

Annexure No.	31 N
SCAA Dated	29.02.2008

BHARATHIAR UNIVERSITY : COIMBATORE
POST GRADUATE DIPLOMA IN COMPUTER APPLICATIONS
For School of Distance Education

(For the students admitted during the Academic Year 2007-2008)

Scheme of Examinations

Year	Subject and Paper		University Examinations	
			Durations in Hrs	Max Marks
I	Paper I	Digital Computer Fundamentals and Computer Architecture	3	100
	Paper II	Data Structures using 'C'	3	100
	Paper III	Operating Systems	3	100
	Paper IV	Software Engineering	3	100
	Practical	Data Structures & Operating System Lab	3	100
		Total		500

PAPER – I : DIGITAL COMPUTER FUNDAMENTALS & COMPUTER ARCHITECTURE

Subject Description: This paper presents the concept of number systems, Boolean Algebra and Computer Architecture.

Goal: To enable the students to learn the Computer Fundamentals and Architecture of the Computer.

Objectives: On successful completion of the course the students should have:

- Understand the concept of Computer Fundamentals
- Learnt the Architecture of the Computer

Contents:

Unit – I: Number Systems

Digital Computer and Digital Systems – Binary Numbers – Number Base Conversion – Octal and Hexa Decimal Numbers – Complements – Binary Coders.

Unit – II: Boolean Algebra

Boolean algebra and Logic Gates : Basic Definitions – Axiomatic Definition of Boolean Algebra Boolean Functions – Canonical and Standard Forms – Other Logical Operations – Digital Logic Gates – 1C Digital Logic Families – Semiconductor Memories – Bipolar – CMOS – ROM –RAM –PROM – EPROM. Simplification of Boolean Functions – The map method – product of Sums – sum of products – simplifications – NAND and NOR implementation. Don't Care Conditions – the tabulation method.

Unit – III: Combinational Logic & Sequential Logic

Introduction – Adders – Subtractors – Code conversion - Binary Parallel Adder – Decimal Adder – Decoder – encoder – Multiplexers – DeMultiplexers.

Introduction – Flip Flops – Flip Flop excitation tables – Design counters – Registers, Counters. Registers – shift Registers. – Ripple Counters.

Unit – IV: Computer Organization & Central Processing Unit

Organization of Computer – characteristics – machine language – assembly language – rules of the languages – translation to binary – register transfer language – register transfer.

Central processing Unit: ALU – General Register organizations – control word – examples of micro operations – stack organization – instruction formats – addressing modes – data transfer and manipulation program controls.

Unit – V: Input – Output Organization & Memories

Peripheral devices – I/O interface – Synchronous and Asynchronous data transfer – Mode of transfer – priority interrupt – DMA – IOP. Micro computer memory – auxiliary memories – associative memory – cache memory – virtual memory.

Reference Books

1. Morris Mano, “ Digital Logic and Computer Design” – Prentice Hall of India – 1998.
2. Morris Mano, “Computer System Architecture” – Prentice Hall of India – 1998.
3. Thomas C. Bartee, “Computer Architecture and Logical Design” McCraw Hill International Edition 1998.
4. John P Hayes, “Computer Architecture and Organization” – McGraw Hill International 3rd Edition – 1998.

PAPER – II : DATA STRUCTURES USING C

Subject Description: This paper presents the concept of Data Structures and ‘C’ Language.

Goal: To enable the students to learn the Data Structures and implement its concepts in ‘C’ Language.

Objectives: On successful completion of the course the students should have:

- Understand the concept of Data Structures
- Implement Data Structure concept using ‘C’ Language

Contents:

Unit – I:

Programming development methodologies – Programming style – problem solving techniques : algorithm, flowchart, Pseudocode – Structure of a program – C character set Delimiters – Keywords – Identifiers – Constants – Variables – Rules for defining variables – Data types – Declaring and initializing variables – Type conversion.

Operators and Expressions – Formatted and Unformatted I/O functions – Decision statements – loop control statements.

Unit – II:

Arrays – String and its standard functions. Pointers – Functions – Preprocessor directives: #define, #include, #ifdef, Predefined Macros.

Unit – III:

Structure and Union: Features of structure, Declaration and initialization of structure, Structure within structure, Array of structure, Pointer to structure, Bit fields, Enumerated data types, Union.

Files: Streams and file types, Steps for file operation, File I/O, Structures read and write, other file functions, Command line arguments, I/O redirection.

