Annexure No.	31 A
SCAA Dated	29.02.2008

BHARATHIAR UNIVERSITY :: COIMBATORE – 641 046

REGULATIONS FOR M. Sc. COMPUTER SCIENCE DEGREE COURSE
with Semester System *(Affiliated Colleges)*
(Effective from the academic Year 2007-2008)

1. Eligibility for Admission to the Course

    Candidates for admission to the first year course leading to the degree of Master of Science (M. Sc.,) in Computer Science will be required to possess: A pass with 50% of Marks in BSc (Computer Science/Electronics/Software Systems)/B.C.A./B.Sc (Applied Science – Information Technology/ Computer Technology)/ B. Sc (CT / IT). In case of SC/ST candidates, a mere pass in the qualifying examination will be sufficient.

2. Duration of the Course

    This M. Sc., (Computer Science) course shall be based on Semester System. This Course shall consist of four Semesters covering a total of two Academic Years. For this purpose, each Academic Year shall be divided into two Semesters; the first and third Semesters; July to November and the second and the fourth Semesters; December to April. The Practical Examinations shall be conducted at the end of every Semester.

3. Course of Study

    The Course of the Degree of Master of Science in Computer Science shall be under the Semester System according to the Syllabus to be prescribed from time to time. This Course consists of Core Subjects and Elective Subjects. There shall be one Paper on applied Skill Oriented, subject preferably in each semester as part of the adjunct Diploma Programme DSQA (Diploma in Software Quality Assurance)

4. Scheme of Examinations

Distribution of Marks
            Core   - 1800
            Diploma   -   400
            Total Marks   - 2200

M. Sc. (COMPUTER SCIENCE) WITH
COMPULSORY DIPLOMA IN SOFTWARE QUALITY ASSURANCE
(Affiliated Colleges)
(Effective from the academic Year 2007-2008)

Sem		Subject and Paper	Instructional Hours per week	University Examinations	
				Duration in Hrs	Max Marks*
I	Paper I	Advanced Computer Architecture	4	3	100
	Paper II	Analysis & Design of Algorithms	5	3	100
	Paper III	Object Oriented Analysis and Design & C++	5	3	100
	Paper IV	Advanced Networks	4	3	100
	Paper V	Advanced Software Engineering	4	3	100
	Practical I	Algorithm and OOPS Lab	5	3	100
	Dip. Paper I	Diploma Paper I	3	3	100
II	Paper VI	Data Mining and Warehousing	5	3	100
	Paper VII	Advanced Operating System	5	3	100
	Paper VIII	Advanced Concepts of Internet & Web	5	3	100
	Paper IX	Elective – I	6	3	100
	Practical II	Advanced Operating System & Internet Applications Lab	6	3	100
	Dip. Paper II	Diploma Paper II	3	3	100
III	Paper X	Digital Image Processing	5	3	100
	Paper XI	Advanced Tools in Computing	5	3	100
	Paper XII	Network Security and Cryptography	5	3	100
	Paper XIII	Elective – II	5	3	100
	Practical III	Advanced Tools in Computing Lab	4	3	100
	Dip. Paper III	Diploma Paper III	3	3	100
	Dip. Paper IV	Diploma Paper IV	3	3	100
IV	Project Work and Viva Voce				200
Total	M. Sc. (COMPUTER SCIENCE) DIPLOMA IN SOFTWARE QUALITY ASSURANCE				1800 400

∗   Includes 25% continuous internal assessment marks.

For project work and viva voce (External) Breakup:
        Project Evaluation   : 100
        Viva Voce   : 50

ELECTIVES FOR SECOND SEMESTER

ELECTIVE – I

      E.1.1. Software Testing
      E.1.2. Distributed Computing
      E.1.3. Neural Network and Fuzzy Logic
      E.1.4   Artificial Intelligence & Expert Systems

ELECTIVES FOR THIRD SEMESTER

ELECTIVE – II

      E.2.1. Multimedia and its Applications
      E.2.2. Embedded Systems
      E.2.3. Natural Language Processing
      E.2.4. Simulation and Modeling

      Practical examinations will be conducted with one internal examiner and one external examiner and the question paper for practical examination will be set by both Internal and External examiners. One external examiner for every 30 students will be appointed to conduct viva-voce examinations during sixth semester.

5. Requirement to appear for the Examinations

a) A candidate will be permitted to take the University Examination for any Semester, if he/she secures not less than 75% of attendance out of the 90 instructional days during the Semester.

b) A candidate who has secured attendance less than 75% but 65% and above shall be permitted to take the Examination on the recommendation of the Head of the Institution to condone the lack of attendance as well as on the payment of the prescribed fees to the University.

c) A candidate who has secured attendance less than 65% but 55% and above in any Semester, has to compensate the shortage of attendance in the subsequent Semester besides, earning the required percentage of attendance in that Semester and take the Examination of both the Semester papers together at the end of the latter Semester.

d) A candidate who has secured less than 55% of attendance in any Semester will not be permitted to take the regular Examinations and to continue the study in the subsequent Semester. He/she has to re-do the Course by rejoining the Semester in which the attendance is less than 55%.

e) A candidate who has secured less than 65% of attendance in the final Semester has to compensate his / her attendance shortage in a manner to be decided by the Head of the Department concerned after rejoining the Course.

6.   Restriction to take the Examinations

a) Any candidate having arrear paper(s) shall have the option to take the Examinations in any arrear paper(s) along with the subsequent regular Semester papers.

b) Candidates who fail in any of the papers shall pass the paper(s) concerned within 5 years from the date of admission to the said Course. If they fail to do so, they shall take the Examination in the revised Text / Syllabus, if any, prescribed for the <u>immediate next batch of candidates.</u> If there is no change in the Text / Syllabus they shall take the Examination in that paper with the Syllabus in vogue, until there is a change in the Text or Syllabus.

In the event of removal of that paper consequent to the change of Regulations and / or Curriculum after a 5 year period, the candidates shall have to take up on equivalent paper in the revised syllabus as suggested by the chairman and fulfill the requirements as per Regulations/Curriculum for the award of the Degree.

7. The Medium of Instruction and Examinations

The medium of instruction and Examinations shall be in English.

8. Submission of Record Notebooks for Practical Examinations & Project Viva-Voce.

Candidates taking the Practical Examinations should submit bonafide Record Note Books prescribed for the Examinations. Otherwise the candidates will not be permitted to take the Practical Examinations.

Candidates taking the Project Viva Examination should submit Project Report prescribed for the Examinations. Otherwise the candidates will not be permitted to take the Project Viva-voce Examination.

9. The Minimum (Pass) Marks

A candidate shall be declared to have passed in a paper if a student obtains not less than 50% of marks in that paper. A candidate shall be declared to have passed the whole Examination if the student passes in all the papers.

10. Improvement of Marks in the subjects already passed

Candidates desirous of improving the marks secured in their first attempt shall reappear once within the subsequent Semester. The improved marks shall be considered for classification but not for ranking. If there is no improvement there shall not be any change in the original marks already awarded.

11. Classification of successful candidates

A candidate who passes all the Examinations in the first attempt within a period of two years securing 75% and above marks in the aggregated shall be declared to have passed with First Class with Distinction.

Successful candidates passing the P.G. Degree Examinations, securing 60% marks and above shall be declared to have passed the examination in First Class. All other successful candidates shall be declared to have passed the Examination in Second Class.

12. Ranking

A candidate who qualifies for the PG Degree Course passing all the Examinations in the first attempt, within the minimum period prescribed for the Course of Study from the date of admission to the Course and secures 1st or 2nd Class shall be eligible for ranking and such ranking will be confined to 10% of the total number of candidates qualified in that particular subject to a maximum of 10 ranks.

The improved marks will not be taken into consideration for ranking.

13. Conferment of the Degree

No candidate shall be eligible for conferment of the Degree unless he / she has undergone the prescribed Course of Study for a period of not less than four Semesters in an Institution approved of by and affiliated to the University or has been exempted there from in the manner prescribed and has passed the Examinations as have been prescribed.

14. Evening College

The above Regulations shall be applicable for candidates undergoing the respective Courses in the Evening Colleges also.

15. Revision of Regulations and Curriculum

The above Regulation and Scheme of Examinations will be in vogue without any change for a minimum period of three years from the date of approval of the Regulations. The University may revise /amend/ change the Regulations and Scheme of Examinations, if found necessary.

16. Transitory Provision

Candidates who have undergone the Course of Study prior to the Academic Year 2007-2008 will be permitted to take the Examinations under those Regulations for a period of four years i.e. up to and inclusive of the Examination of April 2012 thereafter they will be permitted to take the Examination only under the Regulations in force at that time.

****

Paper I   : ADVANCED COMPUTER ARCHITECTURE

Subject Description
        This Course presents the Advanced Computer Architecture emphasizing parallel processing, solving problems in parallel and SIMD processors.
Goals
 To enable the students to learn the parallel processing and SIMD arrays.
Objectives
 On successful completion of the course the students should have:
 • Understood the trends and principles of parallel processing in computers.
 • Gained problem solving skills using parallel algorithms.
Contents
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.
    2. V. Rajaraman, C. Siva Ram Murthy, "Parallel Computers Architectures and Programming", PHI, 2003.
    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   :   ANALYSIS & DESIGN ALGORITHMS

Subject Description
This course presents an introduction to the algorithms, their analysis and design and various methods like divide and conquer method, Dynamic programming, backtracking and parallel models.
Goals
To enable the students to learn the Elementary Data Structures and algorithms.
Objectives
On successful completion of the course the students should have
- Understood the various design and analysis of the algorithms.

Contents
UNIT I
        Introduction:- algorithm definition and specification – performance analysis – Elementary Data structures:- stacks and queues – trees – dictionaries – priority queues – sets and disjoint set union – graphs – basic traversal and search techniques.

UNIT II
        Divide – and – conquer: - General method – binary search – merge sort – quick sort – The Greedy method:- General method – knapsack problem – minimum cost spanning tree – single source shortest path.

UNIT III
        Dynamic Programming - general method – multistage graphs – all pair shortest path – optimal binary search trees – 0/1 Knapsack – traveling salesman problem – flow shop scheduling.

UNIT IV
        Backtracking:- general method – 8-Queens problem – sum of subsets – graph coloring – Hamiltonian cycles – knapsack problem – Branch and bound:- The method – 0/1 Knapsack problem – traveling salesperson.

UNIT V
        Parallel models:- Basic concepts, performance Measures. Parallel Algorithms: Parallel complexity, Analysis of Parallel Addition, Parallel Multiplication and division, Parallel Evaluation of General Arithmetic Expressions, First-Order Linear recurrence.

