Annexure No.	31 J
SCAA Dated	29.02.2008

BHARATHIAR UNIVERSITY, COIMBATORE – 641 046

M. Sc COMPUTER SCIENCE

For School of Distance Education

(Effective from the academic Year 2007-2008)

Scheme of Examinations

Year	Subject and Paper		University Examinations	
			Durations in Hrs	Max Marks
I	Paper I	Advanced Computer Architecture	3	100
	Paper II	Computer Graphics & Multimedia	3	100
	Paper III	Software Engineering	3	100
	Paper IV	Computer Networks	3	100
	Practical I	Computer Graphics and Multimedia Lab	3	100
II	Paper V	Advanced Operating System	3	100
	Paper VI	Internet programming and Web Design	3	100
	Paper VII	Data Mining and Warehousing	3	100
	Practical II	Internet programming and Web Design Lab	3	100
	Project	Project Work and Viva Voce		100
	Total			1000

For project work and viva voce (External) Breakup:

    Project Evaluation   : 75
    Viva Voce   : 25

1

YEAR – I

PAPER I: ADVANCED COMPUTER ARCHITECTURE

Subject Description: This paper presents the concept of parallel processing, solving problem in parallel processing, Parallel algorithms and different types of processors.

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

Objectives: On successful completion of the course the students should have:
> ➢ Understand the concept of Parallel Processing.
> ➢ Learnt the different types of Processors.
> ➢ Learnt the Parallel algorithms.

Content:

Unit I

Introduction to parallel processing – Trends towards parallel processing – parallelism in uniprocessor Systems – Parallel Computer structures – architectural classification schemes – Flynn' Classification – Feng's Classification – Handler's Classification – Parallel Processing Applications.

Unit II

Solving problems in Parallel: Utilizing Temporal Parallelism – Utilizing Data Parallelism – Comparison of Temporal and Data Parallel Processing – Data parallel processing with specialized Processor – Inter – task Dependency. Instructional Level parallel processing – Pipelining of Processing Elements – Delays in Pipeline Execution – difficulties in Pipelining.

Unit III

Principles Linear Pipelining – Classification of Pipeline processors – General Pipeline and Reservation tables – Arithmetic Pipeline – Design Examples – Data Buffering and Busing structure – Internal forwarding and Register Tagging – Hazard Detection and Resolution – Job sequencing and Collision prevention – Vector processing requirements – Characteristics – Pipelined Vector Processing methods.

Unit IV

SIMD Array processors – Organization – Masking and Data routing – Inter PE communications – SIMD Interconnection Networks – Static Vs Dynamic – Mesh connected Illiac – Cube interconnection network – Shuffle – Exchange and Omega networks – Multiprocessor Architecture and programming Functional Structures – interconnection Networks.

Unit V

      Parallel Algorithms: Models of computation – Analysis of parallel Algorithms Prefix Computation – Sorting – Searching – Matrix Operations.

Reference Books:

1   Kai Hwang, Faye A. Briggs, "Computer Architecture and Parallel Processing" Mc Graw – Hill Book Company, 1985 [I, III UNITS]

2   V. Rajaraman, C. Siva Ram Murthy, " Parallel computers Architectures and Programming", PHI,2003 [II, IV UNITS]

3   Kai Hwang, "Advanced Computer Architecture – Parallelism, Scalability, Programmability", Mcgraw Hill, 1993.

4   Michael J. Quinn, 'parallel Computing Theory and Practice", TMCH, Second Edition, 2002.

5   Barry Wilkinson, Micheal Allen, "Parallel Programming : Techniques and Applications", Prentice Hall, 1999.

PAPER II: COMPUTER GRAPHICS AND MULTIMEDIA

Subject Description: The first part of this paper presents the overview of Graphics system, two dimensional three dimension concepts and surface detection methods.

The second part of this paper presents the introduction to Multimedia. Multimedia building blocks and animation.

Goal: To enable the students to develop Graphics and Multimedia programs.

