design time and at runtime variables, VB data types , variable declaration, VB operators and functions, Branching statements – if then , goto, Looping statements, VB Tools , arrays, control arrays

Unit 2

Designing an application, using general sub procedures in applications, creating a codemodule, adding menus to an application, note editor, assigning icons to forms, creating VB Executable files, error types, debugging VB programs, debugging strategies, sequential files, writing and reading text using sequential files. Random access files , writing and reading text using random access files , graphics methods, using colors, mouse events, timer tools and delays, animation techniques. Database structure and terminology, ADO data controls, connection strings, assigning tables, bound data tools, database management, customs controls, multiple form visual

basic applications, VB multiple document interface (MDI), creating a help file

Unit 3

Visual C++: Integrated Development environment; Resource Editor, Class Wizard, Adding Message Functions, Overriding Virtual Functions of base class; Dialog based program structure, CwinApp Class: InitInstance; Cdialog class: OninitDialog, DoModal, OnOk, UpdateData, OnPaint, MoveWindow; Device Context classes CDC, CClinentDC, CPaintDC; TextOut, SetBkMode, SetColor, SetTextColor, MoveTo, LineTo, Ellipse; Writing Simple dialog based programs

Unit 4

ODBC Classses: ODBC, Database drivers, Data source Name; Connecting Visual C++ program to remote database. Cdatabase Class: Open, Close; CrecordSet Class Establishing connection, MoveFirst, MoveNext, MovePrev, MoveLast functions. Adding, Editing and deleting records, Edit, AddNew, Update Functions; Sorting and filtering reocrds; m_strSort and m_strFilter variables; Creating simple database editing programs

Unit 5

Database Access Technologies: ODBC Architecture; Service Provider Interface Model; Role of ODBC Application Data Source , Driver Manager, Driver and network software ODBC Drivers; ODBC Driver API Conformance Levels; Core API, Level 1 and 2 API; ODBC Driver SQL grammar conformance levels; ODBC applications programming, handles, transactions, transaction isolation levels, concurrency, ACID, consistency and measuring database transactions Block cursors; Scrollable cursors; cursor library support; Programming protocol; ODBC Tarpits, Division of labor; Procedural solution, bookmarks, buffers, comparing columns, data source catalog, extression in SQL query, limiting a result set, list boxes, managing a BLOB, mixed mode expressions, output data binding, preparing SQL statement primary keys, recombining strings , record length, search limited, SQLExtendedfetch

Reference:

The MFC Programmer's Reference by Robert D Thompson

Windows Architecture I & II MCSD Study guide by Bruce T Prendergast

Paper 3.5 Linux System Administration

Unit 1

Introduction: Various parts of operating system: kernel, system programs, and application programs; system calls; Important parts of kernel; Major services in a UNIX system: init, login from terminals, syslog, periodic command execution crown and at; Graphical user interface; Bourne shell scripts: scripts execution, permissions and file magic, variables and parameters, inherited environment, if else elsif constructs, conditional tests, case statement, for construct.

Unit 2

Boot Process: The LILO boot process: LILO parameters, /etc/lilo.conf; loadlin; The /boot directory and files; initrd file and mkinitrd; Run levels: /etc/inittab, start-up script /etc/rc. d/rc. sysinit; System initialization scripts:/etc/rc.d/rc.seriai, /etc/rcd/rc.local, /etc/issue, /etc/issue.net, /etc/rc.d/init.d/.. scripts operation, starting X windows automatically;

Unit 3

System Configuration: The /etc/sysconfig/... files used in network setup: */etc/sysconfig/network-scripts/ files (parameter files and scripts),* /etc/sysconfig files for clock, mouse, static-routes, keyboard, network and pcmcia; kernel modules; kernel daemon; /etc/modules.conf and module parameters; [lib/modules!... directory structure and contents. File system configuration: file system types, /etc/fstab layout and meaning; Basic user environment: /etc/skel/... and home directories, Window manager configuration file locations;

Unit 4

System security: Host security: tcp_wrappers and /etc/hosts.allow and */etc/hosts.deny,* /etc/security, shadow password, file permissions, users groups **and** umask; Adding and deleting users; Printing: /etc/printcap file, adding local and remote printers, etc/hosts.lpd file, print filter system for local printers, using lpc, lpq and lprm;

Unit 5

System maintenance:Syslogd, klogd and /etc/syslog.conf; Using a remote syslog; The system crontab, dailyscript, tmpwatch and logrotate; Using and managing the system log files; Basic system backup and restore operations; Emergency rescue operations; Basic shell configuration for Bourne and bash shells: /etc/bashrc, /etc/profile, ~/bashrc, ~/.bash profile, ~/.profile.

Reference:

- Unix Power Tools, O'Reilly & Associates, Inc.
- Essential System Administration, O'Reilly & Associates, Inc.
- Red Hat Linux 7 by Bill Ball, David Pitts, et al, Techmedia Publication

Sd/-

Dr. N.K. Narayanan

Chairman, BOS , Computer Science (CD