M.Sc. INFORMATION TECHNOLOGY

Syllabus

(Academic year 2015 onwards)

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), COIMBATORE - 641 018
(An Autonomous) college affiliated to Bharathiar University)
M. Sc., Information Technology and Scheme of Examinations for the Students Admitted from 2015-2016 academic year onwards

ABOUT THE COURSE

The M. Sc. (**Information Technology**) course offered by this college is a two year full time course consisting of four semesters. It is oriented towards the concepts of the theory of Computer Science and its applications in recent developments both in commercial and scientific areas.

ELIGIBILITY FOR ADMISSION

Candidates for admission to the first year course leading to the degree of Master of Science (M.Sc.) will be required: A pass with 50% of Marks in B.Sc.(CS) or B.C.A. or B.Sc.(IS) or B.Sc.(IT) or B.Sc.(CT) degree in any University recognized by the Bharathiar University.

In case of SC/ST candidates, a mere pass in the qualifying examination will be sufficient.

ELIGIBILITY FOR EXAMINATION

A candidate will be permitted to appear for the semester examinations held at the end of each semester only on securing a minimum attendance of 75% and that the candidate's conduct has been satisfactory. If a candidate fails to secure 75% attendance and conduct has been satisfactory it shall be open to the principal or any authority delegated such powers to grant exemption to a candidate for valid reasons subject to usual conditions.

EXAMINATIONS

Semester examinations shall be conducted at the end of each semester for the subjects of study undergone by the students in that semester. UGC pattern of question paper is followed for all the theory subjects. 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.

PASSING REQUIREMENTS

1. Single valuation (External) system will be followed to award marks.

2. A candidate shall be declared to have passed the examinations in a subject if he/she secures not less than 50% in the end of semester examination.

3. A candidate who successfully completes the course and passes the examinations prescribed in all the subjects of study and practical examinations shall be declared to have been qualified for the degree.

4. If a candidate does not complete the course successfully within a period of 4 years (8 semesters) from the date of his/her joining, he/she will be disqualified from the course.

CLASSIFICATION OF SUCCESSFUL CANDIDATES

1. All candidates securing not less than 60% of the aggregate marks shall be declared to have passed the degree in FIRST CLASS provided they have passed the examination in every subject including practical, project work and Viva-Voce within two years of joining the course.
2. Other successful candidates shall be declared to have passed the examinations in SECOND CLASS
3. He / She earns a progress certificate from the Head of the Institution of having satisfactorily completed the course

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), COIMBATORE - 641 018
DEPARTMENT OF COMPUTER SCIENCE
**M. Sc., Information Technology Syllabi and Scheme of Examinations for the Students
Admitted from 2015-2016 academic year onwards**

Semester	Code	Part	Paper	Title of the Paper	Hrs (wk)	Internal (CA)Mar	External (SE)Mar	Total Marks	SE – Min.	TPM	Credits
I	15MIT11C	A	I	Parallel Processing	4	25	75	100	38	50	4
	15MIT12C	A	II	Object Oriented Analysis and Design	4	25	75	100	38	50	4
	15MIT13C	A	III	Java Programming	4	25	75	100	38	50	4
	15MIT14C	A	IV	Data Mining and and Big Data Analytics	4	25	75	100	38	50	4
	15MIT15C	A	V	Web Designing	4	25	75	100	38	50	5
	15MIT16P	A		**Practical 1 :** Java Lab	3	40	60	100	30	50	2
	15MIT17P	A		**Practical 2 :** Web Designing Lab	2	40	60	100	30	50	2
					25			**700**			**25**
II	15MIT21C	A	VI	.NET Programming (C#)	4	25	75	100	38	50	4
	15MIT22C	A	VII	Neural Networks and Fuzzy Logic	4	25	75	100	38	50	4
	15MIT23C	A	VIII	Network Security	4	25	75	100	38	50	4
	15MIT24C	A	IX	Mobile Computing	4	25	75	100	38	50	4
	15MIT25E	B	**X**	**Elective 1:**	4	25	75	100	38	50	5
	15MIT26P	A		**Practical 3:** C# Programming Lab	3	40	60	100	30	50	2
	15MIT27P	A		**Practical 4:** Network Security Lab	2	40	60	100	30	50	2
					25			**700**			**25**
III	15MIT31C	A	XI	Digital Image Processing	4	25	75	100	38	50	4
	15MIT32C	A	XII	Software Testing	4	25	75	100	38	50	4
	15MIT33C	A	XIII	Open source Tools	4	25	75	100	38	50	4
	15MIT34C	A	XIV	Distributed computing	4	25	75	100	38	50	4
	15MIT35E	B	XV	**Elective 2:**	4	25	75	100	38	50	5
	15MIT36P	A		**Practical 5**: Open source Tools Lab	3	40	60	100	30	50	2
	15MIT37P	A		**Practical 6:** Digital Image Processing Lab	2	40	60	100	30	50	2

					25			700			25
IV	15MIT41V	B		**Project and Viva Voce**		40	160	200	80	100	15
			Total / Credits					2300			90

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ELECTIVES FOR SECOND SEMESTER
ELECTIVE – I

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   1.1.   Principles of Compiler Design
   1.2.   Information Coding Techniques
   1.3.   Artificial Intelligence & Expert Systems
   1.4.   Cloud Computing

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ELECTIVES FOR THIRD SEMESTER
ELECTIVE – II

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   2.1. Web services
   2.2.   Enterprise Resource Planning
   2.3. Natural Language Processing
   2.4. Semantic Web Technology
   2.5.   Bio Informatics

SEMESTER I

Paper–I: PARALLEL PROCESSING

UNIT – I

Introduction to parallel processing – Parallelism in uniprocessor Systems – Parallel Computer structures – Architectural Classification schemes – Parallel Processing Applications.