Objectives: On successful completion of the course the students should have
- ➢ Learnt the concepts of Graphics.
- ➢ Learnt the concepts of two and three dimensional objects.
- ➢ Learnt the multimedia concepts.
- ➢ Learnt image, animation and Video.

Content:

Unit I

A Survey of Computers Graphics – Overview of Graphics Systems – Output primitives: points and Lines, DDA, Bresenham's Algorithm, properties of Circles & Ellipse, Pixel Addressing.

Unit II

Two Dimensional Geometric Transformations : Basic Transformations, Matrix Representations, Composite Transformations – Line Clipping – Two Dimensional Viewing – Graphical User interfaces and Interactive Import Methods.

Unit III

1 Three Dimensional Concepts – Three Dimensional Object Representations: polygon Surfaces – Curved Lines and Surfaces.

2 **Surface Detection Methods:** Classification of Visible – Surface Detection Algorithms, Back face Detection, Depth – Buffer Method.

Unit IV

What is Multimedia – Introduction to making Multimedia – Basic Software Tolls – Multimedia building blocks – Text – Sound.

Unit V

Images – Animation – Video.

Reference Books:

1 Donald Hearn, M. Pauline Baker, "Computer Graphics C Version" Second Edition, Pearson Education.
2 Zhigangxiang, Roy Phastock, "Computer Graphics", 2nd Edition, TMCH.
3 Tay Vaughan, "Multimedia making it work", Fifth Edition, Tata McGraw Hill.
4 John F. Koegel Bufford, "Multimedia Systems", Pearson Education.
5 Judith Jeffloate, "Multimedia in Practice (Technology and Applications)", PHI, 2003.

PAPER III: SOFTWARE ENGINEERING

Subject Description: This course presents the Software Engineering, Web Engineering project management and component based development.
Goals: To enable the students to develop the effective software.
Objectives: On successful completion of the course the students should have

> ➢ Understood the steps involved in Software Engineering.
> ➢ Learn Different methods in Software Engineering.
> ➢ Learnt Web Engineering.
> ➢ Learnt Risk Management, Quality Management.
> ➢ Learnt component based development.

Content:
Unit I

    Introduction to Software Engineering : The evolving role of software – the changing nature of software – software myths – A process frame work – process technology – Process model – Agile process model.

Unit II

    Applying Web Engineering: Attributes of web based systems and applications – Web app engineering layers – Process – Practices – Web based systems – Planning web engineering projects – Team issues – Requirement analysis for webapp – Model – Architecture design – Object oriented hyper media design method – Testings.

Unit III

    Project Management : The management spectrum – Estimation – Resources – Decomposition techniques – Empirical estimation models – project scheduling – Defining the tasks – Risk management – Quality management – Software configuration management – The SCM process.

Unit IV

    Advanced topic in Software Engineering : Formal methods – Basic concepts – mathematical preliminaries – Mathematical notations – Forma specification languages – Object constraint languages – The Z specifications – The ten commandments of formal methods – The clean room approach – Functional specification – Clean room design – Clean room testing.

Unit V

    Component based development: Engineering of component based systems – The CBSE process – domain engineering – Component based development – classifying and retrieving components – Economics of CBSE – Re – engineering: Business process re-engineering – Software re-engineering – Reverse engineering – Restructuring – Forward engineering – The economics of re-engineering.

Reference Books:
1. Roger S. pressman, 'Software Engineering – A practitioner's Approach", 6th edition, McGraw Hill International Edition, 2005.

PAPER IV: COMPUTER NETWORKS

Subject Description: this Paper Present of Different overview of LAN/WAN, Internet Protocol and Application Layer.

Goal: To enable the students to learn the basic concept , functions and Principles of LAN/WAN and Internet Protocol.

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

> ➢ Learnt the concept of LAN/ Wan.
> ➢ Learnt the functions and principles of Internet Protocol and application layer.

Content:

Unit I

   Introduction to digital networks – WAN –WAN standards – Introduciton TCP/IP and Internet – network technologies – TCP/IP features, protocol standards Internetworking concepts and Architectural model – Network interface layer.

