ALAGAPPA UNIVERSITY, KARAIKUDI – 630003.
(Re-Accredited with 'A' Grade by NAAC)

DEPARTMENT OF COMPUTER SCIENCE
School of Computer Science

Master of Science in Computer Science
M.Sc. (Computer Science)
Choice Based Credit System (CBCS)

Regulations (2016-2017)

1. Candidates for admission to the first year of the Master of Science in Computer Science[M.Sc. (Computer Science) programme is required to pass in any one of the following Examinations of any recognized University with a minimum of 55% marks in Part-III (minimum 50% marks for SC/ST candidates):

   B.Sc. Degree in Computer Science/Information Technology/Electronics or B.C.A. or any qualification equivalent thereto in 10+2+3 pattern.

2. The M.Sc. (Computer Science) programme is a two year programme consisting of four semesters. Each semester consists of minimum of 75 working days at the rate of 6 hours per day.

3. The courses of study and the scheme of examinations are shown in Appendix A and B respectively.

4. The End-Semester Examinations is conducted in November and April of every academic year by the University in different courses according to the scheme given in Appendix B. A candidate is permitted to appear for the End-Semester examination in a particular course at the end of each semester provided he/she secures not less than 75% of attendance in each course in that semester.

5. The revised curriculum is offered from the academic year 2016-2017.

6. Each student should take 90 credits to complete M.Sc. (Computer Science) Programme.

7. a) Each student is allowed to take elective courses from the respective groups to fulfill the courses of study.

   b) Students are allowed to take interdisciplinary courses in a semester from the interdisciplinary courses offered by the Department and other Departments as suggested by the advisory staff.

8. Each student has to register for at least 4 credits in the interdisciplinary courses. The number of credits so registered should not exceed 8 credits for the entire period of study.

9.	Each theory course carries 4 credits with 75 marks in the Semester (University) Examination and 25 marks in the Internal Assessment and each Lab (Practical) course carries 3 credits with 60 marks in the Semester examination and 40 marks in the Internal Assessment. .

10.	The Semester Examinations are conducted for three hours duration.

11.	The project work shall span for a period of one semester duration. The students have to submit a project report at the end of the IV Semester. It carries 12 credits with 75 marks in the End-Semester examination (50 marks for Project Evaluation by External Examiner and 25 marks for viva-voce jointly awarded by both Internal and External Examiners) and 25 marks in the Internal Assessment (Project monitoring and Evaluation by the Internal Examiner).

12.	To pass in each course, a candidate is required to secure 40% marks in the Semester examination and 40% marks in the Internal assessment and 50% marks in the aggregate (marks in Semester Examination + marks in Internal Assessment).

13.	A student is permitted to continue the Programme from I to IV semesters irrespective of failure(s) in the courses of the earlier semesters. The candidate will qualify for the M.Sc. (Computer Science) degree only if the student passes all the prescribed courses of the Programme with in a period of FOUR years.

14.	Results will be declared after the completion of the each Semester examination and the marks/grades obtained by the candidate will be forwarded to them through the Head of the Department.

   a)	A Candidate who has passed all the examinations in the first attempt within two years of admission shall be declared to have passed in First Class with Distinction provided the candidate secures more than 75% marks in the aggregate

   b)	A candidate who has passed all the examinations within two years of admission shall be declared to have passed in First Class provided he/she secures not less than 60% marks in the aggregate.

   c)	All other candidates who have passed all the examinations in the prescribed courses shall be declared to have passed in Second Class.

15.	All the candidates who have passed all prescribed courses in all Examinations shall be eligible for the award of the Degree of Master of Science in Computer Science [M.Sc. (Computer Science)].

16.	The common CBCS regulations prescribed for the Departments by the Alagappa University will be followed in all respect.