UNIT – II

Memory and Input-output subsystems –Hierarchical Memory structure-virtual Memory system-Memory allocation and management-Cache Memories and Management –Input –Output Subsystems.

UNIT – III

Principles Linear Pipelining and Vector Processing – Pipelining : an overlapped Parallelism-Instruction and Arithmetic pipelines-Principles of Designing pipelined Processors.

UNIT – IV

Structures and Algorithms for array processors- SIMD Array Processors – SIMD Interconnection Networks –Parallel Algorithms for array processors.

UNIT – V

Multiprocessor Architecture and programming-Functional Structures-Interconnection networks –Multi processor operating systems

TEXT BOOKS

1. J.L. Hennessy and D.A. Patterson, Computer Architecture: A Quantitative Approach", Harcourt Asia, for Morgan Kaufmann Publishing co, 1999.

2. Kai Hwang, "Advanced Computer Architecture – Parallelism, Scalability, Programmability", McGraw Hill, 1993.

SEMESTER I

Paper - II: - OBJECT ORIENTED ANALYSIS AND DESIGN

UNIT I

Object Orientation – System Development – Review of Objects – Inheritance –Object Relationships – Dynamic binding – OOSD life cycle – Process – Analysis- Design- Prototyping – Implementation – Testing – Overview of Methodologies

UNIT II

OMT – Booch methodology, Jacobson – Methodology – patterns - Unified Approach– UML – Class Diagrams – Dynamic Modeling

UNIT III

Using Case mode - Creation of classes –Noun Phrase approach-responsibilities-Collaborators and relationships - Super –Subclass - Aggregation. .

UNIT IV

OO Design axioms – Class visibility – refining attributes- Methods – Access layer –OODBMS – Class mapping view layer

UNIT V

Quality Assurance testing – Inheritance and testing - Test Plan – Usability testing –User satisfaction testing

REFERENCE BOOKS

1. Ali Brahmi , " Object Oriented System Development" , McGraw-Hill International Edition
2. Object-Oriented Analysis and Design by Grady Booch, Addison – Wesley
3. Object Oriented Modelling and Design by James Rumbaugh , Micheal Blaha,Prentice Hall

SEMESTER I

Paper III: JAVA PROGRAMMING

UNIT – I

Introduction: History of JAVA, JAVA class libraries – Basics of a typical JAVA environment – Arithmetic, Equality and Relational Operators – Thinking about Objects, – **Control Structures:** if, if-else, while, for, switch, do-while, break and continue – **Operators:** Assignment, Increment and Decrement and Logical – Primitive Data types.

UNIT – II

Methods: Program modules in JAVA – Methods – Method definitions – JAVA API packages – Duration of identifiers – Scope rules – Method overloading – Arrays – References and Reference parameters – Passing arrays to methods – Multiple subscripted arrays – Class scope – Controlling access to members – Creating packages – Constructors – Overloaded constructors – Set and Get methods – Final instance variables – Packages access – Using this reference – Finalizers – static Class members – Data abstraction and Information Hiding – Superclasses and Subclasses – protected members – Constructers and Finalizers in subclass – inner class definitions – Type wrapper class for primitive types-string methods, string buffer class.

UNIT – III
The basics of JAVA exception handling – Class Thread: an overview – Thread states – Thread priorities and scheduling – Thread synchronization – Runnable interface – Thread groups – Loading, displaying and scaling images- Applets.

UNIT – IV
Files and Streams – Creating, Reading and Updating a sequential access file – Creating, Writing and Reading a random access file – Class file – Reading, Inserting and Updating a database .(Use JDBC to MS Access)

UNIT – V

Overview of Servelet technology - Handling HTTP GET and POST requests – Session tracking – RMI: defining, implementing the RMI – Define the Client – Compile Execute the server and the client – Networking: Reading a file on a web server – Establishing a simple server and a simple client (using stream sockets) – **JAVABEANS:** Preparing a class to be a JavaBean – Creating a JavaBean – Adding Beans and Properties to a JavaBean – Connecting Beans with Events in the BeanBox – the BeanInfo class.

TEXT BOOKS

1. Deitel and Deitel, "Java How to Program", Third Edition, Pearson Education Asia.

REFERENCE BOOKS

1. Keyur shab, "Java 2 programming", Tata McGraw-Hill Pub. Company Ltd.

2. C. Xavier, "Programming with Java 2", SciTech Publications (India) Pvt. Ltd.

3. Cays S. Horstmann, Gary Cornell, "Core Java2 Volume I – Fundamentals", Pearson Edition, 2001.

4. Cays S. Horstmann, Gary Cornell, "Core Java2 Volume II – Fundamentals", Pearson Edition, 2003.

SEMESTER I
Paper -IV: DATA MINING AND BIG DATA ANALYTICS

Objectives

• To know the basic concepts of Data Mining and Big Data Analytics.

UNIT – I

Introduction – Data Mining – Relational Databases – Data Warehouses – Transactional databases – Data Mining functionalities – Classification of Data Mining systems – Major Issues in Data Mining.

UNIT – II

Data Preprocessing – Data cleaning – Missing value, noising data and inconsistent data – Data integration and Transformation – Data reduction – Data cube aggregation – Dimensionality reduction and data compression – Data mining primitives.