 REFERENCE BOOKS

1. Ellis Horowitz, "Computer Algorithms", Galgotia Publications.
2. S. Lakshmivarahan, Sundarshan K.Dhall, "Analysis and Design of Parallel Algorithms".
3. Alfred V.Aho, John E.Hopcroft, Jeffrey D.Ullman, "Data Structures and Algorithms".
4. Goodrich, "Data Structures & Algorithms in Java", Wiley 3rd edition.

Paper III   :   OBJECT ORIENTED ANALYSIS AND DESIGN & C++

Subject Description
 This course presents the object model, classes, objects and their relationship, nature of the classes and introduction to C++

Goals
To enable the students to learn C++ and object models.

Objectives
On Successful completion of the course the students should have
- Understood the concepts in object models and the basically the C++ language

Contents
UNIT I
        The Object Model: The Evolution of the Object Model – Elements of the Object Model – Applying the Object Model. Classes and Objects: The Nature of an Object – Relationship among Objects.

UNIT II
        Classes and Object: Nature of Class – Relationship Among classes – The Interplay of classes and Objects. Classification: The importance of Proper Classification –identifying classes and objects –Key Abstractions and Mechanism.

UNIT III
        Introduction to C++ - Input and output statements in C++ - Declarations -control structures – Functions in C++.

UNIT IV
        Classes and Objects –Constructors and Destructors –operators overloading –Type Conversion- Inheritance – Pointers and Arrays.

UNIT V
        Memory Management Operators- Polymorphism – Virtual functions – Files – Exception Handling – String Handling -Templates.

REFERENCE BOOKS
1. "Object Oriented Analysis and Design with Applications", Grady Booch, Second Edition, Pearson Education.
2. "Object -Oriented Programming with ANSI & Turbo C++", Ashok N.Kamthane, First Indian Print -2003, Pearson Education.
3. Balagurusamy "Object Oriented Programming with C++", TMH, Second Edition, 2003.

Paper IV   : ADVANCED NETWORKS

Subject Description
This course presents the Introduction to Digital networks, Internet Address, Internet protocol, TCP and UDP.
Goals
To enable the students to learn the digital networks, Internet protocol and UDP diagrams.
Objectives
On Successful completion of the course the students should have
  - Gained in-depth knowledge of Internet protocols and their functionalities.

Contents
UNIT I
        Introduction to digital networks - WAN - WAN standards - Introduction 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 startup - 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 datagram 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 datagrams. 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 protocols.

 REFERENCE 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.

Paper V   :   ADVANCED SOFTWARE ENGINEERING

Subject Description
This course presents the Introduction to Software Engineering, Applying web engineering, project management and Z specifications.
Goals
To enable the students to learn the concepts of Software Engineering, Web engineering and Component based development.
Objectives
On Successful completion of the course the students should have:
- Understood the concepts of Software Engineering.
- Understood the concepts of Web Engineering & Component based development

Contents
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 – Webapp engineering layers – Process – Practices – Web based systems – Planning web engineering projects – Team issues – Requirement analysis for webapp – Models – 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 – Concepts – Assurance – Reviews – Change management – Software configuration management – The SCM process.

UNIT IV
        Advanced topic in Software Engineering :   Formal methods – Basic concepts – Mathematical preliminaries – Mathematical notations – Formal 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 BOOK

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

Paper VI   : DATA MINING AND WAREHOUSING

Subject Description
This course presents the Introduction to Mining tasks, classification, clustering and Data Warehousing.
Goals
To enable the students to learn the Data mining tasks& Data warehousing techniques.
Objectives
On Successful completion of the course the students should have:
   • Understood the Association rules, Clustering techniques and Data warehousing.
Contents
UNIT I
      Basic data mining tasks – data mining versus knowledge discovery in databases – data mining issues – data mining metrics – 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 & 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 modelling –star schema for multidimensional view –data modelling – multifact star schema or snow flake schema – OLAP TOOLS – State of the market – OLAP TOOLS and the internet.
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 – metadata distribution of data – tools for data warehousing – performance considerations – crucial decisions in designing a data warehouse.
      Applications of data warehousing 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 a applications", PHI, Second Edition.
      3. Arun K.Pujari, " Techniques", Universities Press (India) Pvt. Ltd., 2003.
      4. Alex Berson, Stephen J. Smith, "data warehousing, data mining, & OLAP, TMCH, 2001.
      5. Jiawei Han & Micheline Kamber, " Data mining Concepts & Techniques", 2001, Academic press

Paper VII   : ADVANCED OPERATING SYSTEMS

Subject Description
This course presents the Introduction & Evolution of Operating Systems, Interprocess Communication, distributed systems and UNIX OS.

Goals
To enable the students to learn the basics of operating systems, distributed operating systems and Unix OS.

Objectives
On Successful completion of the course the students should have:
 • Understood the IPC problems and File caching schemes.
 • Gained knowledge in Distributed OS and Unix OS

Contents
UNIT I
        Introduction – Evolution of Operating systems – Serial, Simple Batch, Mutiprogrammed 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 – Multi threading.

UNIT II
        Inter Process 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 Systems", PHI/Pearson Education Asia, Second Edition, 2001
2. Pradeep K. Sinha, "Distributed operating systems concepts and design" ,Prentice - Hall of India, 2002
2. Maurice J. Bach, "The Design of the Unix Operating System", Prentice-Hall of India, 1998.
4. William Stallings, "Operating Systems", Prentice Hall of India, Second   Edition, 2000

Paper VIII   : ADVANCED CONCEPTS OF INTERNET & WEB

Subject Description
This course presents the Introduction to Internet, Java, Advanced Java, and the web services.
Goals
To enable the students to gain knowledge in Internet and Web.
Objectives
On Successful completion of the course the students should have:
 • Understood the features of Java and the Web services.

Contents
UNIT I
        The Internet : Introduction – Understanding the Internet – A tour of the Internet – Hardware and Software requirements of Internet – Internet Services Providers (ISP) – Internet addressing – Mail – Understanding the Web – The Web: Advanced topics – Introduction to usenet – Gopher, Veronica and Jughead.

UNIT II
        Java : Features of Java – Object Oriented Fundamentals – Comparing Java with C++ - Introduction to Java language – Types – Operators – Flow control – Classes – Packages and Interfaces – String Handling – Exception Handling.

UNIT III
        Advanced Java : Threads and Synchronization – Utilities – Input / Output – Networking – Applets – Abstract Window Toolkit.

UNIT IV
        Introduction to Web Services :   Understanding Web Services – Advantages – Disadvantages and Pitfalls – Comparing Web Services to other technologies – Typical Web Services Design.

UNIT V
        Working with Web Services : The Web Services Architecture – Understanding XML – Understanding how web services communicate – Exchanging messages with SOAP – Describing a web services with the Web Services Description Language (WSDL) – Advertising a Web Service – Sending attachments with Web Services.

 REFERENCE BOOKS

        1. Harley Hahn, "The Internet – Complete Reference", Second edition, Tata McGraw Hill, 1996
        2. Patric Naughton, "The Java Hand Book", Tata McGraw Hill, 1996.
        3. Stephen Potts, Mike Kopack, "Web Services", Pearson Education, 2004

Paper X   : DIGITAL IMAGE PROCESSING

Subject Description
This course presents the Introduction to Digital image Processing, fundamentals, image enhancement and image restoration techniques
Goals
To enable the students to learn the fundamentals of Digital Image Processing, image compression and segmentation
Objectives
On Successful completion of the course the students should have:
- Understood the fundamentals of Digital Image Processing, image compression and segmentation

Contents
UNIT I
Introduction: What is Digital image processing – the origin of DIP – Examples of fields that use DIP – Fundamentals steps in DIP – Components of an image processing system.
Digital Image Fundamentals: Elements of Visual perception – Light and the electromagnetic spectrum – Image sensing and acquisition – Image sampling and Quantization – Some Basic relationship between Pixels – Linear & Nonlinear operations.
UNIT II
Image Enhancement in the spatial domain:- Background – some basic Gray level Transformations – Histogram Processing – Enhancement using Arithmetic / Logic operations – Basics of spatial filtering – Smoothing spatial filters – Sharpening spatial filters – Combining spatial enhancement methods.
UNIT III
Image Restoration: A model of the Image Degradation / Restoration Process – Noise models – Restoration is the process of noise only – Spatial Filtering – Periodic Noise reduction by frequency domain filtering – Linear, Portion – Invariant Degradations – Estimating the degradation function – Inverse filtering – Minimum mean square Error Filtering – Constrained least squares filtering – Geometric mean filter – Geometric Transformations.

UNIT IV
Image Compression: Fundamentals – Image compression models – Elements of Information Theory – Error Free compression – Lossy compression – Image compression standards.
UNIT V
Image Segmentation: Detection and Discontinuities – Edge Linking and Boundary deduction – Threshold – Region-Based segmentation – Segmentation by Morphological watersheds – The use of motion in segmentation.

REFERENCE BOOKS

1. Rafael C. Gonzalez, Richard E. Woods, "Digital Image Processing", Second Edition, PHI/Pearson Education.
2. B. Chanda, D. Dutta Majumder, "Digital Image Processing and Analysis", PHI, 2003.
3. Nick Efford, "Digital Image Processing a practical introducing using Java", Pearson Education, 2004.

Paper XI   : ADVANCED TOOLS IN COMPUTING

Subject Description
This course presents the Introduction of XML, Document type definition, Schemas, Document Object models, and ASP.net.
Goals:
To enable the students to learn the XML Technologies, applications and ASP.net programming
Objectives:
On Successful completion of the course the students should have:
  • Gained knowledge in XML, DOM technologies
  • Understood the basics of ASP.NET, and Programming in ASP.NET and Web forms.

Contents
UNIT I
        XML : Introduction to XML Markup – Parsers and Well formed XML Documents – Parsing a Document with msxml – Characters – Markup – CDATA Sections – XML Namespaces – Case study: A Day Planner Application

        Document Type Definition (DTD) : Introduction – Parsers, Well formed and valid XML Documents – Document Type Declaration – Element Type Definitions – Attribute Types – Conditional Selection – White space characters – Case Study: Writing a DTD for the Day Planner Application.

UNIT II

        Schemas : Introduction – Schemas vs DTD – Microsoft XML Schema: Describing Elements- Describing Attributes – Data Types – W3C XML Schema - Case Study: Writing a Microsoft XML Schema for the Day Planner Application.

        Document Object Model(DOM) : Introduction – DOM Implementation – DOM and Java Script – Setup – DOM Components – Creating Nodes – Traversing the DOM – Modifying the Day Planner Application to use DOM.

UNIT III

        XML Technologies and Applications : Introduction – XML Query Language – Directory Services Markup Language – Resource Definition Framework – XML Topic Maps – Virtual Glossary – Channel Definition Format – Information and Content Exchange Protocol \ Rich Site Summary – P3P – Blocks Extensible Exchange Protocol – XML Digital Signatures – Extensible Tights Markup Language – XML Metadata Interchange – W3C's XML Protocol – XAML.