Unit – IV:

Linear data structures: introduction to data structures – List: Implementations, Traversal, Searching and retrieving an element, predecessor and successor, Insertion, Deletion, Sorting, Merging lists – Stack: Representation, Terms, Operations on stack, Implementation.

Single linked list, Linked list with and without header, Insertion, Deletion, Double linked list - Queues: Various positions of queue, Representation.

Unit – V:

Searching and Sorting – Searching: Linear, Binary.

Sorting – Insertion, Selection, Bubble, quick, Tree, Heap.

Reference Books:

1. Ashok N Kamthane, “Programming and data structures” – Pearson Education, first Indian print 2004, ISBN 81-297-0327-0.
2. E Balagurusamy : programming in ANSI C, Tata McGraw-Hill, 1998.
3. Ellis Horowitz and Sartaj Sahni: fundamentals of Data Structure, Galgotia Book source, 1999.
4. Data structure using C – Aaron M Tanenbaum, Yedidyeh langsam, Moshe J Augenstein, PHI Pub.

PAPER – III : OPERATING SYSTEMS

Subject Description: This paper presents the concept of Operating System and UNIX operating system.

Goal: To enable the students to learn the Operating System, MS – DOS and UNIX.

Objectives: On successful completion of the course the students should have:

- Understand the concept of Operating System.
- Learnt UNIX and MS-DOS Operating Systems

Contents:

Unit – I:

Introduction & process Concept: Definition of DOS – Early History – History of DOS & UNIX OS. Definition Of process – Process states – process states transition – Interrupt Processing – Interrupt classes – context switching – semaphores – deadlock & indefinite postponement.

Unit – II:

Storage management Real Storage: Real Storage management strategies – Contiguous Vs non- contiguous storage allocation – Fixed partition multiprogramming – Variable partition multiprogramming, Multiprogramming with storage swapping.

Virtual Storage: Virtual storage management strategies – Page replacement strategies – Working sets – Demand paging – page size.

Unit – III:

Processor Management Job and Processor Scheduling: Preemptive Vs Non-preemptive scheduling – Priorities – Deadline scheduling – FIFO – RR – Quantum size – SJF – SRT-HRN.

Distributed Computing: Classification of sequential and parallel processing – Array processors – Dataflow computers – Multiprocessing – Fault Tolerance.

Unit – IV:

Device and Information Management Disk Performance optimization : Operation of Moving head disk storage – Need for disk scheduling – Seek Optimization – FCFS – SSTF – SCAN-RAM Disks – Optical Disks.

File and Database systems: File System – functions – organization – Allocating and freeing space – File descriptor – Access control matrix.

Unit – V:

Case Studies:

MS – DOS: Introduction – Early History of MS – DOS – User’s view of MS-DOS – the Systems view of MS-DOS – The future of MS-DOS.

UNIX: Introduction – History – The Shell – The Kernel – File System – Process management – Memory Management – the Input/Output System.

Reference Books

1. H.M. Deitel, “Operating System”, Second Edition, Pearson Education Publ, 2003.
2. Achyut S Godbole, “Operating Systems”, TMH Publ, 2002.

PAPER – IV : SOFTWARE ENGINEERING

Subject Description: This paper presents the concept of Software Engineering.

Goal: To enable the students to learn the different phases of Software Engineering.

Objectives: On successful completion of the course the students should have:

- Understand the Software Engineering Technology.
- Learnt different Software testing techniques.

Contents:

Unit – I:

Introduction – The evolving role of s/w – s/w crisis – s/w myths – s/w engineering technology – the s/w process – s/w process models – the prototyping model.

Unit– II:

Requirements Engineering – System modeling – requirements analysis and elicitation for s/w – s/w prototyping – specification – mechanics of structured analysis – data dictionary – elements of analysis model – data modeling – functional modeling and information flow.

Unit – III:

Object oriented design – design for object – oriented systems – the system design process – s/w design and s/w engineering – the design process principles – design concepts – effective modular design – design heuristics for effective modularity.

Unit – IV:

Mapping requirements into a s/w architecture – transform mapping – transaction mapping – user interface design – interface design activities – s/w testing techniques – s/w testing fundamentals – white box testing – Basis path testing – control structure testing – Black Box testing.

Unit – V:

Software testing strategies – A strategic approach to s/w testing – validation testing – system testing – the art of debugging – s/w quality – s/w reengineering – reverse engineering – Building blocks for CASE – a taxonomy of CASE tools.