UNIT – III

Classification and predictions – Issues regarding classification and prediction – Classifications by decision tree induction – Classification by Back propagation – Other classification methods

UNIT – IV

Cluster Analysis – Types of Data in Cluster Analysis – Interval – Scaled variables, Binary variables, Nominal ordinal and ratio-scaled variables – Clustering methods – Partitioning methods – K-means, k-medoids and CLARANS – Hierarchical methods – Agglomerative and Divisive, BIRCH, CURE – Outlier analysis – Data Mining applications.

UNIT-V

The Big Deal about Big Data: What is Big Data-Why Is Big data important- Big Data. Applying Big Data to Business problems: A sampling of use cases-Big Data use cases-IT for IT – Customer state. Analytics for Big Data at Rest: The Big Data platform for high performance deep analytics- Appliance simplicity – Hardware Acceleration-Balance, massively parallel architecture- Modular design.

TEXT BOOKS

1. Jinweihan, Micheline Kambler, "Data Mining: Concepts and Techniques", Morgan Kaufman Publishers, New Delhi. (For Unit I, II, III and IV).
2. Paul C Zikopoulos, Dirk deRoos, Krishnan Parasuraman, Thomas Deutsch, David Corrigan, James Giles, "Harness the Power of Big Data", The McGraw-Hill Publications, 2013, First Edition. (For Unit V).

REFERENCE BOOKS

1. Pieter Adriaans, Dolf Zantinge, "Data Mining", Addison Wesley, 1998.
2. Sam Anohory, Dennis Murrey, "Dataware housing in the real world", Pearson, 2004.

SEMESTER I

PAPER - V: WEB DESIGNING

UNIT – I
Basics of Web Technology: Web page creation- Scripting Language - HTML Tags – VBScript- JavaScript- Looping -Array handling -Functions and Procedures - Object creation - Validating Form Elements**.**

UNIT – II
 ASP: Active Server Pages- Server Side Scripting- Servers: IIS, PWS _ ASP Objects – Request- Response- Session- Server- Application objects- globel.asa file - Cookies - External & Internal cookies.

UNIT – III
 ASP Components - Ad Rotator- Context Rotator- Browser Capability- Page counter - Server objects- Database connectivity - DSN -Retrieving information from table – Manipulating records in tables. Implementation of ASP concepts in .NET environment.

UNIT – IV
 XML: XML essentials - XML Documents - Valid Documents- Entities and attributes - Cascade Style Sheets - XML Scheme - Handling XML Documents and Data Binding.

 UNIT – V
 XML DOM - XSL Transformations - XSL Formatting Objects - XML and ASP- XML and Servlets - XML and Perl- WML

REFERENCE BOOKS
1. Steven Holzner – "Inside XML ", 2000 Edition, Techmedia Publishers.
2. "Unleashed ASP"- Techmedia Publisher.
3. "Interactive VBScript" – Techmedia Publishers.

SEMESTER – I

Practical 1: JAVA LAB

1. Create an Employee package to maintain the information about the employee. Use the Constructors to initialize the Employee number and use Overloading method to get the Basic pay of the employee .By using package create a java program.
2. Write a Java Program to implement Polymorphism, Inheritance, and Inner Classes
3. Write a Java Program to handle different Mouse events.
4. Create an applet for a calculate Application
5. Write a Java Program to maintain student's information in text File.
6. Animate images at different intervals by using multi threading concepts.
7. Java program by using JDBC concepts to access a database
8. Write a Java Bean Program to view a image.
9. Write a Java Program to implement RMI
10. Write a Java Program using Java Script

SEMESTER - I

Practical 2: WEB DESIGN LAB

The Exercise should contain Web Page creation and Hosting in Websites.

1. Design a Web page for a College with 5 departments and 5 staff members in each department. Create web links with necessary information.
2. Using Java script design a web page for Student Information System.
3. Using DHTML create a Banking Information System.
4. Create a Library Information System using XML.
5. Create a Website for e-shopping using ASP.
6. Write a VB script program to develop an Inventory Control System.

SEMESTER II
Paper–VI: .NET PROGRAMMING (C#)

UNIT – I
Introduction to .Net: Common Language Runtime, .NET frame work, Microsoft Intermediate Languages, JIters, Unmanaged code.
Introduction to C#: Evolution of C#, Characteristics of C#, How does C# differ from C++ and Java, Data types, Variables and Literals, Boxing and unboxing, Operators and Expressions, Type conversions, Mathematical functions, Decision making and branching, Decision making and looping.

UNIT – II
Object Oriented Programming In C#: Methods, Classes and objects, access specifier, Inheritance, abstract class, sealed classes, interfaces, delegates, namespaces, exceptions.

UNIT – III
Advanced Features of C#: Serializing objects, deserialization, XML based serialization, Multi threading, Reflection Attributes, Properties and Indexers.

UNIT – IV
Window Based Programming: Win Forms, Textbox, Buttons, Message Box, List Box, Handling events.

UNIT –V
ADO.NET: ADO.Net Object Model - Connecting with database, retrieving results, updating data in database, Deletion.
ASP.NET USING C#: Web Application Project, Web Forms, Controls.

TEXT BOOKS
1. E. Balagurusamy, "Programming in C#" A Primer Second Edition.
2. Ian Griffiths, Matthew Adams and Jesse Liberty, "Programming C# 4.0" O'Reilly Sixth Edition.

REFERENCE BOOKS
1. Stanley B.Lippman, "C# Primer A Practical Approach", Pearson Education, 2002.
2. Tom archer, "Inside C#", Microsoft Press, 2001.
3. "Microsoft C# Language Specification", Microsoft Press, 2001.