Unit II

   IP layer: Internet Address – Mapping Internet Address to physical Address – Determining an Internet address at strartup – Transparent gateways and subnet addressing – multicast addressing – client server model of interaction – bootstrap protocol – domain name system – address discovery and binding

Unit III

   Internet Protocol: Connectionless Datagram delivery – data Structures and input processing. Routing IP datagrams – error and control messages – protocol layering – user data gram protocol – reliable stream transport service –fragmentation and reassembly. Routing: cores – peers and algorithms – autonomous systems – interior gateways protocols – routing table and routing algorithms.

Unit IV

   UDP: User data grams. TCP: Data Structures and Input processing – finite state machine implementation – output processing – timer management – flow control and adaptive retransmission – urgent data processing and the push function – socket level interfaces.

Unit V

   Application layer: Remote login – File transfer Access – electronic mails – Internet management. X.25 networks and support networks.

References Books:

1. Douglas E. Comer, "Internetworking with TCP/IP Volume I" , Prentice Hall, 1991.
2. Douglas E. Comer, David L. Stevens, "Internetworking with TCP/IP Volume II" , Prentice Hall, 1991.
3. Uyless Black, "TCP/IP & Related Protocols" McGraw – Hill, 1995.

RACTICAL I: COMPUTER GRAPHICS AND MULTIMEDIA LAB

1   Line Drawing Algorithm. (DDA, Bresenham's)
2   Circle Drawing algorithm.
3   Transformation.
4   Text Clipping.
5   Line Clipping Cohen Surther land Algorithm.
6   Problems using simple Multimedia packages.

YEAR II

PAPER V: ADVANCED OPERATING SYSTEM

Subject Description: This paper presents the evolution of Operating System, concepts of operating system Inter process communication, Distributed Operating System and Unix Operating System.
Goals: To enable the students to learn the concepts of Operating System and Unix Operating System.
Objectives: On successful completion of the course the students should have

- ➢ Understood the concepts of Operating System.
- ➢ Understood the Interprocess communication.
- ➢ Understood the concepts distributed Operating System.
- ➢ Understood the UNIX Operating System.

Content:

Unit I
        Introduction – Evolution of operating systems – Serial , simple Batch, Multiprogrammed Batch, timesharing, distributed and Real time operating systems – Computer Hardware review – Interrupts – Operating System Concepts – Processes – Model – Creation – Termination – Process Hierarchy – Process States – implementation of Processes – Threads – Thread Usage – Implementation of Threads in User Space and Kernel space – Multithreading.

Unit II
        InterProcess Communication - Race condition – Critical Region – Mutual Exclusion – sleep and wakeup – Semaphores – Mutexes – Message passing.
Classical IPC problems: The Dining Philosophers Problem – The Readers and Writers Problem – The Sleeping Barber Problem – Producer Consumer problem.

Unit III

Distributed Operating System Concepts & Design – Fundamentals – Remote Procedure Calls – The RPC Model – Transparency of RPC – Implementing RPC mechanism- Stub Generation – RPC Messages – Server Management – Parameter – Passing Semantics – Call Semantics – Communication Protocol for RPCs.

Distributed File System: Introduction – Desirable Features – File Models – File – Accessing Models – File Sharing Semantics – File Caching Schemes – File Replication.

Unit IV

Unix : Architecture of Unix Operating System – Introduction to system concepts – Kernel data structures – Internal representation of Files – Inodes – Algorithms for allocation and Releasing inode – Structure of a Regular file – Directories – Super block – Algorithm for assigning new Inode and freeing Inode – allocation of Disk blocks – Process states and transition – layout of system memory – The context of a Process.

Unit V

Process Control in Unix – algorithm for Fork system call – Algorithm for Exit – algorithm for Wait – Algorithm for Exec – Uses of Exec – Algorithm for Booting the Unix system – Algorithm for Init process – process scheduling algorithm – Example of Process scheduling in Unix. Example C programs by using fork, exec, wait, exit system calls.