APPENDIX A
Courses of Study

M.Sc. (Computer Science)

Course Code	Title of the Course	Hours per week	Credit
I Semester			
551101	Advanced Computer Architecture	4	4
551102	Data Structure and Algorithms	4	4
551103	Internet and Java Programming	4	4
551104	Data Communication Networks	4	4
551105	Advanced Operating Systems	4	4
551106	Lab I: Internet and Java Programming Lab	4	3
551107	Lab II: Algorithm lab	4	3
	Total	**28**	**26**
II Semester			
551201	Advanced Database Systems	4	4
551202	Web Technology	4	4
551203	Communication and Employability Skills	4	4
	Elective I	4	4
	Elective II	4	4
551204	Lab III: Web Technology Lab	4	3
551205	Lab IV: Advanced Database Lab	4	3
	Total	**28**	**26**
III Semester			
551301	Compiler Design	4	4
551302	Network Security	4	4
551303	Data Mining and Warehousing	4	4
	Elective III	4	4
	Elective IV	4	4
551304	Lab V: Dot Net Lab	4	3
551305	Lab VI: Open Source Lab	4	3
	Total	**28**	**26**
IV Semester			
551999	Project Work	-	12
	Total		**12**
	Total Credits		**90**

ELECTIVE COURSES

	Course Title
	Elective Group I
551551	Object Oriented Analysis and Design
551552	Software Project Management
551553	Software Engineering

	Elective Group II
551554	Mobile Application Development
551555	Mobile Communications
551556	Multimedia and its Applications

	Elective Group III
551557	Web Application Development
551558	Cloud Computing
551559	Digital Image Processing

	Elective Group IV
551560	Soft Computing
551561	Web Intelligence Systems
551562	Grid Computing

APPENDIX B
Scheme of Examinations

M.Sc. (Computer Science)

Course Code	Title of the Course	IA marks (Max)	ES marks (Max)	TOTAL marks (Max)
I Semester				
551101	Advanced Computer Architecture	25	75	100
551102	Data Structure and Algorithms	25	75	100
551103	Internet and Java Programming	25	75	100
551104	Data Communication Networks	25	75	100
551105	Advanced Operating Systems	25	75	100
551106	Lab I: Internet and Java Programming Lab	40	60	100
551107	Lab II: Algorithms lab	40	60	100
II Semester				
551201	Advanced Database Systems	25	75	100
551202	Web Technology	25	75	100
551203	Communication and Employability Skills	25	75	100
	Elective I	25	75	100
	Elective II	25	75	100
551204	Lab III: Web Technology Lab	40	60	100
551205	Lab IV: Advanced Database Lab	40	60	100
III Semester				
551301	Compiler Design	25	75	100
551302	Network Security	25	75	100
551303	Data Mining and Warehousing	25	75	100
	Elective III	25	75	100
	Elective IV	25	75	100
551304	Lab V: Dot Net Lab	40	60	100
551305	Lab VI: Open Source Lab	40	60	100
VI Semester				
551999	Project Report & Viva – voce	25	75	100

IA – Internal Assessment; **ES** – End-Semester

551101 ADVANCED COMPUTER ARCHITECTURE

Objective: Explore the advanced computer architecture concepts like Instruction Level Parallelism, Multiprocessor and thread level parallelism, memory hierarchy design and storage systems.

UNIT I
Fundamentals of Computer design: Introduction - Defining Computer Architecture - Trends in Technology, Power in IC, Cost - Dependability - Measuring, reporting and summarizing performance - Quality principles of Computer Design - Performance.

UNIT II
Instruction level parallelism : Concepts and Challenges - Basic Compiler Techniques for exposing ILP - Reducing Branch Costs with Prediction - Data Hazards - Dynamic Scheduling - Hardware based Speculation - Multiple issue and Static Scheduling - Advanced Techniques for Instruction Delivery and Speculation - Limitations of ILP - Hardware vs Software Speculation - Multithreading.

UNIT III
Multiprocessor and thread level parallelism: Introduction – Symmetric shared-memory architectures – Performance of Symmetric shared-memory Multiprocessors – Distributed shared-memory architectures – Synchronization - Models of Memory Consistency - Crosscutting issues.