SEMESTER II
Paper VII: NEURAL NETWORKS AND FUZZY LOGIC

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: Cluster Structure, Vector Quantization, Classical ART Networks, Simplified ART Architecture. **ART1:** Architecture of ART1–Special features of ART1 Models-ART1 Algorithms-illustration. **ART2:** Architecture of ART2– ART2 Algorithms-illustration- Applications.

UNIT – IV
Fuzzy Set Theory: Fuzzy versus crisp, **Crisp sets**: Operation on Crisp sets- Properties of Crisp sets-Partition and Covering. **Fuzzy sets:** Membership Function – Basic fuzzy set Operations-properties of fuzzy sets. **Crisp relations:** Cartesian product-Other Crisp Relation-Operations on Relations. **Fuzzy relations:** Fuzzy Cartesian product- Operations on Fuzzy Relations.

UNIT – V
Fuzzy Systems: Crisp logic: Laws of Propositional Logic-Inference in propositional Logic. **Predicate logic:** Interpretations of Predicate Logic Formula – Inference in Predicate Logic. **Fuzzy logic**: Fuzzy Quantifiers – Fuzzy Inference, Fuzzy rule based system – Defuzzification Methods.

TEXT BOOKS
1. S.Rajasekaran, G.A.Vijayalakshmi Pai – "Neural Networks, Fuzzy logic, and Genetic Algorithms Synthesis and Applications, PHI, 2003.

REFERENCE BOOKS
1. James A. Freeman, David M. Skapura – "Neural Networks – Algorithms, Applications, and Programming Techniques", Pearson Education.
2. Fredric M. Ham, Ivica Kostanic, "Principles of Neuro computing for science of Engineering", TMCH.

Simon Haykin – "Neural Networks-a comprehensive foundation", PHI/Pearson Edition.

SEMESTER II
Paper–VIII: NETWORK SECURITY

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.

TEXT BOOKS
   1. William Stallings, "Cryptography and Network Security", PHI/Pearson Education.

REFERENCE BOOKS
   1. Bruce Schneir, "Applied Cryptography", CRC Press.
   2. A.Menezes, P Van Oorschot and S.Vanstone, "Hand Book of Applied Cryptography", CRC Press, 1997 (Free Downloadable).
   3. Ankit Fadia, "Network Security", MacMillan.

SEMESTER II
Paper- IX: MOBILE COMPUTING

UNIT I

Introduction: Mobility of Bits and Bytes –Wireless The Beginning – Mobile Computing – Dialogue Control – Networks – Middleware and Gateways –Application and services- Developing Mobile computer Applications – security in mobile computing – Standards _ Why is it necessary – Standard bodies.

MOBILE COMPUTTING ARCHITECTURE: History of computers and Internet – Architecture for mobile computing – Three-tier architecture – Design considerations for mobile computing – Mobile computing through Internet –Making exiting applications mobile enabled

UNIT II

MOBILE COMPUTING THROUGH TELEPHONY: Evaluation of telephony –Multiple access procedures – Mobile computing through telephone – IVR Application – Voice XML – TAPI

UNIT III

EMERGING TECHNOLOGIES: Blue Tooth – RFID – WiMAX – Mobile IP –IPv6 – Java Card. GSM : Global System for mobile communications – GSM Architecture – GSM Entities – Call routing in GSM – PLMN Interfaces – GSM Addresses and Identifiers – Network Aspects in GSM – GSM Frequency allocations – Authentications and Security. SMS

UNIT IV

GPRS – GPRS and packet data network – GPRS network architecture – GPRS network operations – Data services in GPRS – Application for GPRS Limitations– Billing and Charging. **WAP:** MMS – GPRS Applications

UNIT V

CDMA and 3G: Spread spectrum technology – Is 95 – CDMA vs GSM –Wireless Data – Third generation networks – Applications on 3G WIRELESS LAN: Wireless LAN advantages – IEEE 802.11 standards –Architecture – Mobile in Wireless LAN – Deploying wireless LAN – Mobile
adhoc networks and sensor networks – Wireless LAN Security –WiFi vs 3G

TEXT BOOK

MOBILE COMPUTING, Asoke K Talukder , Roopa R Yavagal, TMH, 2005

ELECTIVE – I

1.1 PRINCIPLES OF COMPILER DESIGN

UNIT – I

Introduction – Structure of a Compiler – Compiler writing Tools – Basic constructs of High level Programming languages: Data structures, Parameter transmission. Lexical analysis – Role of lexical analyser – Finite automata – Regular expressions to Finite automata – NFA to DFA – Minimizing the number of states of a Deterministic Finite Automata – Implementation of a Lexical Analyser.

UNIT – II

Parsing techniques – Context free grammars – Derivations and Parse trees – Ambiguity – Capabilities of Context free grammars – Top down and Bottom up parsing – Handles – Shift Reduce parsing – Operator precedence parsing – Recursive descent parsing – Predictive parsing.

UNIT – III

Automatic parsing techniques – LR parsers – Canonical collection of LR(0) items – Construction of SLR parsing table – LR(1) sets of items Construction – Construction of canonical LR Parsing Tables.

UNIT – IV

Syntax Direction Translation – Semantic actions – Implementation of Syntax Directed Translators – Intermediate Code: Postfix notation, Quadruples, Triples, Indirect triples – Methods of translation of Assignment statements, Boolean expressions.

UNIT – V

Symbol tables and Code generation: Representing information in a Symbol Table – Data Structures for Symbol table – Introduction to Code Optimization: Basic blocks – DAG representation – Error detection and recovery – Introduction to Code Generation.