UNIT IV

        ASP.NET : Introduction - .NET Framework – ASP – Operating Systems – Servers – ASP Objects – ADO and ADO.NET Objects – ASP Components – Relational DBMS and Other Data Sources – Developing Distributed Online Application – Client/Server or Tiered Applications.

Programming ASP.NET with Visual Basic .NET : VB .NET Programming Language Structures – Built in ASP .NET Objects and Interactivity – u\Using the Response Object – The ASP Server Object

UNIT V

Web Forms and ASP .NET : Programming Web Forms – Web Forms Capabilities – Web Forms Processing – Web Forms and Events – Creating Web Forms Events Handlers – Building Interactive Applications with VS .NET – Solutions and Project in VS .NET – Solution Explorer – Creating a Web Form .

ASP .NET Configuration, Scope and State – ASP Application - ASP .NET Applications – ASP .NET and State – The Application Object – ASP Sessions – The Session Object.

ASP .NET Objects and Components : The Scripting Object Model – Active Server Components and Controls – More Active Server Components.

REFERENCE BOOKS
1. Dave Mercer, "*ASP*.NET: A Beginner's Guide", Tata McGraw-Hill Publishing Company Limited Edition 2002.
2. H.M. Deitel P.J.Deitel T.R. Nieto T.M. Lin P.Sadu , "XML How to Program".
3. AI Williams , Kim Barber ,"ASP Solutions" , DreamTech Press 2000.

Paper XII   : NETWORK SECURITY AND CRYPTOGRAPHY

Subject Description
This course presents the Introduction to Cryptography, Web Security and Case studies in Cryptography

Goals
To enable the students to learn the concepts of Network Security and Cryptography

Objectives
On Successful completion of the course the students should have:
* Understood the process of implementing the cryptographic algorithms.

Contents
UNIT I
     Introduction to Cryptography – Security Attacks – Security Services –Security Algorithm - Stream cipher and Block cipher - Symmetric and Asymmetric-key Cryptosystem Symmetric Key Algorithms: Introduction – DES – Triple DES – AES – IDEA – Blowfish – RC5.

UNIT II

     Public-key Cryptosystem: Introduction to Number Theory - RSA Algorithm – Key Management - Diffie-Hell man Key exchange – Elliptic Curve Cryptography Message Authentication and Hash functions – Hash and Mac Algorithm – Digital Signatures and Authentication Protocol.

UNIT III
     Network Security Practice: Authentication Applications – Kerberos – X.509 Authentication services and Encryption Techniques. E-mail Security – PGP – S / MIME – IP Security.
UNIT IV
     Web Security - Secure Socket Layer – Secure Electronic Transaction. System Security - Intruders and Viruses – Firewalls– Password Security

UNIT V
     Case Study: Implementation of Cryptographic Algorithms – RSA – DSA – ECC (C / JAVA Programming).
     Network Forensic – Security Audit - Other Security Mechanism: Introduction to: Stenography – Quantum Cryptography – Water Marking - DNA Cryptography

REFERENCE BOOKS

1. William Stallings, "Cryptography and Network Security", PHI/Pearson Education.
2. Bruce Schneir, "Applied Cryptography", CRC Press.
3. A.Menezes, P Van Oorschot and S.Vanstone, "Hand Book of Applied Cryptography", CRC Press, 1997 [Free Downloadable].
4. Ankit Fadia,"Network Security", MacMillan.

<u>ELECTIVE I FOR PAPER IX</u>

ELECTIVE I.1: SOFTWARE TESTING

Subject Description
This course provides principles of Software Testing and about tools.
Goal :
To enable the students to learn about the principle and tools of Software testing.
Objectives :
On successful completion of the course the students must have
  • understood the concepts of Software testing
  • got the skill of software testing
  • exposed to software testing tools.

Contents
UNIT I
  Purpose of Software testing – Some Dichotomies – a model for testing – Playing pool and
  consulting oracles – Is complete testing possible – The Consequence of bugs – Taxonomy of
  Bugs.

  UNIT II
  Software testing Fundamentals – Test case Design – Introduction of Black Box Testing and
  White Box testing – Flow Graphs and Path testing – Path testing Basics - Predicates, Path
  Predicates and Achievable Paths - Path Sensitizing – Path Instrumentation –
  Implementation and Application of Path Testing.

  UNIT III
  Transaction Flow testing – Transaction Flows – techniques – Implementation Comments –
  Data Flow Testing – Basics – Strategies – Applications, Tools and effectiveness – Syntax
  Testing – Why, What, How – Grammar for formats – Implementation – Tips.

  UNIT IV
  Logic Based Testing – Motivational Overview – Decision tables – Path Expressions – KV
  Charts – Specifications – States, State Graphs and transition Testing – State Graphs – Good
  & bad states – state testing Metrics and Complexity.

  UNIT V
  Testing GUIs – Testing Client – Server Architecture – Testing for Real-time System – A
  Strategic Approach to Software testing – issues – unit testing – Integration Testing –
  Validation testing – System testing – The art of Debugging.

  REFERENCES:
  1. Boris Beizer, Software testing techniques, Dreamtech Press, Second Edition – 2003.
  2. Myers and Glenford.J., The Art of Software Testing, John-Wiley & Sons,1979
  3. Roger.S.Pressman, Software Engineering – A Practitioner's Approach ,Mc-Graw Hill,
     5th edition, 2001
  4. Marnie.L. Hutcheson, Software Testing Fundamentals, Wiley-India,2007

ELECTIVE I.2: DISTRIBUTED COMPUTING

Subject Description
This course presents the Introduction to fully Distributed Processing Systems, Communication Line Loading and Client/Server Network Model.
Goals
To enable the students to learn the concepts of Distributed Computing
Objectives
On Successful completion of the course the students should have:
- Understood the Distributed Processing Systems Design, Client/Server Network Model and Distributed databases.

Contents
UNIT I
        Distributed Systems: Fully Distributed Processing Systems – Networks and Interconnection Structures – Designing a Distributed Processing System.

UNIT II
        Distributed Systems: Pros and Cons of Distributed Processing – Distributed Databases – The Challenge of Distributed Data – Loading Factors – Managing the Distributed Resources – Division of Responsibilities.

UNIT III
        Design Considerations: Communication Line Loading – Line Loading Calculations – Partitioning and Allocation – Data Flow Systems – Dimension Analysis – Network Database Design Considerations – Ration Analysis – Database Decision Trees – Synchronization of Network Databases.

UNIT IV
        Client/Server Network Model: Concept – File Server – Printer Server – an e-mail Server.

UNIT V
        Distributed Databases: An overview – Distributed Databases – Principles of Distributed Databases – Levels of Transparency – Distributed Database Design – The R* Project Technique Problems of Heterogeneous Distributed Databases.

REFERENCE BOOKS
1. John A. Sharp, "An Introduction to Distributed and Parallel Processing", Blackwell Scientific Publications, 1987
2. Uyless D. Black,"Data Communications & Distributed Networks"
3. Joel M. Crichllow, "Introduction to Distributed & Parallel Computing".
4. Stefans Ceri, Ginseppe Pelagatti, "Distributed Databases Principles and systems", McGraw Hill Book Co., New York, 1985.

ELECTIVE I.3: NEURAL NETWORK AND FUZZY LOGIC

Subject Description
This course presents the concepts of Neural Networks, Back propagation Networks, Adaptive Resonance Theory and Fuzzy Set Theory.
Goals
To enable the students to learn the fundamentals of neural networks and Fuzzy logic
Objectives
On Successful completion of the course the students should have:
- Understood the fundamentals of neural networks
- Understood the fundamentals of Back propagation networks
- Gained knowledge in Fuzzy systems

Contents
UNIT I
    Fundamentals of Neural Networks: Basic concepts of Neural Networks –Human Brain – Model of an Artificial Neuron- Neural Network Architectures- characteristics of Neural Networks – Learning methods- Taxonomy of Neural Network Architectures –History of Neural Network Research-Easy Neural Network Architectures- Some Application domains.

UNIT II
    Back propagation Networks: Architecture of a Back propagation Network – Back propagation Learning – Illustration –Applications –Effect of Tuning parameters of the Back propagation Neural Network- Selection of various parameters in BPN- Variations   of standard Back Propagation algorithm.

UNIT III
    Adaptive Resonance Theory: Introduction – ART1- ART2-Applications.

UNIT IV
    Fuzzy Set Theory: Fuzzy versus crisp- Crisp sets –Fuzzy sets –Crisp relations – Fuzzy relations.

UNIT V
    Fuzzy Systems: Crisp logic –Predicate logic –Fuzzy logic –Fuzzy rule based system- Defuzzification Methods.

 REFERENCE BOOKS

1. S.Rajasekaran, G.A.Vijayalakshmi Pai –"Neural Networks, Fuzzy logic, and Genetic Algorithms Synthesis and Applications, PHI, 2003.
2. James A. Freeman, David M.Skapura-"Neural Networks – Algorithms, Applications, and Programming Techniques", Pearson Education.
3. Fredric M. Ham, Ivica Kostanic, "Principles of Neuro computing for science of Engineering", TMCH.
4. Simon Haykin-"Neural Networks-a comprehensive foundation", PHI/Pearson Edition.

ELECTIVE I.4 : ARTIFICIAL INTELLIGENCE & EXPERT SYSTEMS

Subject Description
This course presents the Introduction to AI Problems, Heuristic techniques, and Represents Simple facts and learning.
Goals
To enable the students to learn the concepts of AI and Expert Systems
Objectives
On Successful completion of the course the students should have:
- Understood the AI & Expert Systems.
- Learnt the Heuristic techniques and reasoning

Contents
UNIT I
        Introduction: AI Problems - Al techniques - Criteria for success. Problems, Problem Spaces, Search: State space search - Production Systems - Problem Characteristics - Issues in design of Search.

UNIT II
        Heuristic Search techniques: Generate and Test - Hill Climbing- Best-First, Problem Reduction, Constraint Satisfaction, Means-end analysis. Knowledge representation issues: Representations and mappings -Approaches to Knowledge representations -Issues in Knowledge representations - Frame Problem.

UNIT III
        Using Predicate logic: Representing simple facts in logic - Representing Instance and Isa relationships - Computable functions and predicates - Resolution - Natural deduction. Representing knowledge using rules: Procedural Vs Declarative knowledge - Logic programming - Forward Vs Backward reasoning - Matching - Control knowledge.

UNIT IV
        Statistical reasoning – Knowledge representation – Planning– Understanding.

UNIT V
        Learning – Common sense – Perception and Action – Expert System.

REFERENCE BOOK

1. Elaine Rich and Kevin Knight," Artificial Intelligence", Tata McGraw Hill Publishers company Pvt Ltd, Second Edition, 1991.
2. George F Luger, "Artificial Intelligence",4th Edition, Pearson Education Publ,2002.