UNIT IV
Memory Hierarchy Design: Introduction - Optimizations of Cache performance – Memory Technology and Optimizations - Protection : Virtual Memory and Virtual machines – Crosscutting Issues in the Design of Memory Hierarchies.

UNIT V
Storage systems : Advanced Topics in Disk Storage - Real Faults and Failures - I/O Performance, Reliability measures and Benchmarks- A Little Queuing Theory - Crosscutting issues - Designing and Evaluating an I/O System - The Internet Archive Cluster.

Text Book:
1. John L.Hennessy & David A Patterson Morgan ,"Computer Architecture a quantitative approach", 4th edition Kufmann (An important of Elsevier), 2007

Reference Books:
1. Kai Hwang and A. Briggs "Computer Architecture and Parallel Processing ", International edition McGraw- Hill. 2003
2. Dezso Sima, Terence Fountain, Peter Kacsuk, "Advanced Computer Architectures",
   Addison Wesley: 1st edition, 1997

551102 DATA STRUCTURE AND ALGORITHMS

Objective: Creating Better Model of Data Structures for Design Paradigms to Analyze the Performance of Algorithms yielding good Software Product.

UNIT I
Data Structures - Introduction - Basic concepts of data Structures -   Abstract data types; Data Representation; Elementary data types – Array; Structure Data Types – Stack ; Representation; Operations on Stack – Queue ; Representation ; Operations on queue; Linked List ; Representation; Operations on List.

UNIT II
Tree – Introduction - tree representation, traversal of trees- Binary tree - threaded binary trees, application of binary trees - Tree Searching – Binary Search Tree - AVL Tree - B-Tree - Searching for Minimum and Maximum – Huffman coding- application of threaded binary trees – Hashing – Hashing Function – Hashing Algorithms

UNIT III
 Sorting – Exchange Sort – Selection Sort – Insertion Sort – Radix Sort – Merge Sort; Algorithms of Sorting ; Complexities of Sorting–Graph – Data Structures Representation Graph – Graph Traversal Techniques ; Depth First ; Breadth First Algorithms - Applications.

UNIT IV
 Algorithm **-** Introduction –Pseudocode for algorithms – Performance Analysis – Space and Time Complexity – Asymtotic Notations; Big Oh; Omega; Theta Notations – Example for Asymtotic Notations- Divide and Conquer – Introduction – General method – Binary Search – Merge Sort.

UNIT V
 Greedy Method –General Method – KnapsackProblem – Minimum Cost Spanning Trees – Prim's and Kruskal methods. Dynamic Programming – General Method – Travelling Sales Person Problem – Backtracking – 8 Queens Problem, Sum Subset Problem.

Text Books:

1. Aaron M.Tenebaum, Yedidyah Langsam and Moshe J. Augenstein , "Data Structures using C" Pearson Education, Prentice Hall 2008.
2. Ellis Horowtz, SartajSahni and SanguthevarRajasekaran ," Fundamentals of Computer Algorithms", Universities Press Pvt Ltd, 2014

Reference Books:

1. P.S.Deshpande, O.G.Kakde, "C & Data Structures", Charles River MeidaPublications , 2004.

2. AnanyLevitin , "Introduction to the design and Analysis of Algorithms", Pearson Education, Second Edition, 2009.

551103 INTERNET AND JAVA PROGRAMMING

Objective: Learn basics of internet, Programming Internet and Managing files

UNIT I
Basic Internet Concepts: Connecting to the Internet – Domain Name System – E-mail – The World Wide Web – Internet Search Engines – Web Browsers – Chatting and conferencing on the Internet – Online Chatting –Messaging – Usenet Newsgroup – Internet Relay chat (IRC) – FTP – Telnet.