TEXT BOOKS
1. Aho A. V. R, Ullman J. D., Compilers, Principles, Techniques and Tools, Addison Wesley, 2002.

REFERENCE BOOKS
1. Dhamdhere D. M., Compilers construction Principles and Practice, Macmillan India Ltd.

ELECTIVE – I
1.2 INFORMATION CODING TECHNIQUES

UNIT I

Information Entropy Fundamentals: Relation between information and probability,mutual and self information entropy, Shannon's Theorem, Code design, Shannon-Fano coding, Huffman coding, implementation of Huffman Code.

UNIT II

Data and Voice Coding: context dependent coding, arithmetic codes, overall efficient consideration – voice coding, delta-modulation and adaptive modulation, linear predictive coding, silence coding, sub-band coding

UNIT III

Image and Video Compression: direct cosine transform, quantization loss, loss estimation – JPEG components and standards – Inter-frame coding, motion compensation techniques, MPEG-2 standards, Introduction to MPEG-4.

UNIT IV

Error Control coding: Backward error correction, linear lock codes, BCH codes, Golay codes, efficiency of LBC, performance of simple ARQ , go back-n and selective repeat schemes – Forward correction codes- Convolution coding, decoding algorithms, Viterbi decoding, optimum decoding, performance measures.

UNIT V

Encryption Coding: Transposition and substitution coding, Data Encryption Standards (DES), key distribution problem, public key encryption, public key decryption and MIT algorithm-Direct sequence CDMA based encryption, orthogonal sequences, and R-S code

REFERENCE BOOKS

1. Viterbi, "Information Theory and Coding", McGrawHill, 1982.
2. Proakis, "Digital Communication", McGrawHill, 1994.
3. Data compression Book" BPB publication, 1992.

ELECTIVE – I
1.3 ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS

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 – II

Statistical reasoning: Probability and Bayes Theorem- Certainly Factors and Rule- Based systems- Bayesian Networks- Dempster-Shafer Theory-Fuzzy logic .

Knowledge representation: Syntactic-Semantic Spectrum of Representation-Logic and Slot-and Filter Structures- Other Representational Techniques – Planning – Understanding.

UNIT – II

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

TEXT BOOKS

1. Elaine Rich and Kevin Knight," Artificial Intelligence", Tata McGraw Hill Publishers company Pvt. Ltd, Second Edition, 1991. (Chapters 1 – 6 only).

REFERENCE BOOKS

1. George F Luger**,** "Artificial Intelligence", 4th Edition, Pearson Education Publ., 2002.

ELECTIVE – I

1.4 CLOUD COMPUTING

UNIT – I

INTRODUCTION TO PARALLEL AND DISTRIBUTED COMPUTING: Introduction, Architecture and Distributed computing models and technologies SOA, Web Services
GRID, CLUSTER AND UTILITY COMPUTING: Introduction, Architecture, Pros & Cons, Real time applications.

UNIT – II

INTRODUCTION TO CLOUD COMPUTING: Definition, History, Comparison of Cloud Computing with Grid, Cluster and Utility Computing, Deployment models – Private, Public, Hybrid and Community - Pros and Cons of Cloud Computing. SaaS, PaaS, IaaS etc.

UNIT – III

VIRUTUALIZATION: Types of Virtualization, Tools for Virtualization, Architecture of VMM, Virtualization for Cloud.
ADVANCED WEB TECHNOLOGIES: AJAX and Mashup – Programing examples using applications.

UNIT – IV

MAP REDUCE PARADIGMS: Introduction, GFS Architecture, HDFS Architecture, Hbase, Google big Table, Amazon's (key value) pair storage and Microsoft's Azure infrastructure, Map reduce programming examples

UNIT – V

CLOUD COMPUTING FRAMEWORK: Amazon EC3, S3 storage revises, Aneka frame work, IBM blue Cloud .
APPLICATIONS: Distributed search engine and distributed data mining in the cloud.

TEXT BOOKS:

1. Anthony T Velte, Toby J Velte and Robert Elsenpeter, "Cloud Computing : A Practical Approach", Tata McGraw Hill, New Delhi, 2010
2. Liu M L, "Distributed Computing Principles and Applications", Pearson Education, New Delhi, 2009.

SEMESTER II
Practical 3: C# PROGRAMMING LAB

1. Generate Fibonacci series
2. Find the area of square, triangle, and rectangle.
3. Calculate nCr and nPr values.
4. Find the area and circumference of circle
5. Convert dollar to rupee, rupee to dollar.
6. Student details using inheritance.
7. Sales bill preparation using interface.
8. Display clock time using delegates and events.
9. Arithmetic operations
10. Passing values from one form to another form.
11. Calculator.
12. Insert record using data grid view.
13. Create user login form.
14. Cutoff mark calculation.

SEMESTER II
Practical 3: NETWORK SECURITY LAB

1. Trace out Debug Message
2. Random Number checking
3. Password Checking
4. Generate Public Key and Private Key
5. Ceaser Cipher
6. RSA Algorithm
7. DSA Algorithm

SEMESTER III
PAPER-XI : DIGITAL IMAGE PROCESSING

UNIT-I

Introduction:- Digital Image-Digital Image Processing-Origins of Digital Image Processing-Applications of Digital Image Processing-Basic steps in Digital Image Processing. Digital Image Fundamentals: Light and the Electromagnetic spectrum-Image sensing and acquisition-Image sampling and quantization-Basic relationships between pixels-Linear and non-linear operations.