Reference Books:
1 Andrew S. Tanenbaum, " Modern Operating System", PHI/Pearson Education Asia, Second Edition, 2001 [Units I,II]
2 Pradeep K. Sinha, " Distributed operating systems concepts and design" prentice – Hall of India, 2002 [Unit III]
3 Maurice J. Bach, "The Design of the Unix operating System", Prentice – Hall of India, 1998. [Units IV,V]
4 William Stallings, "Operating Systems", Prentice Hall of India, Second Edition,2000.

PAPER VI: INTERNET PROGRAMMING AND WEB DESIGN

Subject Description: This Paper presents introduction to internet, HTML, Java script and Dynamic HTML.

Goals: To enable the students to write programs for internet and to develop web applications.

Objectives: On successful completion of the student should have:
  - ➢ Understood the internet.
  - ➢ Learnt HTML. Intermediate HTML and dynamic HTML
  - ➢ Learnt Java Script.

Content:

Unit I

  Introduction to computers and the Internet: history of the world wide web Hardware trends – The say software trend: Object Technology – Java Script: Object – based scripting for the web – browser portability.

  Introduction to HTML : Introduction – markup language – editing HTML – common tags – headers – text styling – liking images – formatting text with <FONT> special characters, horizontal rules and more line breaks – internet and www resources.

Intermediate HTML : Introduction – Unordered Lists – nested and ordered lists – basic HTML tables – intermediate HTML tables and formatting – basic HTML forms – more complex HTML forms – internal liking – creating and using images maps <META> Tags, <FRAMESET> tags – internet and www resources.

Unit II

  Java Script – Introduction to scripting: Introduction – memory concepts – arithmetic – decision making – java script internet & www resources.

  Java script control structures : If , if / else selection structure while, for do/while repetition structure – switch multiple – selection structure – break and continue Statements – Laballed Break and continue Statements – Logical Operators.

  Java Script Functions : Introduction – Program Modules in Java Script – programmer – Defined Functions – Functions – Duration of Identifiers – Scope Rules – Recursion – Recursion Vs Iteration – Java Script Global Functions.

Unit III

  Java Script Arrays: Introduction – Arrays – Declaring and Allocating Arrays – References and References Parameters – Passing Arrays to functions – Sorting Arrays – searching Arrays – Multiple Subscripted Arrays.

  Java Script Objects: Introduction – Thinking about Objects – Math String, Data, bookan and Number Objects.

  Dynamic HTML : CSS : Introduction – Inline Styles – Creating Style Sheets with the Style Element – Conflicting Styles – Linking External Style Sheets – Positioning Elements – Backgrounds – Element Dimensions – Text flow and the Box model – user Style Sheets – Internet & www resources.

Unit IV

  Dynamic HTML: Object model and collections: Introduction – Object Referencing – Collections all and Children – Dynamic Styles – Dynamic Positioning – using the Frames Collection – navigator object.

9

Dynamic HTML : Event model : Introduction – event ON CLICK – Event ON LOAD – error handling with ON ERROR – Tracking the mouse with event ON MOUSE MOVE – Rollovers with ON MOUSE OVER and ONBLUR – more form processing with ON SUBMIT and ON RESET – event Bubbling more DHTML events.

Dynamic HTML : Filters and Transitions : Introduction – Flip filters : Flipu and Fliph – transparency with the Chroma filter – Creating Images filters : Invert, Gray and x ray – Adding Shadows to Text – Creating Gradients with Alpha – Making Text Glow – Creating Motion with blur – using the Wave filter – Advanced filters : Drop Shadow and Light – Transitions I : Filter Transition II : Filter Reveal Trans.

Dynamic HTML : client Side Scripting with VB Script : Introduction – Operators – Data Types and Control Structures – VB Script Functions – Arrays – String manipulation Classes and Objects – Internet & www resources.