UNIT II
Fundamentals of Object-Oriented Programming: - Basic concepts of OOP – Benefits – Applications Java Evolution: Features – how java differs from C and C++ - java and internet- java support system – java environment - Overview of Java Language –constants variables and datatypes- Operators and Expressions - Decision Making and Branching - Looping

UNIT III
Classes, Objects and Methods: - Defining a class –fields –methods –creating objects – accessing class members – constructors – methods overloading –static members –nesting of methods – Inheritance –overriding methods –final variables-classes –methods- Arrays, Strings and Vectors :One dimensional Arrays –creating of array – Two dimensional arrays- strings –vectors –Wrapper classes – Enumerated Types - Interfaces: Multiple Inheritance - Packages: Defining interface – Extending interfaces – Implementing Interfaces -Putting Classes Together

UNIT IV
Multithreaded Programming – Creating Threads –Extending the thread class –Stopping and Blocking a thread –Life cycle of a thread –using thread methods –Thread Exceptions –Priority – Synchronization –Implementing the 'Runnable' Interface Managing Error and Exceptions: Types of errors –Exceptions –Syntax of Exception Handling code – Multiple Catch statements –using finally statement – Throwing our own Exceptions – using exceptions for Debugging - Graphics Programming

UNIT V
Managing Inputs/Output Files in Java: Introduction – concept of streams –stream classes – byte stream classes – character Stream classes –using stream –using the file class –Input / output Exceptions –creation of files – Reading / writing characters – reading writing bytes – random access files- Interactive input and output –Other stream classes

Text Books:
1. Deitel, Deitel and Nieto," Internet and World Wide Web – How to program", Pearson Education,   2000.
2. E. Balagurusamy ,"Programming with Java", Tata McGraw-Hill, 5th Edition, 2014(Unit II to Unit V). ISBN10: 9351343200   ISBN13: 9789351343202

Reference Books:
 1. R. Krishnamoorthy and S. Prabhu, "Internet and Java Programming", New Age International Publishers, 2009 (Unit I). ISBN 10: 8122413528 / ISBN 13: 9788122413526
2. Naughton and H.Schildt, "Java 2 - The complete reference", Tata McGraw-Hill, Fourth edition, 2002.

551104 DATA COMMUNICATION NETWORKS

Objectives: To provide an overall knowledge in computer communication networks concepts and its implementation details in the Internet

UNIT I
Data communication-Networks-Protocols and standards –Standards Organizations-Basic concepts Line configuration –Topology-Transmission mode – Categories of Networks.

UNIT II
The OSI Model –The Modal –Functions of the Layers –TCP/IP protocol suite. Signals: Analog and digital – Periodic and Aperiodic signals-Analog signals-Time and frequency domains –Composite signals-Digital signals-Encoding and modulating-Analog to digital conversion-Digital to analog conversion-Transmission of digital data: Interfaces &modems- Digital data Transmission-Modems Cable modem.

UNIT-III
Transmission Media-Guided media-Unguided media-Transmission Impairment –Multiplexing-Many to one/one to many-frequency –division multiplexing(FDM)-Wave division multiplexing(WDM)- Time division multiplexing(TDM) Multiplexing application:-The telephone system-Error detection and correction:- Types of errors-Detection-Vertical redundancy check(VRC)-Longitudinal Redundancy check(LRC)-Cyclic redundancy check(CRC)-Checksum-Error correction.

UNIT IV
Local Area networks Project 802-Ethernet-Token Bus-Token Ring-Switching-Circuit Switching Packet Switching Message Switching –Networking and internetworking devices-Repeaters-Bridges Routers –Gateways-Other devices-Routing algorithms-Distance vector routing –Link state routing.

UNIT V
TCP/IP Protocol Suite :Part 2,Application layer –client ,Server model-Domain name system-Telnet File Transfer Protocol:-Trivial File Transfer Protocol(TFTP)-Simple Mail Transfer Protocol(SMTP)- Simple network Management Protocol(SNMP)-Hypertext Transfer Protocol(HTTP)-World Wide Web- VLANs and VPNs-VPN-Network Security-Four aspects of security –Privacy-Digital signature.