UNIT-II

Image Enhancement(Spatial domain):- Introduction-Basic Gray Level Transformations-Histogram Processing-Arithmetic/Logic operations-Basics of spatial filtering-Smoothing-Sharpening. Image restoration(Spatial domain): Model of the Image degradation/Restoration Process-Noise Models-Noise reduction filters-Mean filters-Order statistics filters-Adaptive filters-Geometric transformations.

UNIT-III

Color Image Processing:- Color fundamentals-Color Models-Pseudocolor Image Processing-Basics of full color Image Processing-Color Transformations-Smoothing and Sharpening-Noise in Color Images.

UNIT-IV

Introduction to MatLab:-Programming Environment-Basic commands-Characters-Strings-Operators-Conditional statements-Loop statements-Built-in functions-User defined functions-Input/output functions-Matrix manipulations-Plots-Subplots-Figures-m-files-Example programs.

UNIT-V

Image Processing Tools:- Image file read/Write-Image display commands-Create image, image show, image tool, Subimage, Colorbar-Image arithmetic-add, subtract, divide, multiply, complement-Spatial transformations-image rotation, image resize, cropping-Image statistics-mean, variance, standard deviation, histogram, pixel values-Image enhancement-normalized histogram-adjusting image intensity, adding/removing noise, median and order statistic filtering-contrast stretching-Linear filtering.

TEXT BOOK:
1. R.C. Gonzalez and R.E. Woods, "Digital Image Processing", Prentice Hall, Second Edition.
2. R.C. Gonzalez, R.E. Woods and L. Eddins, "Digital Image Processing using MATLAB", Prentice Hall, Second Edition, India.
3. R. Prathap, Getting started with MatLab 7: A Quick introduction for Scientists and Engineers, Oxford University Press, 2005.

REFERENCE BOOK:
1. Milan Sonka, Vaclav Hlavac and Roger Boyle, Image Processing, Analysis and Machine Vision, Thomson Publishers, Second Edition.

SEMESTER III

Paper XII SOFTWARE TESTING

UNIT - I

Software Development Life Cycle models: Phases of Software project − Quality, Quality Assurance, Quality control − Testing, Verification and Validation − Process Model to represent Different Phases - Life Cycle models. **White-Box Testing**: Static Testing − Structural Testing − Challenges in White-Box Testing.

UNIT - II

Black-Box Testing: What is Black-Box Testing? - Why Black-Box Testing? − When to do Black-Box Testing? − How to do Black-Box Testing? − Challenges in White Box Testing - **Integration Testing:** Integration Testing as Type of Testing − Integration Testing as a Phase f Testing − Scenario Testing − Defect Bash.

UNIT - III

System and Acceptance Testing: system Testing Overview − Why System testing is done? − Functional versus Non-functional Testing - Functional testing - Non-functional Testing − Acceptance Testing − Summary of Testing Phases.

UNIT _IV

Performance Testing: Factors governing Performance Testing − Methodology of Performance Testing − tools for Performance Testing − Process for Performance Testing − Challenges.
 Regression Testing: What is Regression Testing? − Types of Regression Testing − When to do Regression Testing − How to do Regression Testing − Best Practices in Regression Testing

.
UNIT - V:

Test Planning, Management, Execution and Reporting: Test Planning − Test Management − Test Process − Test Reporting −Best Practices. **Test Metrics and Measurements:** Project Metrics − Progress Metrics − Productivity Metrics − Release Metrics.

TEXTBOOKS: 1.
1. SOFTWARE TESTING Principles and Practices − Srinivasan Desikan & Gopalswamy Ramesh, 2006, Pearson Education. *(UNIT-I: 2.1-2.5, 3.1-3.4 UNIT-II: 4.1-4.4, 5.1-5.5 UNIT III: 6 .1-6.7 (UNIT IV: 7.1-7.6, 8.1-8.5 UNIT-V: 15.1-15.6, 17.4-17.7)

REFERENCE BOOKS:
1. EFFECTIVE METHODS OF SOFTWARE TESTING–William E.Perry, 3rd ed, Wiley India.
 2. SOFTWARE TESTING – Renu Rajani, Pradeep Oak, 2007, TMH.

SEMESTER III
Paper XIII OPEN SOURCE TOOLS

UNIT – I
Introduction to Linux – What every Linux users knows- The shell-The X windows system –Files and Directories.

UNIT – II
Viewing Text – Editing Text – Grammar and Reference – Analyzing text – Formatting Text.

UNIT – III
LINUX: Network Programming-Introduction to TCP/IP: Introduction –The Transport Layer TCP and UDP. Elementary sockets: Sockets Introduction, Elementary TCP sockets – I/O multiplexing – Socket options

UNIT – IV
PHP Programming Basics PHP - Introduction, PHP Basics: - Syntax- Variables- Controls and functions- passing information between pages -Strings. Arrays: - Using Arrays, Manipulating Arrays, Associative Arrays

UNIT – V

Perl Programming Perl - Introduction, Perl Basics: - Syntax, Variables, Strings, Numbers, Operators, **Arrays:** - Using Arrays, Manipulating Arrays, Associative Arrays, Chop, Length, and Sub string. Hashes, Arguments, Logic, Looping, Files, Pattern Matching, Environment Variables, Using cgi- lib for Forms.
File Management PERL: - File Handling, Reading From Files, Appending Files, Writing to Files, File Checking, Reading Directories.
Databases PERL: - DBI Module, DBI Connect, DBI Query, MySQL Module, MySQL Connect, MySQL SelectDB, MySQL Query.