Unit V

Active Server Pages (ASP): Introduction – How ASP Work – Client – Side Scripting Versus – Server Side Scripting – Using Personnel Web Server or Internet Information Server – Server – Side Activex Components – File System Objects Session Tracking and cookies – Accessing a Database form an ASP – Internet & www resources.

CGI and Perl : CGI - Introduction to Perl – Configuring Personal Web Server or Perl/CGI – String Processing and Regular Expressions – Viewing Client/ Server Environment Variables – Form Processing and Business Logic – Server – Side Includes – verifying a username and password – sending E-Mail from a web browser – using ODBC to connect to a Database – cookies and Perl – Internet & www resources.

XML : Introduction – Structuring Data – Document Type Definitions – Customized Markup Language – XML Parsers – XHTML – Internet & www resources.

Reference Books:

1. Deitel, Deitel, Nieto, "Internet and World Wide Web – How to program", Pearson Education Asia, 2003.
2. Thomas A. Powell, "The Complete Reference HTML and XHTML", fourth Edition, Tata McGraw Hill Pub. Company Ltd.
3. Achyut s. Godbole, Atul Kahate, "Web Technologies – TCP / IP to Internet Application Architectures", Tata McGraw – Hill Pub. Company Ltd, 2003.

PAPER VII: DATA MINING AND WAREHOUSING

Subject Description: This Paper presents introduction to Data mining, Classification, Clustering and data warehousing.

Goals: To enable the students to understand the concept of data mining and techniques of data mining.

Objectives: On successful completion of the student should have:

➢ Understood the concept of data mining.
➢ Learnt Classification, Clustering and Data warehousing.

Content:

Unit I

Basic data mining tasks – data mining versus knowledge discovery in data bases- data mining issues – data mining metrices – social implications of data mining – data mining from a database perspective.

Data mining techniques: Introduction – a statistical perspective on data mining – similarity measures – decision trees – neural networks – genetic algorithms.

Unit II

Classification: Introduction – Statistical based algorithms – Distance based algorithms – decision tree based algorithms – neural network based algorithms – rule based algorithms – combining techniques.

Unit III

Clustering: Introduction – Similarity and distance measures – Outliers – Hierarchical Algorithms – Partitional Algorithms.

Association rules: Introduction – large item sets –basic algorithms – parallel and distributed algorithms – comparing approaches – incremental rules – advanced association rules techniques – measuring the quality of rules.

Unit IV

Data warehousing: An Introduction – characteristics of a data warehouse – data marts – other aspects of data mart. Online analytical processing: Introduction – OLTP & OLAP systems – data modeling – star schema for multidimensional view – data modeling – multifact star schema or snow flake schema – OLAP TOOLS – State of the market – OLAP TOOLS and the inernet.

Unit V

Developing a data WAREHOUSE: why and how to build a data warehouse – data warehouse architectural strategies and organization issues – design consideration – data content – meta data distribution of data – tools for data warehousing – performance considerations – crucial decisions in designing a data warehouse.

Applications of data warehouse and data mining in government: Introduction – national data warehouses- other areas for data warehousing and data mining.

Reference Books:

1. Margaret H. Dunham, "Data mining Introductory and advanced topics",
   Pearson education, 2003.
2. C.S.R. Prabhu, "Data warehousing concepts, techniques, products and applications", PHI,
   Second Edition.
3. Arun K. Pujari, "Data mining Techniques", Universities Press (India) Pvt. Ltd., 2003.
4. Alex Berson, Stephen J.Smith, "Data warehousing, data mining & OLAP TMCH, 2001
5. Jiwei Han & Micheline Kamber, "Data mining Concepts & Techniques", 2001, Academic
   press.

PRACTICAL II: INTERNET PROGRAMMING
AND WEB DESIGN LAB

1   Simple Web page & Website Design for a Department, College, Company etc.
2   Exercises using HTML.
3   Exercises using JavaScript.
4   Exercises using DHTML.
5   Exercises using ASP.
6   Exercises using perl and XML.