Reference Books:

1. Roger S Pressman, “Software Engineering”, 5th Edition. TMH Publishers.
2. Watts S Humphrey, “A discipline for Software Engineering”, Pearson Education Publishers, 2001.
3. Ian Somerville, “Software Engineering”, 6th Edition, Pearson Education Publishers, 2001.

PRACTICAL – I : DATA STRUCTURES & OPERATING SYSTEM LAB

DATA STRUCTURES LIST OF PROGRAMS:

1. Write a Program to create Array Creation & Operations.
2. Write a Program to create Stack and Queue Operations.
3. Write a Program to create Polynomial Addition.
4. Write a Program to create Linear Search.
5. Write a Program to create Binary Search.
6. Write a Program to create Linked List
7. Write a Program to create Quick Sort.
8. Write a Program to create Merge Sort.
9. Write a Program to create Bubble Sort.

OS LAB:

1. Write a shell script which receives two filenames as arguments. Check whether the file contents are same or not.
2. Write a shell script which gets executed the moment the user logs in.
3. Write a function GO would change the \$ Prompt to the current directory name in which you are working. Thus if you working in \usr\acc the prompt should look like \usr\acc.
4. Write a shell script which displays a:
 - a) List of all files in the current directory to which you have read, write and execute permissions.
 - b) Receive any number of file names as arguments and whether the argument supplied is a file or directory. If it is a directory it should appropriately reported. If it is a file name then name of the file as well as the number of lines present in it should be reported.
5. Write a shell script to search a file from the current directory in any of the sub-directories and report the path.
6. Create a file called test which contains sample data as follows,

a00001	Shanthi	80
a00007	Arun	70
s00005	Karthi	50

Answer the following questions based on the above data:

- a) Display the contents of the file sorted according to the marks in the descending order.
- b) Display the names of the students in the alphabetical order ignoring the cases.
- c) Display the list of students who have scored marks between 60 and 80.
- d) Display the list of students and their register number.
7. Write a Shell Script to check if the input string is a Palindrome.
8. Write a Shell Script to accept two file names and check if both exist. If the second file name exists then the contents of the first filename should be appended to it. If the second file name does not exist then create a new file with the contents of the first file name.
9. Write a shell script to accept a number in the command line and display the sum up to that number.
10. Write a shell script to prepare a pay slip.

Model Question Papers

POST GRADUATE DIPLOMA IN COMPUTER APPLICATIONS

PAPER I : DIGITAL COMPUTER FUNDAMENTALS & COMPUTER ARCHITECTURE

Time : 3 Hrs

Marks : 100

Answer five out of eight questions (5 x 20 = 100)

1. Explain about Complements in Number Systems.
2. Write short notes on: i) PROM
ii) EPROM.
3. Brief notes on NAND and NOR implementation.
4. Explain about De Multiplexers.
5. Write short notes on Flip Flops.
6. Explain the organization and characteristics of Computer.
7. Discuss about stack organization in CPU.
8. Brief notes on DMA with suitable example.

PAPER II : DATA STRUCTURES USING C

Time : 3 Hrs

Marks : 100

Answer five out of eight questions (5 x 20 = 100)

1. Explain about variables and rules for defining variables.
2. Discuss about loop control statements with suitable example.
3. Explain about Pointers in C.
4. Short notes on: i) Structure within structure
ii) Array of structure.
5. Explain about Command line Arguments.
6. Write short notes on Stack with example program.
7. Short notes on: i) Single Linked List
ii) Double Linked List.
8. Write brief notes on Bubble sort with example.

PAPER III : OPERATING SYSTEMS

Time : 3 Hrs

Marks : 100

Answer five out of eight questions (5 x 20 = 100)

1. Explain about process state transition.
2. Write short notes on fixed partition multiprogramming.
3. Explain about virtual storage management strategies.
4. Discuss about deadline scheduling.
5. Explain about array processors in distributed computing.
6. Write brief notes on seek optimization.
7. Explain about file descriptor.
8. Write short notes on i) The Shell
ii) The Kernel.

PAPER IV : SOFTWARE ENGINEERING

Time : 3 Hrs

Marks : 100

Answer five out of eight questions (5 x 20 = 100)

1. Explain about software myths.
2. Write brief notes on software prototyping.
3. Explain about data modeling.
4. Short notes on i) Software design
ii) Software engineering.
5. Write brief notes on transform mapping.
6. Explain about white box and black box testing.
7. Discuss about: i) Validation testing
ii) System testing.
8. Explain about reverse engineering.