ELECTIVE II FOR PAPER XIII

ELECTIVE II.1 : MULTIMEDIA AND ITS APPLICATIONS

Subject Description
This course presents the Introduction to Multimedia, Images & Animation.
Goals
To enable the students to learn the concepts of Multimedia.

Objectives
On Successful completion of the course the students should have:
   • Understood the Multimedia animation and Desktop Computing.

Contents
UNIT I
        What is Multimedia – Introduction to making Multimedia – Macintosh and Windows Production platforms – Basic Software tools.

UNIT II
        Making Instant Multimedia – Multimedia authoring tools – Multimedia building blocks – Text – Sound.

UNIT III
        Images – Animation – Video.

UNIT IV
        Multimedia and the Internet – The Internet and how it works – Tools for World Wide Web – Designing for the World Wide Web.

UNIT V
        High Definition Television and Desktop Computing – Knowledge based Multimedia systems.

REFERENCE BOOK

   1. Tay Vaughan, "Multimedia making it work", Fifth Edition, Tata McGraw Hill.
   2. John F. Koegel Bufford, "Multimedia Systems", Pearson Education.
   3. Judith Jeffloate, "Multimedia in Practice (Technology and Applications)", PHI, 2003

ELECTIVE II.2 : EMBEDDED SYSTEMS

Subject Description
This course presents the Introduction to 8051 Microcontroller Instruction Set, concepts on RTOS & Software tools.
Goals
To enable the students to learn about Microcontroller and software tools in the embedded systems.
Objectives
On Successful completion of the course the students should have:
- Understood the Instruction Set and Programming.
- Understood the Embedded software Development

Contents
UNIT I
     8051 Microcontroller: Introduction - 8051 Architecture-Input/Output Pins, Ports and Circuits - External Memory - Counters / Timers - Serial Data Input / Output - Interrupts.

UNIT II
     Instruction Set and Programming Moving Data-Addressing Modes-Logical operations-Arithmetic Operation-Jump and Call Instructions-Simple Program. Applications: Keyboard Interface-Display Interface-Pulse Measurements-DIA and AID Conversions-Multiple Interrupts.

UNIT III
     CONCEPTS ON RTOS: Introduction to RTOS-Selecting an RTOS-Task and Task states - Tasks and data- Semaphores and shared data. MORE operating systems services: Interrupt Process communication - Message Queues, Mailboxes and pipes- Timer Functions-Events - Memory Management-Interrupt Routines in an RTOS Environment.

UNIT IV
     Basic Design using a RTOS: Principles - Encapsulating semaphores and Queues-Hard real time scheduling considerations-Saving memory space and power- introductions to RTL & QNX.

UNIT V
     SOFTWARE TOOLS: Embedded software Development Tools:Hosts and Target Machines- Linker/Locators for Embedded software-getting Embedded software into the Target systems. Debugging Techniques: Testing on your Host machine -Instruction set simulators- The assert macro-using laboratory tools.

REFERENCE BOOKS
1. David.E.Simon, "An Embedded Software Primer", Pearson Education-2001.
2. The 8051 Microcontroller and Architecture programming and application II Edition - Kenneth J Ayala- Penram International.

ELECTIVE II.3 : NATURAL LANGUAGE PROCESSING

Subject Description
This course presents the Introduction to natural language, Grammars and parsing & Semantic Interpretation.
Goals
To enable the students to gain knowledge in Natural language processing, parsing and Semantic Interpretation
Objectives
On Successful completion of the course the students should have:
 • Understood the principles & applications of Natural Language Processing.
Contents
UNIT I
       Introduction to natural language processing-the study of language, applications of natural language understanding, evaluating language understanding systems. SYNTACTIC PROCESSING: Linguistic background: An outline of English syntax - words, the elements of simple noun phrases, verb phrases and simple sentences.
UNIT II
       Grammars and parsing - grammars and sentence structure, a top down parser, a bottom up chart parser, transition network grammars. Features and Augmented grammars-featured system and augmented grammars, some basic feature systems for English, morphological analysis and the lexicon, a simple grammar using features, Grammars for natural language - auxiliary verbs and verb phrases, movement phenomena in language, handling questions in context free grammar, the hold mechanism in ATN's gap threading.
UNIT III
       Toward Efficient parsing-human preferences in parsing, encoding uncertainty, a deterministic parser, techniques for efficient encoding of ambiguity, partial parsing, Ambiguity Resolution: statistical methods - basic probability theory, estimating probabilities, part of speech tagging, obtaining lexical probabilities, probabilistic context free grammars, best firing parsing, a simple context.
UNIT IV
       SEMANTIC INTERPRETATION: Semantic and logical form - semantics and logical form, word senses and ambiguity, the basic logical form language, encoding ambiguity in the logical form, verbs and states in logical form, thematic roles, speech acts and embedded sentences, linking syntax and semantics - semantic interpretation and compositionality, a simple grammar and lexicon with semantic interpretation, prepositional phrases and verb phrases, lexicalized semantic interpretation and semantic roles, ambiguity resolution - selectional restrictions, semantic filtering using selection restrictions, semantic networks, statistical word sense disambiguation, statistical semantic preferences, combining approaches to disambiguation.
UNIT V
       Other strategies for semantic Interpretation - grammatical relations, semantic grammars, template matching, semantically driven parsing techniques, scoping and the Interpretation of noun phrases - scoping phenomena, definite descriptions and scoping, a method for scoping while parsing, co-references and binding constraints, adjective phrases, relational sounds and nominalizations.
REFERENCE BOOK
       1. "NATURAL LANGUAGE UNDERSTANDING" - James Allen- Second edition- Pearson Education

ELECTIVE II.4 : SIMULATION & MODELING

Subject Description
This course presents the Principles of Modeling, Random Generation and Simulation Techniques.
Goals
To enable the students to gain knowledge in Simulation techniques and languages, random number generation and distribution techniques.
Objectives
On Successful completion of the course the students should have:
• Gained Knowledge of Simulation & Modeling Techniques.
Contents
UNIT I
        Principle of computer modeling and simulation, Monte Carlo simulation. Nature of computer modelling and simulation. Limitations of simulation, areas of application. System and environment – components of a system – Discrete and continuous systems. Models of a system – A variety of modelling approaches.
UNIT II
        Random number generation, technique for generating random numbers – Midsquare method – The midproduct method – Constant multiplier technique – Additive congruential method – Linear congruencies method – Tests for random number – The Kolmogorov Smirnov test – The chi-square test.
        Random variable generation – Inverse transform technique – Exponential distribution – Uniform distribution – Weibull distribution, empirical continuous distribution – Generating approximate normal variates.
UNIT III
        Empirical discrete distribution – Discrete uniform distribution – Poisson distribution – Geometric distribution – Acceptance – Rejection technique for Poisson distribution – Gamma distribution.
UNIT IV
        Design and evaluation of simulation experiments – Input – Output analysis – Variance reduction technique – Verification and validation of simulation models. Discrete event simulation – Concepts in discrete – event simulation – Manual simulation using event scheduling, single channel queue, two server queue, simulation of inventory problems.
UNIT V
        Simulation languages – GPSS – SIMSCRIPT – SIMULA – Programming for discrete event systems in GPSS and C.
        Case Study : Simulation of LAN – Manufacturing system – Hospital management system.

REFERENCE BOOKS
    1. Jerry Banks and John S. Carson II, "Discrete Event System Simulation", Prentice Hall Inc, 1984.
    2. Narsingh Deo, "System Simulation with Digital Computer", Prentice Hall of India, 1979.
    3. Francis Neelamkovil, "Computer Simulation and Modeling", John Wiley & Sons, 1987.
    4. Averil M. Law and W. David Kelton, "Simulation Modeling and Analysis", McGraw Hill International Editions, 1991.

COMPULSORY DIPLOMA IN SOFTWARE QUALITY ASSURANCE (DSQA)

DIPLOMA PAPER I : SOFTWARE QUALITY ASSURANCE

Subject Description
        This Course presents the essentials of Software Qulaity, Plan for SQA, Standards, Tools for SQA.

Goals:
 To enable the students to learn the Concepts and Principles of SQA.

Objectives :
 On successful completion of the course the students should have:
- Understood the principles of SQA
- Must be able to judge the quality of Softwares.

Content
UNIT I
Introduction to software quality – Software modeling – Scope of the software quality program – Establishing quality goals – Purpose, quality of goals – SQA planning software – Productivity and documentation.

UNIT II
Software quality assurance plan – Purpose and Scope, Software quality assurance management - Organization – Quality tasks – Responsibilities – Documentation.

UNIT III
Standards, Practices, Conventions and Metrics, Reviews and Audits – Management, Technical review – Software inspection process – Walk through process – Audit process – Test processes – ISO, cmm compatibility – Problem reporting and corrective   action.

UNIT IV
Tools, Techniques and methodologies, Code control, Media control, Supplier control, Records collection, Maintenance and retention, Training and risk management.

UNIT V
ISO 9000 model, cmm model, Comparisons, ISO 9000 weaknesses, cmm weaknesses, SPICE – Software process improvement and capability determination.

REFERENCES
1. Mordechai Ben – Meachem and Garry S.Marliss, "Software Quality – Producing Practical, Consistent Software", International Thompson Computer Press, 1997
2. Watt. S. Humphrey, "Managing Software Process", Addison – Wesley, 1998.
3. Philip.B.Crosby, "Quality is Free : The Art of making quality certain", Mass Market, 1992.

DIPLOMA PAPER II : SOFTWARE RELIABILITY

Subject Description
This course provides the insight in to the reliability factors of the Software.
Goal :
To enable the students to learn about the principle and concepts of Software reliability.

Objectives :
On successful completion of the course the students must have
- understood the concepts of Software reliability
- analysed the quality standards

Content
UNIT I
Software Reliability Definitions - software disasters - Errors - faults - failures - different views of software reliability – software requirements specification - Causes of unreliability in software - Dependable systems: reliable, safe, secure, maintainable, and available - Software maintenance.

UNIT II
The phases of a Software Project - Monitoring the development process – The software life cycle models - software engineering - Structured Analysis and structured Design - Fault tolerance - Inspection - Software cost and schedule.

UNIT III
Software quality modeling - Diverse approaches and sources of information - Fault avoidance, removal and tolerance - Process maturity levels (CMM) - Software quality assurance (SQA) - Monitoring the quality of software - Total quality management (TQA) - Measuring Software Reliability - The statistical approach - Software reliability metrics.

UNIT IV
Data Trends - Complete prediction Systems - overview of some software reliability models - The recalibration of the models - Analysis of model accuracy - Reliability growth models and trend analysis - Software Costs Models - Super models.