BHARATHIAR UNIVERSITY, COIMBATORE 46
M.Sc Computer Science (SDE)

MODEL QUESTION PAPERS

PAPER I : ADVANCED COMPUTER ARCHITECTURE

Time : 3 hrs   Marks : 100

Answer five out of eight questions (5 x 20 =100)
1. Explain the architectural classification schemes.
2. Compare the Temporal and Data Parallel Processing. Explain.
3. Explain about Delays in Pipeline Execution.
4. Discuss about Data Buffering and Busing structure in detail.
5. Write short notes on :
   i) Vector processing requirements.
   ii) Characteristics of Vector processing.
6. Write brief notes on SIMD Interconnection Networks.
7. Explain :
   i)   Multiprocessor Architecture.
   ii)   Programming Functional Structures.
8. Analyze the Parallel Algorithms.

PAPER II : COMPUTER GRAPHICS AND MULTIMEDIA

Time : 3 hrs   Marks : 100

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

1. Write about the Overview of Graphics Systems.
2. Explain Bresenham's Algorithm.
3. Discuss the various Basic 2D Transformations.
4. Write short notes on:
   i) Graphical User interfaces.
   ii) Interactive Import Methods.
5. Write in detail about – Curved Lines and Surfaces.
6. Explain Back face Detection method.
7. Discuss about MIDI versus Digital Audio.
8. How animation helps multimedia?

PAPER III : SOFTWARE ENGINEERING

Time: 3 hrs   Marks : 100

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

1. Write about the software myths. Compare it with the realities.
2. Write short notes on :
   i) Web app engineering layers.
   ii) Requirement analysis for webapp.
3. Explain Risk management.
4. Write about The SCM process.
5. Explain the Forma specification languages.
6. Discuss about the clean room approach.
7. Write in detail about the Economics of CBSE.
8. How Software re-engineering is done? Explain.

PAPER IV : COMPUTER NETWORKS

Time : 3 hrs   Marks : 100

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

1. How does TCP/IP support internet? Mention the different features of TCP/IP.
2. Explain the functioning of ARP.
3. Explain the BOOTP. How is the BOOTP message format represented?
4. How is the data delivered properly under the Connectionless Datagram delivery method?
5. Write about interior gateways protocols.
6. Explain UDP and its functions.
7. Explain the socket level interfaces.
8. Write about various protocols used for electronic mails.

PAPER V : ADVANCED OPERATING SYSTEM

Time : 3 hrs   Marks : 100

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

1. Explain different kinds of Operating System.
2. Write about Process Hierarchy, Process States and Implementation of process.
3. Explain any two Classical IPC problems.
4. Write in detail about Remote Procedure Call.
5. Discuss about File Sharing Semantics and File Caching Schemes.
6. Write short notes on:
   > i) Architecture of Unix Operating System.
   > ii) Kernel data structures.
7. Algorithm for assigning new Inode and freeing Inode.
8. Give an example for Process scheduling in Unix.

PAPER VI : INTERNET PROGRAMMING AND WEB DESIGN

Time : 3 hrs   Marks : 100

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

1. How HTML is used for:
   > i) Text Styling.
   > ii) Linking Images.
   > iii) Creating and Formatting Tables.
2. Write a program to create a feedback form using HTML
3. Write a Java program to print the sum of first 20 Fibonacci Numbers.
4. Explain about Java Script Control Structures.
5. Write short note on CSS with Example. Give the uses of CSS.
6. Explain Event model in Dynamic HTML.
7. How is VB Script implemented in Dynamic HTML?
8. Discuss about Document Type Definitions in XML.

PAPER VII : DATA MINING AND WAREHOUSING

Time : 3 hrs   Marks : 100

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

1. Discuss about Data mining versus knowledge discovery in data bases.
2. Give brief notes on neural networks.
3. Write about decision tree based algorithms.
4. Explain the various Hierarchical Algorithms.
5. Explain the advanced association rules techniques.
6. Explain OLAP TOOLS.
7. Brief notes on tools for data warehousing.
8. Explain National data warehouses.