Text Book:
1. Behrouz A Forouzan, "Data communications and Networking " Tata McGrawHill Higher Education, 2nd Edition,2000, ISBN 0072322047
Reference Books:
1. S.Tanen Baum, "Computer Networks", Pearson Education, 5th Edition, 2011.
2. William Stallings ,"Data and Computer Communications", Pearson Education, 8th Edition, 2013. ISBN: 978-0133506488

551105 ADVANCED OPERATING SYSTEMS

Objective: Practices to learn concepts of OS and Program the principles of Operating Systems

UNIT I
Introduction – Operating System Definition – Functions of Operating System – Types of Advanced Operating System – Design Approaches – Synchronization Mechanisms – concepts of a Process – Critical Section Problem – Process Deadlock – Models of Deadlock – Conditions for Deadlock – System with single-unit requests, Consumable Resources , Reusable Resources.

UNIT II
 Distributed Operating Systems: Introduction- Issues – Communication Primitives – Inherent Limitations –Lamport's Logical Clock , Vector Clock, Global State , Cuts – Termination Detection – Distributed Mutual Exclusion – Non Token Based Algorithms – Lamport's Algorithm - Token Based Algorithms –Distributed Deadlock Detection – Distributed Deadlock Detection Algorithms – Agreement Protocols

UNIT III
 Distributed Resource Management – Distributed File Systems – Architecture – Mechanisms – Design Issues – Distributed shared Memory – Architecture – Algorithm – Protocols – Design Issues – Distributed Scheduling – Issues – Components – Algorithms.

UNIT IV
 Failure Recovery and Fault Tolerance – Concepts – Failure Classifications – Approaches to Recovery – Recovery in Concurrent Systems – Synchronous and Asynchronous Check pointing and Recovery –Check pointing in Distributed Database Systems – Fault Tolerance Issues – Two-Phase and Nonblocking Commit Protocols – Voting Protocols – Dynamic Voting Protocols.

UNIT V
Multiprocessor and Database Operating Systems –Structures – Design Issues – Threads – Process Synchronization – Processor Scheduling – Memory management – Reliability/Fault Tolerance – Database Operating Systems – concepts – Features of Android OS, Ubuntu, Google Chrome OS and Linux operating systems.

Text Book:
1.MukeshSinghalN.G.Shivaratri, "Advanced Concepts in Operating Systems", McGraw Hill 2000.

Reference Books:

1.Abraham Silberschatz, Peter B.Galvin, G.Gagne, "Operating Concepts", 6th Edition Addison Wesley publications 2003.

2.Andrew S.Tanenbaum, "Modern Operating Systems", 2nd Edition Addison Wesley 2001

551201 ADVANCED DATABASE SYSTEMS

Objective: Acquire knowledge of Database models, Application of Database models and Emerging Trends

UNIT I
Database System: Introduction-Data Independence-Database System Architecture- The External Level – The Conceptual Level – The Internal Level – Mappings – The Database Administrator – Data Dictionary – Data Models – Record-Based Data Models – Object based Data Models – Physical Data Models-Hierarchical Data Models – Network Data Models-Relational Data Model-Entity-Relationship Models – Object Oriented Data Model-Comparision Between Data Models.

UNIT II
Distributed Databses: Introduction-Preliminaries-The Tweleve Obectives-Problems – Client/Server Systems – DBMS Independence-SQL Facilities – Decision Support-Data Preparation-Data Warehouses and Data Marts – Online Analytical Processing – Object Oriented Databases: Introduction-Object Oriented Data Models-Object Oriented Database-Object Oriented DBMS – Object Oriented Languages.

UNIT III
Temporal Databases: Introduction-Intervals-Packing and Unpacking relations- Generalizing the relational operators – Databse Design – Integrity Constraints – Multimedia Databses: Multimedia Sources – Multimedia Database Queries – Multimedia Database Applications.