REFERENCE BOOKS

1. Linux ookBook 2nd Edition Michael Stutz , SPD Pvt.ltd 2004 edition.
2. Linux Ina Nutshell – A desktop Quick Reference – O'Reilly 5th Edition, Ellen sivever, Aarom weber,Stephen Figgins, Robers Love and Arnold Robbins
3. Unix Network programming –The Sockets networking API volume I –Third Edition- W.Richard stevens, Bill Fenner,, Andrew M Rudoff
4. PHP 5 and MySQL Bibble Wiley Dream tech India Pvt.ltd 2006 Edition.
5. Perl CookBook –Tom Christinasen & Nathan Torkington , O'Relliy ,SPD Pvt ltd,2006 Edition

SEMESTER III
Paper-XIV: DISTRIBUTED COMPUTING

UNIT – I

Distributed systems: Fully Distributed Processing systems – Networks and interconnection structures – designing a distributed processing g system.

UNIT – II

Distributed systems: Pros and Cons of distributed processing – Distributed databases – the challenges 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 – dimensional 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 and e-mail server

UNIT - V

Distributed databases: An overview, distributed databases – principles of distributed databases – levels of transparency- distributed database design- the R* project techniques problem of heterogeneous distributed databases

REFERENCE BOOK

1. John a. Sharp, "An introduction to distributed and parallel processing g" *Blackwell Scientific Publication(Unit I & III)*
2. Uyless D. Black, "Data communication and distributed networks"(unit II)
3. Joel M.Crichllow "introduction to distributed & parallel computing (Unit IV)
4. Stefans Ceri, Ginseppe Pelagatti "Distributed database Principles and systems" *McGraw Hill*

SEMESTER III
Practical 5: OPEN SOURCE TOOLS

1. Write a PHP program to display date and time using AJAX

2. Write a PHP program to check user login

3. Write a PHP program to create a college website

4. Write a PHP program for cookies and session scripts

5. Write a PHP program to perform file read, write, open and append operation

6. Write a PHP program to create a library information using inheritance

7. Write a PHP program for online examination

8. Write a PHP program to send the mail using mail concept

9. Write a PHP program for super market

10. Write a PHP program for on line recharging

SEMESTER III
Practical 6: DIGITAL IMAGE PROCESSING LAB

1. Write a program to read an image and display.

2. Write a program to perform image quantization.

3. Write a program to find statistical features of an image.

4. Write a program to perform basic gray level transformations.

5. Write a program to covert the color image into gray scale and black and white image.

6. Write a program to calculate the histogram of an image and display the histogram plot.

7. Write a program to adjust the intensity of an image.

8. Write a program to implement the smoothing spatial filter.

9. Write a program to implement the sharpening spatial filter.

10. Write a program to add and remove the noise in image.

11. Write a program to implement the Mean filter for noise reduction.

12. Write a program to implement the Order statistics filters for noise reduction.

13. Write a program to implement the Adaptive filters for noise reduction.

14. Write a program to perform color complement transformation.

15. Write a program to perform color slicing transformation.

ELECTIVE - II

2.1: WEB SERVICES

UNIT - I

Introduction to web services – Overview of Distributed Computing- Evolution and importance of web services-Industry standards, Technologies and concepts underlying web services-Web services and enterprises-web services standards organization-web services platforms.

UNIT - II

XML Fundamentals – XML documents - XML Namespaces- XML Schema –Processing XML

UNIT - III

SOAP: The SOAP model- SOAP messages-SOAP encoding- WSDL: WSDL structure-interface-definitions-bindings-services-Using SOAP and WSDL-UDDI: About UDDI- UDDI registry-Specification- Core data structures-Accessing UDDI

UNIT - IV

Advanced web services technologies and standards: Conversations overview-web services conversation language-WSCL interface components.
Workflow: business process management-workflows and workflow management systems
Security: Basics-data handling and forwarding-data storage-errors-Web services security issues.

UNIT - V

Quality of Service: Importance of QoS for web services-QoS metrics-holes-design patterns-QoS enabled web services-QoS enabled applications.
Web services management-web services standards and future trends.

REFERENCE BOOKS:
1. Sandeep Chatterjee, James Webber, „Developing Enterprise Web Services : An Architects Guide", Prentice Hall, Nov 2003.

ELECTIVE – II

2.2 ENTERPRISE RESOURCE PLANNING

UNIT - I

Introduction to ERP: Introduction – Evolution of ERP – What Is ERP – Reasons For The Growth of The ERP Market – The Advantages of ERP – Why do Many ERP Implementations Fail – Why are ERP Packages Being used now. Enterprise – An Overview: Introduction – Integrated Management Information – Business Modeling – Integrated Data Model.

UNIT - II

ERP and Related Technologies: Introduction – Business Process Reengineering – Management Information System – Decision Support System – Executive Information Systems – Data Warehousing – Data Mining – Online Analytical Processing – Supply Chain Management. ERP A Manufacturing Perspective: Introduction – ERP CAD / CAM – Materials Requirement Planning – Bill of Material – Closed Loop – Manufacturing Resource Planning – Distribution Requirements Planning – JIT and Kanban Product Data Management – Data Management – Benefits Of PDM – Make to Order and Make to Stock – Assemble to Order – Engineer to Order – Configure to Order.

UNIT - III

ERP Modules: Introduction – Finance – Plant Maintenance – Quality Maintenance – Material Management. Benefits of ERP: Introduction – Reduction of Lead Time – On Time Shipment – Reduction in Cycle Time – Improved Resource Utilization – Better Customer Satisfaction – Improved Supplier Performance – Increased Flexibility – Reduced Quality Costs – Improved Information Accuracy and Decision Making Capability.