UNIT V
Testing and maintaining more reliable software –logical testing – functional testing – algorithm testing – regression testing - fault tree analysis – failure mode effects and critical analysis – reusability - case studies.

REFERENCES
1. J.D. Musa, A. Iannino and K.Okumoto, Software Reliability, Measurement, Prediction, Application, McGraw Hill, 1990.
2. J.D. Musa, Software Reliability Engineering, McGraw Hill, 1998.
3. Michael R. Lyer, Handbook of Software Reliability Engineering, McGraw Hill, 1995.
4. Xie, M., Software Reliability Modelling, World Scientific, London, 1991.

DIPLOMA PAPER III: SOFTWARE TESTING

Subject Description
This course provides principles of Software Testing and about tools.
Goal :
To enable the students to learn about the principle and tools of Software testing.
Objectives :
On successful completion of the course the students must have

- understood the concepts of Software testing
- got the skill of software testing
- exposed to software testing tools.

Content

UNIT I
Purpose of Software testing – Some Dichotomies – a model for testing – Playing pool and consulting oracles – Is complete testing possible – The Consequence of bugs – Taxonomy of Bugs.

UNIT II
Software testing Fundamentals – Test case Design – Introduction of Black Box Testing and White Box testing – Flow Graphs and Path testing – Path testing Basics - Predicates, Path Predicates and Achievable Paths - Path Sensitizing – Path Instrumentation – Implementation and Application of Path Testing.

UNIT III
Transaction Flow testing – Transaction Flows – techniques – Implementation Comments – Data Flow Testing – Basics – Strategies – Applications, Tools and effectiveness – Syntax Testing – Why, What, How – Grammar for formats – Implementation – Tips.

UNIT IV
Logic Based Testing – Motivational Overview – Decision tables – Path Expressions – KV Charts – Specifications – States, State Graphs and transition Testing – State Graphs – Good & bad states – state testing Metrics and Complexity.

UNIT V
Testing GUIs – Testing Client – Server Architecture – Testing for Real-time System – A Strategic Approach to Software testing – issues – unit testing – Integration Testing – Validation testing – System testing – The art of Debugging.

REFERENCES :

1. Boris Beizer, Software testing techniques, Dreamtech Press, Second Edition – 2003.
2. Myers and Glenford.J., The Art of Software Testing, John-Wiley & Sons,1979
3. Roger.S.Pressman, Software Engineering – A Practitioner's Approach ,Mc-Graw Hill, 5th edition, 2001
4. Marnie.L. Hutcheson, Software Testing Fundamentals, Wiley-India,2007

DIPLOMA PAPER IV: SOFTWARE TESTING LAB

Subject Description
This course provides hand on experience of Software Testing tools.

Goal :
To enable the students to learn about the usage of tools of Software testing.

Objectives :
On successful completion of the course the students must have
- understood the concepts of Software testing
- got the skill of software testing tools
- expertise in using software testing tools.

Running and testing in any one of the following Testing tools :

- WinRunner
- Silk Test
- SQA Robot
- LoadRunner
- JMeter
- TestDirector
- GNU Tools (Source Code Testing Utilities in Unix / Linux)
- Quick Test Professional

REFERENCE :

Dr.K.V.K.K.Prasad, Software Testing Tools, Dreamtech Press, 2007

MODEL QUESTION PAPERS
SEMESTER: I

Subject Title: ADVANCED COMPUTER ARCHITECTURE

Maximum Marks: 75   Duration: 3 Hrs

Section-A (10*1=10 Marks)

Answer all the Questions

1. What is Flynn's classification?
2. What is Feng's Scheme?
3. The Arithmetic logic units of a computer can be segmentized for pipeline operation in various _____
4. The number of time units between two initiations is called _____.
5. A synchronous array of parallel processors is called _____.
6. A set of processes and their precedence relation are known before execution is called _____.
7. The _____ channel can be used to provide direct information transfer between the I/O devices and the main memory.
8. A _____ pipeline can process a succession and subtasks with a linear precedence graph.
9. A _____ instruction combines two vectors under the control of a masking vector.
10. _____ machines are especially designed to perform vector computations over matrices or arrays of data.

Section-B (5*5=25 Marks)

Answer all the Questions

11. (a) Write a note on "Multiprogramming and Time Sharing". Or
     (b) Explain the serial versus parallel processing.
12. (a) Discuss about utilizing data parallelism.   Or
     (b) Describe the Inter-task dependency.
13. (a) Write about Job sequencing and collision prevention.   Or
     (b) Describe the characteristics of vector processing
14. (a) Explain two configurations of SIMD computer organizations.   Or
     (b) Discuss about masking and Data Routing
15. (a) Explain synchronized parallel algorithms   Or
     (b) Describe the m (j,k) sorting algorithm.

Section-C (5*8=40 Marks)

Answer all the Questions

16. (a) Explain the following : (i)   Predictive modeling and simulations
                                  (ii) Engineering Design and Automation
          Or
     (b) Describe in detail the multiprocessing systems performance of parallel computers.
17. (a) Explain about the Temporal parallelism and Data parallelism.   Or
     (b) Write short notes on :
          (i)   Delays in pipeline Execution (ii)   Pipelining of processing Elements
18. (a) Discuss the arithmetic pipeline design examples in detail   Or
     (b) Describe the Internal Forwarding and Register Tagging
19. (a) Explain any two Inter connections Networks array processor.   Or
     (b) Discuss about Hierarchical and unhierarchichal structured multiprocessing systems.
20. (a) Explain an O (n2) and O (n3) algorithm in matrix multiplications. Or
     (b) Describe the various models of computations in parallel algorithm

SEMESTER: I

Subject Title: ANALYSIS AND DESIGN OF ALGORITHMS

Maximum Marks: 75   Duration: 3 Hrs

Section-A (10*1=10 Marks)

Answer all the Questions

1. Which is called a full binary tree?
2. The _____ method suggests that one a devise an algorithm that works in stages, considering one input at a time.
3. What is the most serious drawback of dynamic programming?
4. The _____ would be to form all these n-tuples, evaluate each one with criterion function. P and save those which yield the optimum.
5. Which is called the very general model for the study of parallel computation?
6. Which is an extended binary tree?
7. Which of the following algorithm cannot be sent by dynamic programming?
8. Dynamic programming algorithms often be of _____ complexity
9. What are implicit constraints?
10. What is efficiency ratio?

Section-B (5*5=25 Marks)

Answer all the Questions

11.   (a)   Enumerate various asymptotic notations out the time and space complexities of an algorithm.
            Or
      (b)   What is priority queue ? Give any two real the problems in which priority queues are useful.
12.   (a)   Consider the following elements:
            -15, -6, 0, 7, 9, 23, 54, 82, 101, 112, 125, 131, 142, 151. Apply binary search algorithm check whether the following elements 151, -14 and 9 are found or not in the list. Use divide – and – conquer strategy.
            Or
      (b)   Consider the array of ten elements α [1… 10] = (310, 285, 179, 652, 351, 423, 861, 254, 450, 520) using merge sort algorithm, sort the above numbers. Draw a tree that represents the sequence of recursive calls that are produced by merge sort.
13.   (a)   Consider the following instance of the 0/1 knapsack problem :
            N= 3, m=6, (p_1, p_2, p_3) = (1,2,4) and (w_1, w_2, w_3) = (2, 3, 4) use dynamic programming find the optimal solution.
            Or
      (b)   Draw an optimal binary search tree for the identifiers (do, while, int and if).
14.   (a)   Explain 8-queens problem, Find at least a solution for it.
            Or
      (b)   Discuss hamitonian cycles with an examples.
15.   (a)   Explain briefly the NC-class.   Or
      (b)   What is first-order linear recurrence of size N ? How Horner's method is used to polynominal ?

Section-C (5*8=40 Marks)

Answer all the Questions

16.   (a)   Write algorithms for inserting and deleting
            (i)   elements from the circular queue.
            (ii)   Write short notes on towers of Hanoi problem.

(4)

Or

(b) (i)   What is binary search tree. Give an example.   (3)
     (ii) Discuss union and operations with respect to set.   (5)

17. (a) (i)   Prove that the average of quick sort is 0 (n log n).   (5)
          (ii) For the following graph, find the minimum cost spanning tree by Prim's algorithm

Or   (3)
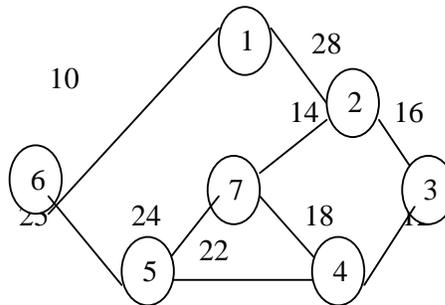
(b) Explain single-source shortes paths with an example. Write the algorithm also.

18. (a) Find a minimum-cost path from s to t in the following multistage graph using dynamic programming:
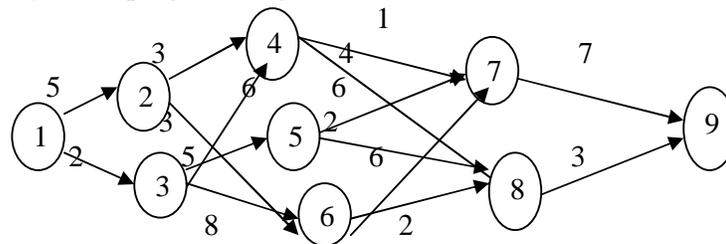
Or

(b) Explain how to solve the flow scheduling problem by dynamic programming with example.

19. (a) Let w = {5, 10, 12, 13, 15, 18 } and m. Find all possible subsets of w that sum to m. Determine using sum of sub of back tracking algorithm. Drive portion of the state space tree that is generated.

Or

(b) Use branch and bound method, solve the following travelling sales person with the cost matrix:

		To City			
From City	A	B	C	D	E
A	∞	20	30	10	11
B	15	∞	16	4	2
C	3	5	∞	2	4
D	19	6	18	∞	3
E	16	4	7	16	∞

20. (a) Explain Ofman-Wallace and Mahlhorn-Praparata algorithms for parallel multiplication.

Or

(b) Discuss the cyclic reduction algorithm and divide-and-conquer method of linear recurrence.

SEMESTER: I

Subject Title: OBJECT ORIENTED ANALYSIS DESIGN AND C++

Maximum Marks: 75   Duration: 3 Hrs

Section-A (10*1=10 Marks)

Answer all the Questions

1.   What is object programming?
2.   The two kinds of object hierarchies are _____ and _____ relationships.
3.   The wrapping up of data and function into a single unit is called _____.
4.   _____ is used to destroy objects.
5.   _____is used to achieve run time polymorphism
6.   Which is the conceptual frame work of object oriented model ?
7.   What is association?
8.   What is a member function?
9.   Give any one operator that cannot be overloaded?
10.   The ios :: at mode allows us to write _____.