UNIT IV
Spatial Databases: Spatial Data- Spatial Databse Characteristics – Spatial Data Model-Spatial Databse Queries – Techniques of Special Database Query- Logic based Databases: Introduction-Overview-Proportioanl calculas – Predicate Calculas – Deductive Database Systems – Recursive Query Processing.

UNIT V
Emerging Database Technologies: Introduction – Internet Databases: Internet Technology – The World Wide Web-Web Technology – Web Databses – Advantages-Mobile Databases: Architecture of Mobile Databases – Characteristics of Mobile Computing – Mobile DBMS.

Text Book:

1. C.J.Date, A.Kannan, S.Swamynathan, "An Introduction to Database Systems", 8th Edition, Pearson Education,2006.

Reference Books:
1. S.K. Singh," Databse Systems: Concepts, Design and Applications", 2nd Edition, Person Eduction, 2008.
2. Abraham Silberschats, Hentry F.Korth and S.Sudarshan,"Database Management System Concepts",McGraw Hill International Edition,2006.

551202 WEB TECHNOLOGY

Objective: Covers the wide range of web technologies both client side and server side to provide the exposure to the students in developing Rich Internet Applications using them.

UNIT I
HTML **:** HTML, XML, and the World Wide Web - Basic HTML - The Document Body - Text - Hyperlinks - Adding More Formatting - Lists - Using Color and Images - Tables - Multimedia Objects - Frames - Forms - XHTML – An Evolutionary Markup. **Style sheets :** Introduction - Using Styles: Simple Examples - Defining Your Own Styles - Properties and Values in Styles - Formatting Blocks of Information - Layers

UNIT II
Client Side Programming : Introduction - Dynamic HTML - JavaScript - Basics - Variables - String Manipulation - Mathematical Functions - Statements - Operators - Arrays - Functions - Data and Objects - Regular Expression - Exception Handling - Built in objects - Cookies - Events. **Dynamic HTML with JavaScript :** Data Validation - Opening a New Window - Messages and Confirmations - The Status Bar - Writing to a Different Frame - Rollover Buttons - Moving Images - Multiple Pages in a Single Download - A Text-only Menu System - Floating Logos

UNIT III
Host Objects : Browsers and the DOM-Introduction to the Document Object Model DOM History and Levels-Intrinsic Event Handling-Modifying Element Style-The Document Tree-DOM Event Handling-Accommodating Noncompliant Browsers Properties of window. Representing Web Data: XML-Documents and Vocabularies-Versions and Declaration- Namespaces - JavaScript and XML: Ajax - DOM based XML processing - SAX - XSL - XPATH - XSLT

UNIT IV
Server Side Programming : Java Servlets - History of Web Applications - Support for Servlets - The Power of Servlets - HTTP Servlet Basics - HTTP Basics - The Servlet API - Page Generation - Web Applications. The Servlet Lifecycle : The Servlet Alternative - Servlet Reloading - Init and Destroy - Single-Thread Model - Background Processing - Load on Startup - Client-Side Caching - Server-Side Caching. Retrieving Information : The Servlet - The Server - The Client

UNIT V
Separating Programming and Presentation : JSP Technology - Need - HTTP and Servlet Basics - HTTP Request/Response Model - Servlets - Problem with Servelets - Anatomy of a JSP page - JSP application design with MVC. Setting up JSP Environment : Installing the Java Software Development Kit - Installing Tomcat Server - Testing Tomcat. Generating Dynamic Content : Creating a JSP page - Installing a JSP page -Running JSP Page - Accessing a Database from a JSP Page

Text Books:

1. Web Programming: Building Internet Applications, 3rd Edition, Chris Bates, Wiley India Publisher, 2007. (Unit - I, II)
2. Web Technologies - A Computer Science Perspective, Jeffrey C. Jackson, Pearson Education, 2006 (Unit - III, IV)
3. Java Server Pages, 3rd Edition, Hans Bergsten, O' Reilly, 2010 (Unit - V)