UNIT - IV

ERP Market: Introduction – SAP AG – Baan Company – Oracle Corporation – People Soft – JD Edwards World Solutions Company – System Software Associate QAD. ERP Implementation Life Cycle: Introduction – Preevaluation Screening – Package Evaluation – Project Planning Phase – Gap Analysis – Reengineering Configuration – Implementation Team Training – Testing – Going Live – End User Training – Post Implementation.

UNIT – V

Vendors, Consultants and Users: Introduction – In House Implementation – Pros and Cons – Vendors – Consultants – End Users. Future Directions In ERP: Introduction – New Markets – New Channels – Faster Implementation Methodologies – Business Models and Bapis Convergence on Windows NT – Application Platforms – New Business Segments – More Features – Web Enabling – Market Snapshot.

TEXT BOOKS

1. "Enterprise Resource Planning", Alexis Leon, Tata McGraw Hill, 2002.

ELECTIVE – II

2.3 NATURAL LANGUAGE PROCESSING

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 – 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 selectional 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 nounds and nominalizations.

TEXT BOOKS "Natural Language Understanding" - James Allen, Second edition, Pearson Education

ELECTIVE – II
2.4 SEMANTIC WEB TECHNOLOGY

UNIT – I

INTRODUCTION: Current Web - Transition to the Semantic Web – Examples - Semantic Web Technologies - A Layered Approach. (5+4)

STRUCTURED WEB DOCUMENTS IN XML: Introduction - The XML Language - Structuring - Namespaces - Addressing and Querying XML Documents - Processing. (6+6)

UNIT – II

DESCRIBING WEB RESOURCES IN RDF: Introduction - RDF: Basic Ideas, XML-Based Syntax - RDF Schema: Basic Ideas, The Language - RDF and RDF Schema in RDF Schema - An Axiomatic Semantics for RDF and RDF Schema - A Direct Inference System for RDF and RDFS. (6+4)

UNIT – III

ONTOLOGY ENGINEERING: Introduction - Constructing Ontologies Manually - Reusing Existing Ontologies - Using Semiautomatic Methods - On-To-Knowledge Semantic Web Architecture. (6+4)

WEB ONTOLOGY LANGUAGE: Introduction - The OWL Language - Examples - OWL in OWL - Future Extensions. (5+4)

UNIT – IV

LOGIC AND INFERENCE: Rules **-** Introduction - Example of Monotonic Rules: Family Relationships - Monotonic Rules: Syntax, Semantics, Nonmonotonic Rules: Motivation and Syntax - Example of Nonmonotonic Rules: Brokered Trade - Rule Markup in XML: Monotonic Rules, Nonmonotonic Rules. (9+4)

UNIT – V

APPLICATIONS: Introduction - Horizontal Information Products at Elsevier - Data Integration at Audi - Skill Finding at Swiss Life - Think Tank Portal at EnerSearch - e-Learning - Web Services - Other Scenarios. (8+4)

TEXT BOOK:

1. Grigoris Antoniou and Frank van Harmelen, "Semantic Web Primer", MIT press, USA, 2008.
2. Michael C Daconta, Leo J Obrst and Kevin T Smit, "The Semantic Web: A Guide to the Future of XML, Web Services, and Knowledge Management", Wiley, USA, 2003.

REFERENCES:

1. John Davies, Rudi Studer and Paul Warren, "Semantic Web Technologies: Trends and Research in Ontology-based
Systems", Wiley, USA, 2006.

ELECTIVE – II

2.5 BIO INFORMATICS

UNIT – I

Introduction – Importance of Bioinformatics – Biological Sequence / Structure – Deficit – Genome Projects – Status – Sequence analysis – Homology and analogy. EMBNET – NCBI – Virtual Tourism. Primary Sequence Databases. Biological data base – Primary Sequence Database – Composite Protein Sequence Database – Secondary database – Composite protein – Pattern database – structure and classification of database.

UNIT – II

Genome Information Resources. DNA Sequences data base – Specialised genomic Resources. DNA Sequence analysis. Why analyse DNA? – Gene structure – Features of DNA sequence analysis – Issues in the interpretation and EST search – Approach of Gene hunting – Cell CDNA libraries and ESTs – Approaches to EST analysis – Effect of EST data on DNA data base examples of EST analysis.

UNIT – III

Data Base Searchers and Pair Wise Alignment. Data base searching – Alphabets and Complexity – Comparing Two Sequences – Sub-Sequence – Identity and Similarity – Dot plots – Simple alignment – Gaps – Scoring Matrices – Dynamic Programming – BLAST and its relative – FASTA and related algorithms – Alignment scores and statistical significance of database sequences. Global and local Alignments: Algorithms – Similarities – Semi global alignment.

UNIT – IV

Multiple Sequence Alignment. Goal – Definition – Consensus – Complex – Methods – Database of multiple Alignment – searching database with multiple alignment. Methods of Photo Genetics. Distance Based Methods – Based Methods – Comparison.

UNIT – V

RNA Structure. Amino Acids – Polypeptide Composition Algorithm – Modeling protein folding prediction – RNA Sequence Structure. Proteomics: Classification – Techniques – Inheritors – Drying Design – Structures – X-Ray Crystal – NMR – Empirical Methods and prediction techniques.

TEXT BOOKS

1. T.K. Attwood, D.J. Parry-Smith, "Introduction to Bioinformatics", Pearson Education Asia, 2003.
2. Dan E. Krane, Michale L. Raymer, "Fundamental Concepts of Bioinformatics", Pearson Education Asia, 2003.