Section-B (5*5=25 Marks)

Answer all the Questions

11.   (a)   Explain strong and weak typing with suitable example   Or
        (b)   Explain the two kinds of object hierarchies in object oriented analysis and design.
12.   (a)   What are the different metrics used to measure the quality of an abstraction ? Or
        (b)   What are the two process involved in the identification of key abstraction ?
13.   (a)   What is the purpose of the following operators ?
                (i)   <<   (ii)   >>   (iii)   new.
        Or
        (b)   What is inline function ? Give an example .
14.   (a)   What is single inheritance ? Give an example. Or
        (b)   Explain any one constructor with suitable example.
15.   (a)   How do you detect end of file in C++ ?   Or
        (b)   How does C++ program handle exception ?

Section-C (5*8=40 Marks)

Answer all the Questions

16.   (a)   Explain the evolution of object model. Or
        (b)   Explain the four major elements of object model.
17.   (a)   Explain the relationships among classes. Or
        (b)   Explain the identification of classes and objects.
18.   (a)   Explain the different control structures in C ++. Or
        (b)   What is a friend function ? Give an example.
19.   (a)   Write a C++ program to concatenate two strings using dynamic constructors.
        Or
        (b)   Write a C++ program to overload the operators +, * and $\frac{\bullet}{\bullet}$ to add, multiply and divide complex numbers.
20.   (a)   What is a file mode ? Describe the various file mode options available in C++.
        Or
        (b)   Write a C++ program to read the contend α one file and copy it into another file.

SEMESTER: I

Subject Title: ADVANCED NETWORKS

Maximum Marks: 75   Duration: 3 Hrs

Section-A (10*1=10 Marks)

Answer all the Questions

1. Mention any one internet application service
2. _____ identifiers are classified as names, addresses or routes.
3. In a packet switching system, _____ refers to the process of choosing a path over which is send packets.
4. TCP provides a _____ connection between two machines, allowing them to exchange the volumes of data efficiently.
5. What is remote login system?
6. WAN technology is also called _____ networks
7. _____ network addresses are both low-level and hardware dependent.
8. ISO stands for _____.
9. When intermediate machines become overloaded, the condition is called _____.
10. TFTP stands for _____.

Section-B (5*5=25 Marks)

Answer all the Questions

11. (a)   Write short notes on Internet. Or
    (b)   Write short notes on WAN.
12. (a)   Discuss on IP Addresses.   Or
    (b)   What are the five steps are performed by the master server ? Explain.
13. (a)   Write short notes on the Internet control Message protocol (ICMP).   Or
    (b)   Discuss on clock synchronization and transmit time estimation.
14. (a)   Explain about timer management.   Or
    (b)   Write short notes on :
           (i)   Flow control
           (ii)   Adaptive retransmission.
15. (a)   Write short notes on application layer.   Or
    (b)   What is Network file System ? Explain.

Section-C (5*8=40 Marks)

Answer all the Questions

16. (a)   Explain in detail about ARPANET technology.   Or
    (b)   Explain in detail about three network interconnected by two gateways.
17. (a)   Write short notes on :
           (i)   Resolution through dynamic Binding
           (ii)   ARP Encapsulation and Identification. (iii)   ARP Protocol Format.
    Or
    (b)   Explain the client-server model in detail
18. (a)   Explain in detail about creating a socket.   Or
    (b)   Explain in detail about TCP finite state machine.
19. (a)   Write short notes on :
           (i)   Datagram Encapsulation. (ii) Fragmentation Control.
    Or
    (b)   Explain in detail about ISO -7 layer reference model.
20. (a)   Write short notes on :
           (i)   R login   (ii)   File Access and transfer.   Or
    (b)   Explain in detail about simple mail transfer protocol.

SEMESTER: I

Subject Title: ADVANCED SOFTWARE ENGINEERING

Maximum Marks: 75   Duration: 3 Hrs

Section-A (10*1=10 Marks)

Answer all the Questions

1. Software delivers the most important product of our time _____.
2. What is a prototype?
3. By its nature, a _____ is a network intensive.
4. Which is termed as the structure of structures of the system?
5. Who interacts with the software once it is released for production use?
6. What are called the objectives of all specification methods?
7. In _____ software engineering, unit testing and debugging are replaced by correctness verification and statistically based testing.
8. CBSE stands for _____
9. What is a Business process?
10. What is meant by design restructuring?

Section-B (5*5=25 Marks)

Answer all the Questions

11. (a)   What are various software applications ? Explain.   Or
    (b)   Explain about software engineering layers.
12. (a)   What is Architecture ? Why is it important ?   Or
    (b)   Explain the web E process model in detail.
13. (a)   What types of risks are encountered during software development ?   Or
    (b)   Write a note on quality concepts.
14. (a)   What operations can be associated with the spooler ?   Or
    (b)   What is clean room testing ?
15. (a)   Write a note on 'economics of CBSE'.   Or
    (b)   What are the principles of Business Process Reengineering ?

Section-C (5*8=40 Marks)

Answer all the Questions

16. (a)   What are software myths ? Explain. Or
    (b)   Explain in detail about software process models .
17. (a)   Explain in detail about Architectural styles . Or
    (b)   Explain the attributes of web based applications.
18. (a)   The MTBF concept Software is open to criticism. Can you think of a few reasons why ?
    Or
    (b)   What is the difference between an SCM audit and a formal technical review ? Can their function be folded into one review ? What are the pros and cons ?
19. (a)   What are the ten commandments of formal methods ? Explain.
    Or
    (b)   Explain the clean room approach in detail.
20. (a)   Write about 'forward engineering'.
    Or
    (b)   Write about 'domain engineering'.

SEMESTER: II

Subject Title: DATA MINING AND WAREHOUSING

Maximum Marks: 75   Duration: 3 Hrs

Section-A (10*1=10 Marks)
Answer all the Questions
1. The empirical cycle of the scientific research of consists of _____
2. One of the ten golden rules for setting reliable data mining environment is _____
3. What is a data warehouse?
4. What is metadata?
5. What are monitoring tools?
6. The definition of concept is _____ if it does not any negative examples as falling under the
7. Very important element in a cleaning operation is _____ of records
8. What is normalization?
9. IP stands for _____
10. In _____ testing, each development unit is its own.

Section-B (5*5=25 Marks)
Answer all the Questions
11.(a) Explain how data mining is a disciplinary field.   Or
    (b)   What does data mining actually practice ?
12.   (a)   What are various coding steps ? Examples   Or
       (b)   Write short notes on : Decision trees
13.   (a)   When is data mart appropriate ?   Or
       (b)   When is a summary table to be useful ?
14.   (a)   Explain about client tools and management ?Or
       (b)   How does parallel query work ? Explain

15.   (a)   What are fixed queries ? Explain.   Or
       (b)   Write about data load

Section-C (5*8=40 Marks)
Answer all the Questions
16.   (a)   What is concept learning ? Explain. Or
       (b)   Explain about self learning computer
17.   (a)   Explain various stages of knowledge process   Or
       (b)   Explain visualization techniques in detail
18.   (a)   Explain about extract and load process.   Or
       (b)   Explain about load manager
19.   (a)   Explain about security in detail   Or
       (b)   Explain about service level agreement for the process of the data warehouse.
20.   (a)   What do you mean by tuning the data . Explain   Or
       (b)   Explain in detail about "Testing in recovery"

SEMESTER: II

Subject Title: ADVANCED OPERATING SYSTEM

Maximum Marks: 75   Duration: 3 Hrs

Section-A (10*1=10 Marks)
Answer all the Questions
1. Define Operating System.
2. What is work station ?
3. What is system calls ?
4. What is the use of spooler directory ?
5. What is meant by Deadlock ?
6. What is meant by absolute path name ?
7. What are the three layers of MS-DOS ?
8. Expand NUMA.
9. What do you mean by pipeline ?
10. What are the two flavours of Real time System

Section-B (5*5=25 Marks)
Answer all the Questions

11.   (a) List some differences between per computer operating systems and mainframe
            operating system
       Or
       (a) Why was timesharing not wide spread second generation computers ?
12.   (a) Explain the concept of Interprocess communication.   Or
       (b) Explain about process scheduling and discuss different types of scheduling
           algorithms.
13.(a) Explain the different types of files with example.   Or
       (b) Explain all the common system calls relating systems in file operations.
14.   (a) Explain the concept of Remote procedure   Or
       (b) Explain about NFS Architecture
15.   (a) Explain about Real-time operating systems.   Or
       (b) Explain the properties of Real time operating System
Section-C (5*8=40 Marks)
Answer all the Questions
16.   (a) Explain about operating system structure.   Or
       (b) Explain about the operating system concepts
17.   (a) Explain about Deadlock detection Recovery   Or
       (b) Explain about the Implementation processes.
18.   (a) Explain about the Implementation of and Directories   Or
       (b) Explain about the fundamental concepts of Unix.
19.   (a) Explain the following design issue of distributed operating system
           (i) Transparency
           (ii) Flexibility
           (iii)Reliability
           (iv)Performance
       Or
       (b) Explain about clock Synchronization Algorithms.
20.   (a) Explain about Real time scheduling   Or
       (b) Explain about Real time Communication

SEMESTER: II

Subject Title: ADVANCED CONCEPTS OF INTERNET AND WEB

Maximum Marks: 75   Duration: 3 Hrs

Section-A (10*1=10 Marks)

Answer all the Questions

1. Which transport layer protocol can achieve data reliability?
2. What is JVM?
3. The process that ensures the accessing a shared resource by only one thread is
   _____.
4. Which language can achieve interoperability of web services?
5. The XML feature that provides the description of data types and their inter relations is
   _____.
6. MIME stands for _____
7. The keyword that prevents classes from method overriding is _____
8. The method that is called only once during the run-time of an applet is _____
9. RPC stands for _____
10. The protocol that is designed to interchange of in an interoperable and extensible form is
    _____

Section-B (5*5=25 Marks)

Answer all the Questions

11.   (a) Briefly explain the Internet Mailing Protocols   Or
        (b) Write short notes on Gopher
12.   (a) What are the Bitwise operators supported by Java ?   Or
        (b) Write a Java program that handles three built-in exceptions.
13.   (a) Write short notes on thread priorities   Or
        (b) Describe the life cycle of an Applet
14.   (a) Explain the application areas where web services can be used and how ?   Or
        (b) Briefly explain distributed computing
15.   (a) With a neat diagram explain the web services architecture   Or
        (b) What is the role of XML in web services ?