Reference Books:

1. Robert. W. Sebesta, "Programming the World Wide Web", Fourth Edition, Pearson Education, 2007.
2. Java Servlet Programming 2nd Edition Joson Hunter, O' Reilly, 2010.
3. Deitel, Deitel, Goldberg, "Internet & World Wide Web How To Program", Third Edition, Pearson Education, 2006.
4. Robert. W. Sebesta, "Programming the World Wide Web", Fourth Edition, Pearson Education, 2007 .
5. Bates, "Developing Web Applications", Wiley, 2006.

551203 COMMUNICATION AND EMPLOYABILITY SKILLS

Objective: Effective Management of Communication, Practicing Soft Skill, Presentation Skill, Group Discussion and Writing Skill.

UNIT I
Importance of Communication: Principles of Effective Communication – Levels of Communication (Extrapersonal, Interpersonal, Intrapersonal, and Mass Communication) – channels of Communication (Downward Communication, Upward Communication, Horizontal Communication, Diagonal Communication) – Barriers to Communication.

UNIT II
Conversations Skills: Soft Skills (Importance , Definition and Attributes) – Verbal and Non-Verbal Communications – Telephone Conversation: Do's and Don'ts – Modes of Coversation – Greeting, Requesting, Thanking, Congratulating, Introducing, Apologizing, Agreeing/Disagreeing, Permitting/Not Permitting.

UNIT III
Presentation Skills: Planning (Analyzing Audience and Locale) – Preparing (Introduction, Middle and End) Pratice and Presentaiton (Nuances of Delivery – Kinesics, Proximics, Paralinquistics, Chronemics) - Audio visual Aids

UNIT IV
Group Communication: Group Discussion – Interviews and Job interviews – Meetings – Skills Needed for Team Work.

UNIT V
Writing Skills: Writing Letters (Job Application, Resume, Curriculum Vitae) – E-Mail and Advertising – Writing of Agenda, Minutes and Memos – Report Writing.

Text Book:
1. Technical Communication – Principles and Practice by Meenakshi Raman, Sangeta Sharma, Oxford University Press, New Delhi, 2004.

Reference Books:
1. Communication Skill for you by Dharmendra Mittal, Arihant Publications (India Pvt, Meerut. U.P.
2. Soft skills (Revised Edition) By Dr. K. Alex, S.Chand and Company, New Delhi.
3. Planning Career in the 21st Century job Market by T. M. Farhathullah, Boston Publishers, Vellore, Tamil Nadu.
4. Soft Skills by S. Hariharan, et.al. MJP Publishers, Triplicane, Chennai.

551301 COMPILER DESIGN

Objective: Exposure to learn compiler writing codes and automata theory.

UNIT I
Overview of Compilation: Phases of Compilation – Lexical Analysis, Regular Grammar and regular expression for common programming language features, pass and Phases of translation, interpretation, bootstrapping, data structures in compilation – LEX lexical analyzer generator.

UNIT II
Top down Parsing: Context free grammars, Top down parsing – Backtracking, LL (1), recursive descent parsing, Predictive parsing, Preprocessing steps required for predictive parsing. Bottom up parsing: Shift Reduce parsing, LR and LALR parsing, Error recovery in parsing , handling ambiguous grammar, YACC – automatic parser generator.

UNIT III
Semantic Analysis: Intermediate forms of source Programs – abstract syntax tree, polish notation and three address codes. Attributed grammars, Syntax directed translation, Conversion of popular Programming languages language Constructs into Intermediate code forms, Type checker.

UNIT IV
Symbol Tables: Symbol table format, organization for block structures languages, hashing, tree structures representation of scope information. Block structures and non block structure storage allocation: static, Runtime stack and heap storage allocation, storage allocation for arrays, strings and records. Code optimization: Consideration for Optimization, Scope of Optimization, local optimization, loop optimization, frequency reduction, folding, DAG representation.