   Section-C (5*8=40 Marks)

Answer all the Questions

16.   (a) Explain the following :
            (i) Internet Addressing   (4)
            (ii) E-mail   (4)
        Or
        (b) Discuss briefly on Usenet and Veronica   (4 + 4)
17.   (a) (i) Describe the features of Java   (5)
            (ii) Distinguish between abstract classes and interfaces   (3)
        Or
        (b) Write a Java program that handles a user-defined exception 'Mark Invalid
            Exception' if the entered Mark is > 100 for the student class   (8)
18.   (a) What is synchronization and how inter thread communication is achieved in Java ?
                                                                       (4+4)
        Or
        (b) Write a Java program that uses TCP/IP client and server sockets for getting the
            current time and data from the server
19.   (a) What are the advantages and disadvantages of web services ?   Or
        (b) Compare web services and distributed computing
20.   (a) Explain the message exchanging in SOAP   Or
        (b) Describe web services using WSDL

SEMESTER: III

Subject Title: DIGITAL IMAGE PROCESSING

Maximum Marks: 75   Duration: 3 Hrs

Section-A (10*1=10 Marks)

Answer all the Questions

1. _____ is used to denote a mask
2. What are Enhancement techniques?
3. A simple approach for reducing the effect of the interference is to use a _____
4. Define data compression
5. _____ subdivides an image into its constituent parts or objects
6. The missing depth information can be obtained be using _____ imaging technique
7. _____ filtering removes selection frequency regions between low and high frequencies.
8. The _____ filtering removes selection frequency regions between low and high frequencies.
9. Most of the restoration techniques are based on _____ of optimality
10. Expand PDQ.

Section-B (5*5=25 Marks)

Answer all the Questions

11. (a) What are the fundamental steps in image processing ? Explain.   Or
    (b) Write a note on connectivity
12. (a) Explain spatial domain methods   Or
    (b) Write a note on smoothing filters.
13. (a) Write a note on constrained and recon strained restoration   Or
    (b) Explain about least mean square filter
14. (a) What are the elements of information theory ?   Or
    (b) What do you mean by error free compression ?
15. (a) Write short notes on line deduction   Or
    (b) What are spatial techniques ? Explain

Section-C (5*8=40 Marks)

Answer all the Questions

16. (a) What are the elements of digital image processing systems ? Explain   Or
    (b) What do you mean by quantization ? Explain
17. (a) Explain in detail about color image processing   Or
    (b) Explain the study of image enhancement techniques by considering processing methods
18. (a) Explain in detail about inverse filtering   Or
    (b) Explain in detail about interaction restoration
19. (a) Explain in detail about image compression models   Or
    (b) Explain in detail about lossy compression
20. (a) Explain in detail about detection discontinuities   Or
    (b) Explain in detail about thresholding

SEMESTER: III

Subject Title: ADVANCED TOOLS IN COMPUTING

Maximum Marks: 75   Duration: 3 Hrs

Section-A (10*1=10 Marks) - Answer all the Questions
1. What is a markup language?
2. Define DTD.
3. What is schema?
4. Define DOM.
5. Define virtual glossary.
6. Expand W3C.
7. What is ADO?
8. What is meant by distributed model/
9. What is a web form?
10. What are Sessions?

Section-B (5*5=25 Marks)   - Answer all the Questions
11.a) Write short notes on XML.   (or)

b) Give an outline of document type definition.

12.a) Describe attributes and data types.   (or)

b) Discuss DOM and Java script.

13.a) What are directory services? Explain.   (or)

b) Explain XML metadata interchange and XAML.

14.a) Describe ASP objects and components.   (or)

b)Explain the programming language constructs of VB.NET.

15.a) Discuss web forms, events processing and event handlers.   (or)

b) Discuss the scope and state of ASP.NET.

Section-C (5*8=40 Marks)   - Answer all the Questions
16.a) Explain in detail XML parsers, namespaces characters and data sections.   (or)

b) Discuss DTD for any application of your choice.

17.a) Discuss schemas in detail   (or)

b) Explain DOM implementation.

18.a) Explain the following

        i. Resource definition framework   ii. Channel definition format   (or)

b) Discuss XML digital signatures and extensible exchange protocol in detail.

19.a) Discuss ASP.Net framework using a sample application.   (or)

b) How ASP.NET programming can be done with VB.NET? Explain with example.

20.a) How web forms can be created and programmed? Explain. Also, discuss interactive application building with VS.NET.

                (or)

b) Discuss ASP controls , session and application objects in detail.

SEMESTER: III

Subject Title: NETWORK SECURITY AND CRYPTOGRAPHY

Maximum Marks: 75   Duration: 3 Hrs

Section-A (10*1=10 Marks)

Answer all the Questions

1. Define cryptography.
2. What is a symmetric key?
3. Define key management.
4. Define digital signature.
5. What is MIME?
6. Give any one service of X.509.
7. What is a firewall?
8. How password can be protected?
9. Define steganography.
10. Expand RSA.

Section-B (5*5=25 Marks)

Answer all the Questions

11.a) What is network security? Why is it needed?   (or)

b) Discuss i. IDEA   ii. Blowfish.

12.a) Explain key management.   (or)

b) Explain digital signatures.

13.a) Explain e-mail security   (or)

b) Explain IP security.

14.a)Discuss SSL in brief.   (or)

b) Write short notes on password security.

15.a) Explain ECC algorithm in detail.   (or)

b) Explain security audit.

Section-C (5*8=40 Marks)

Answer all the Questions

16.a) Explain Stream cipher and block cipher methods.   (or)

b) Discuss symmetric key algorithms.

17.a) Describe Diffie-Hell man key exchange.   (or)

b) Explain Hash functions and Hash algorithm.

18.a) Explain the X.509 encryption techniques.   (or)

b) Discuss MIME in detail.

19.a) Explain web security and secure transaction through the web.   (or)

b) Discus Firewalls, intruders and viruses.

20.a) Discuss the implementation of RSA algorithm.   (or)

b) Explain the following:

i. Quantum cryptography   ii. Water marking

Elective I

Subject Title: SOFTWARE TESTING

Maximum Marks: 75   Duration: 3 Hrs
Section-A (10*1=10 Marks)
Answer all the Questions
   1. What is meant by software testing ?
   2. What is requirement phase testing ?
   3. What is the function of program phase testing ?
   4. Define acceptance testing
   5. How to test the validity of a software ?
   6. What is test planning ?
   7. Define client
   8. Write testing techniques
   9. What is meant by test documentation ?
   10. State the use of testing metrics ?
Section-B (5*5=25 Marks)
Answer all the Questions
11.   (a) Discuss in detail about software system testing strategy   Or
         (b) Explain how to develop software system testing tactics.
12.   (a) Write brief moves on debugging   Or
         (b) Discuss briefly about program phase testing
13.   (a) Explain any one testing methodology for software maintenance   Or
         (b) Discuss about testing the validity a software
14.   (a) Explain the testing of client / server architecture   Or
         (b) Discuss briefly about Rapid prototyping
15.   (a) Write the objectives of test documentation   Or
         (b) Discuss briefly about testing metrics
Section-C (5*8=40 Marks)
   Answer all the Questions
16.   (a) Discuss in detail about addressing the software system   Or
         (b) Write brief notes on requirements phase testing
17.   (a) Discuss in detail about design phase testing   Or
         (b) Explain the detail about installation phase testing
18.   (a) Explain how to test the correctness of the installing a software change Or
         (b) Discuss briefly about testing the progress of the software system
19.   (a) Discuss briefly about the testing techniques   Or
         (b) Describe in detail about testing tools
20.   (a) Discuss briefly about reporting test results   Or
         (b) Explain in detail about evaluating test effectiveness

Semester : Elective I

Subject Title: DISTRIBUTED COMPUTING

Maximum Marks: 75   Duration: 3 Hrs
Section-A (10*1=10 Marks)
Answer all the Questions

1. Multiprocessor operating systems are also called _____ OS
2. What do you mean by resource management ?
3. Expand IPC
4. What expansion of ATM is _____
5. Name any one distributed computing model
6. Computer usage started with _____
7. What is concurrency ?
8. Multiplicity of functional units is _____ mechanisms
9. What is a client ?
10. What is TCP / IP

Section-B (5*5=25 Marks)
Answer all the Questions
11.   (a) Write a short note on distributed systems.   Or
        (b) Discuss on distributed processing
12.   (a) Bring out any four advantages of distributed systems   Or
        (b) Discuss on the loading factors of distributed systems
13.   (a) Discuss on the concept of Ratio Analysis   Or
        (b) What do you mean by decision trees?
14.   (a) Draw a neat diagram of client-server model and explain.   Or
        (b) What is the use of File Server? Explain
15.   (a) What do you mean by distributed databases ?   Or
        (b) Discuss the levels of transparency in the distributed databases

Section-C (5*8=40 Marks)
     Answer all the Questions
16.   (a) Discuss in detail the issues relating to the distributed processing systems ?
        Or
        (b) Elaborate on designing fully distributed systems
17.   (a) What are the challenges faced in distributed data ? Discuss in detail   Or
        (b) How are distributed resources allocated? Discuss the various ways
18.   (a) Discuss in detail the design considerations for distributed computing   Or
        (b) Discuss in detail line loading
19.   (a) Discuss in detail Client –server model   Or
        (b) Bring out a detailed study on file server
20.   (a) Discuss in detail the overview of distributed databases   Or
        (b) Bring out a detailed study of R * protocol.

Semester : Elective I

Subject Title: NEURAL NETWORK AND FUZZY LOGIC

Maximum Marks: 75   Duration: 3 Hrs

Section-A (10*1=10 Marks)

Answer all the Questions

1. Interception was invented by _____
2. What are the three major regions of cell ?
3. Define classification
4. IT stands for _____
5. Optimization technique used in ANNs is be the _____
6. The logic to infer a crisp from fuzzy input _____
7. Fuzzy set theory was developed by _____
8. The _____, averages weighted outputs.
9. OCR stands for _____
10. STLVQ stands for _____

Section-B (5*5=25 Marks)

Answer all the Questions

11.   (a) Write short notes on Delta rule   Or
       (b) Discuss on linear separatability
12.   (a) Explain in detail about Boltzmann machine   Or
       (b) Write short notes on Instar and Outstar
13.   (a) Discuss on Fuzzy relation   Or
       (b) What is matrics ? Explain
14.   (a) What is Fuzzy variable ?Explain Or
        (b) Write the fundamental problem of non –membership defuzzification
15.   (a) Discuss on Handwritten character   Or
       (b)   Mention any five applications of Neural and fuzzy logic.

Section-C (5*8=40 Marks)

   Answer all the Questions

16.   (a) Explain in detail about the structure neural networks.   Or
       (b) Discuss on XOR function with examples
17.   (a) Explain in detail about Hamming networks   Or
       (b) Explain in detail about Kohonen's neocognitron
18.   (a) Explain in detail about the fuzzy theorem   Or
       (b) Discuss on fuzzy composition with example
19.   (a) Discuss on :
              (i) Linguistic variables
              (ii) Measure of fuzziness
       Or
       (b) Explain in detail about Transition
20.   (a) Discuss on Drug discovery   Or
       (b) Explain in detail about Neuro – Fuzzy systems

Semester : Elective I

Subject Title: ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS

Maximum Marks: 75   Duration: 3 Hrs

Section-A (10*1=10 Marks)

Answer all the Questions

1. The first requirement of a good control strategy is that it cause _____.
2. The generate-and-test algorithm is a _____ search procedure.
3. The predicate logic form of 'Caesar was a ruler' is _____.
4. When we say P (A/B), we are describing the conditional probability of A given that the only evidence we have is _____.
5. Expert systems are complex _____ programs.
6. Some of the task domains of AI are Expert tasks, Formal tasks and _____ tasks.
7. What is AI problem?
8. Define Horn clause.
9. Define heuristic knowledge.
10. Caching has been used in AI programs to produce some surprising performance improvements. Such caching is known as _____

Section-B (5*5=25 Marks)

Answer all the Questions

11.   (a)   In order to build a system to solve a problem what are to be done ?   Or
      (b)   What are production system characteristics ?
12.   (a)   Explain the simple hill climbing search procedure.   Or
      (b)   Write a note on 'constraint satisfaction'.
13.   (a)   What is resolution ? Explain.   Or
      (b)   Write a note on 'Logic programming'.
14.   (a)   Explain about Baye's theorem.   Or
      (b)   Explain the components of a planning system.
15.   (a)   What is learning ? Explain.   Or
      (b)   Write a note on speech recognition.

Section-C (5*8=40 Marks)

    Answer all the Questions

16.   (a)   Using state space search, solve the water jug problem.   Or
      (b)   Explain in detail about problem characteristics.
17.   (a)   Explain about means-ends analysis.   Or
      (b)   What are the issues in knowledge representation ? Explain.
18.   (a)   Consider the following facts :
             (i)   Marcus was a man   (ii)   Marcus was a Pompeian
             (iii)   Marcus was born in 40 A.D.   (iv)   All men are mortal
             (v)   All Pompeians died when the volcano erupted in 79 A.D.
             (vi)   No mortal lives longer than 150 years (vii) It is now 1998.
             (viii) Alive means not dead (ix)If someone dies, the he is dead at all later times.
             Represent them in predicate logic and answer the question "is Marcus alive".
      Or
      (b)   Explain about 'Forward Vs Backward reasoning'.
19.   (a)   Explain what makes understanding hard.   Or
      (b)   Explain in detail about Dempster-Shafer-Theory.
20.   (a)   Explain learning in problem solving.   Or
      (b)   What is knowledge acquisition ? Explain.

Semester : Elective II

Subject Title: MULTIMEDIA AND ITS APPLICATIONS

Maximum Marks: 75   Duration: 3 Hrs
Section-A (10*1=10 Marks)
Answer all the Questions
    1. Main aim of multimedia is / are _____.
    2. List two Hardware Components required for media Systems ?
    3. Write a note on animation
    4. Define color palettes
    5. MIME means _____
    6. Define SGML
    7. What is meant by Voice Mail ?
    8. XML _____
    9. What does Authoring mean ?
    10. Name any two virtual Reality software
    Section-B (5*5=25 Marks)
Answer all the Questions
11. (a) State and explain the Multimedia Hardware   Or
    (b) Explain the goals of Multimedia Networking
12. (a)   Bring out a study on Cloning   Or
    (b) State the concept of Compressing Bitmaps
13. (a) Write a note on Speech Recognition   Or
    (b) State the five features of CD family.
14. (a) What is meant by Video Teleconferencing ?   Or
    (b) What are the goals in Multimedia connotation ?
15. (a) Discuss in detail a Generic VR system ?   Or
    (b) Write a note on VR modeling
Section-C (5*8=40 Marks)
    Answer all the Questions
16. (a) Bring out a detailed study on Multimedia Applications.   Or
    (b) Discuss in detail some Multimedia Software
17. (a) Bring out a detailed study on Contribution Palettes and Digital Video   Or
    (b) Discuss in detail Operating Systems for Multimedia
18. (a) Discuss in detail JPEG Image Compress Standards   Or
    (b) Bring out a detailed study on Sequencing and Video Technology
19. (a) State and discuss in detail the HTML, Voice Mail and their features.   Or
    (b) Discuss in detail the Multimedia Presentation and Authoring
20. (a) State and discuss the functions perform the VR Software with example   Or
    (b) Discuss in detail VR applications.

Semester : Elective II

Subject Title: EMBEDED SYSTEMS

Maximum Marks: 75   Duration: 3 Hrs

Section-A (10*1=10 Marks)

Answer all the Questions

1. The 8051 operations that do not use the internal 128 byte RAM addresses from 00H to 7FH are done by a group of specific internal registers, each called a _____.
2. The _____ is the main building block for software written for an RTOS environment.
3. _____ combines separately compiled and assembled modules into an executable image.
4. In Serial Port Control (SCON) SFR, if SMO and SM1 are to be set as 1 then _____ mode is selected.
5. The internal between heart beat timer interrupts is called the _____.
6. Systems with absolute deadlines are called _____.
7. What for counting semaphores are used?
8. What is DPH?
9. Define Mutex.
10. What is a Logic analyzer?

Section-B (5*5=25 Marks)

Answer all the Questions

11.   (a)   Explain the function of each bits available in program status word (PSW) of SFR.   (Or)
       (b)   Explain about shift register mode of serial data transmission in 8051 micro controller.
12.   (a)   Explain register addressing mode in brief with examples.   (Or)
       (b)   Explain how A/D conversion is done in 8051.
13.   (a)   Explain the three states of task in an RTOS.   (Or)
       (b)   Write short notes on pipes in RTOS.
14.   (a)   Explain the disadvantages of using a large number of tasks.   (Or)
       (b)   Explain different modes in which power is saved.
15.   (a)   What are the advantages of using flash memory in RTOS ? Explain in brief. (Or)
       (b)   List the features of using oscilloscopes as a laboratory tool.

Section-C (5*8=40 Marks)

   Answer all the Questions

16.   (a)   Explain the architecture of 8051 micro controller with block diagram.   (Or)
       (b)   Explain the serial data communication done by 8051 micro controller with SFR.
17.   (a)   Discuss about direct addressing mode and indirect addressing mode of 8051 micro controller in detail.   (Or)
       (b)   Write a program in 8051 to add the unsigned numbers found in internal RAM locations 25h, 26h and 27h together and put the result in RAM locations 31h (MSB) and 30h (LSB).
18.   (a)   Explain about RTOS semaphores in detail.   (Or)
       (b)   Explain how events are managed in RTOS. Also compare other methods for inter task communication.
19.   (a)   Explain how encapsulating semaphores and queues are done in RTOS.   (Or)
       (b)   Explain the ways in which you can save code space in RTOS.
20.   (a)   Explain any two ways in which embedded software is loaded in the target system.   (Or)
       (b)   Explain the assert macro technique used in embedded systems briefly.

Semester : Elective II

Subject Title: NATURAL LANGUAGE PROCESSING

Maximum Marks: 75   Duration: 3 Hrs

<u>Section-A (10*1=10 Marks)</u>

Answer all the Questions

1. _____ studies the structure of language itself.
2. _____ evaluates system performance without looking inside to see how it works.
3. Transitive verbs allow another form of verb group called the _____.
4. The grammatical symbols such as N and V which describe word categories are called _____.
5. The presentation of context independent meaning is called the _____.
6. Define semantic interpretation
7. What is active grammar?
8. What are morphemes?
9. A grammar that supports both processes is called _____.
10.   Define pragmatic knowledge.

<u>Section-B (5*5=25 Marks)</u>

Answer all the Questions

11.   (a)   Write about dialogue –based applications involve human-machine communication.   Or
      (b)   Write a none on "the study of language".
12.   (a)   Explain a simple Top-Down parsing algorithm.   Or
      (b)   Describe the Lexicon and Morphological Analysis.
13.   (a)   Write short notes on "Deterministic analysis".   Or
      (b)   Explain the Partial Parsing
14.   (a)   Describe an Encoding Ambiguity in the logical term.   Or
      (b)   Explain the verbs and states in Logical form.
15.   (a)   Explain about definite descriptions and string   Or
      (b)   Describe in detail about rules for simpler noun phrases.

<u>Section-C (5*8=40 Marks)</u>

   Answer all the Questions

16.   (a)   Explain any five different forms of knowledge.   Or
      (b)   How to evaluate the language understanding systems briefly?
17.   (a)   Discuss in detail about Transition Network Grammars .   Or
      (b)   Explain the basic feature systems for English.
18.   (a)   Describe the various techniques for efficient encoding of ambiguity.   Or
      (b)   Explain the part-of speech tagging in details.
19.   (a)   Describe the lexicalized semen Interpretation and Semantic Roles.   Or
      (b)   Explain about statistical word and disambiguation in detail
20.   (a)   Discuss the method for scoping while part with an illustration.   Or
      (b)   Describe the Co-reference and the constraints with an example.

Semester : Elective II

Subject Title: SIMULATION & MODELING

Maximum Marks: 75   Duration: 3 Hrs

Section-A (10*1=10 Marks)

Answer all the Questions

1. Define Computer simulation.
2. What are discrete systems?
3. Mention the significance of random numbers.
4. What is meant by uniform distribution?
5. What is acceptance?
6. What are empirical values?
7. Give any one application of reduction technique.
8. What is manual simulation?
9. Mention any two simulation software.
10. Give any two simulation applications.

Section-B (5*5=25 Marks)

Answer all the Questions

11.a) What are the principles of Computer Simulation? Explain.   (or)

b) Explain the system models.

12.a) Explain the midsquare method of generating random numbers.   (or)

b) Explain inverse transform technique.

13.a) Explain uniform discrete distribution.   (or)

b) Explain Gamma distribution.

14.a) Discuss input-output analysis.   (or)

b) Explain the concepts of discrete event simulation.

15.a) Write short notes on simulation languages.   (or)

b) Write short notes on simulation application areas.

Section-C (5*8=40 Marks)

Answer all the Questions

16.a) What is Monte-Carlo simulation? Explain. Discuss the limitations of simulation.

(or)

b) What are the components of a system? Explain discrete and continuous systems.

17.a) Explain the Kolmogorov Smirnov test for random numbers. Explain where it can be applied.   (or)

b) Explain Uniform distribution and Weibull distribution in detail.

18.a) Explain Poisson distribution and rejection technique for Poisson distribution.   (or)

b) Discuss Geometric distribution in detail.

19.a) Briefly explain the verification and validation of simulation models.   (or)

b) Describe manual simulation using single channel queue and multi server queue.

20.a) Discuss how simulation can be done using C and Simula.   (or)

b) Explain in detail how University examination system can be simulated and tested?