UNIT V
Data Flow Analysis: Flow graph, data flow equation, global optimization, redundant sub expression elimination, Induction variable elements, Live variable analysis, Copy propagation. Object Code Generation: Object code forms, machine dependent code optimization, register allocation and assignment generic code generation algorithms, DAG for register allocation.

Text Book:

1.   A.V. Aho . J.D.Ullman, "Principles of compiler design", Pearson Education.

Reference Books:
1.   Andrew N. Appel,, "Modern Compiler Implementation in C", Cambridge University Press.
2.   Dick Grune, Henry E. Bal, Cariel T. H. Jacobs, "Modern Compiler Design", Wiley dreamtech.
3.   Louden, "Compiler Construction", Thomson.

551302 NETWORK SECURITY

Objective: Learning basics of Securing Computer Network, Studying Algorithmic Principles managing Network Security

UNIT I
Security basic concepts – Security attacks – Need for security – Security goals – services and mechanism – techniques - introduction to cryptography – basics – Traditional cryptographic techniques – substitution – transposition – stream and block ciphers – symmetric key cryptography - Modern block ciphers – modern stream ciphers – Data Encryption Standard (DES) – structure – Cryptanalysis – strength of DES – Multiple DES – International Data Encryption Algorithm (IDEA) – RC5 – Blowfish – Advanced Encryption Standard – Cryptanalysis of AES .

UNIT II
Asymmetric Key Cryptography – basic concepts – primes - primality testing – Factorization - Chinese Remainder theorem - discrete algorithms. Principles of public key crytogrphy – RSA algorithm – security of RSA – key management - Diffle-Hellman key exchange algorithm – Rabin – Elgamal – Elliptic Curve Cryptography

UNIT III
Message Authentication and Hash Function: Message Integrity – Message authentication - Hash functions - MD5 message digest algorithm - Secure hash algorithm (SHA) Digital Signatures: Digital Signatures – process – services – attacks – digital signature schemes – variations – Entity authentication – passwords – biometrics – key management: symmetric key distribution – Kerberos – public key distribution – hijacking.

UNIT IV
Network Security: Security at the application layer: E-mail security – Pretty Good Privacy (PGP) – S/MIME – Security at Transport layer: Security Socket Layer (SSL) – Architecture – Protocols – Message formats – Transport Layer Security (TLS), Secure Electronic Transaction (SET).

UNIT V
Security at the Network Layer: IP Security - Architecture - Authentication header - Encapsulating security payloads - security protocols – security associations - key management. - System Security: Intruders - Viruses and related threads – Buffer overflow – Malicious software – Intrusion Detection System (IDS) – Firewalls – Definition – types - firewall design and working principles – trusted systems.

Text Book:
1. Behrouz A.Forouzan, Debdeep Mukhopadhyay "Cryptography and Network Security", 2nd Edition, McGraw Hill, 2011.

Reference Books:
1. William Stallings, "Cryptography and Network Security: Principals and Practice", Prentice Hall, 2010
2. Atul Kahate, "Cryptography and Network Security", Tata McGraw Hill, 2003.

551303 DATA MINING AND WAREHOUSING

Objective: Learn Design of Data Store of Warehousing, Retrieving and Mining Information of Warehouse

UNIT - I

Data Warehousing Introduction – Definition-Architecture-Warehouse Schema-Warehouse server-OLAP operations. Data Warehouse technology – Hardware and operating system- Warehousing Software – Extraction tools – Transformation tools – Data quality tools – Data loaders – Data Access and retrieval tools – Data Modeling tools – Fact tables and dimensions Data warehousing case studies : Data warehousing in Government , Tourism, Industry , Genomics data.

UNIT - II

Data Mining - Definition – DM Techniques – current trends in data mining - Different forms of Knowledge – Data selection, cleaning, Integration, Transformation, Reduction and Enrichment. Data: Types of data - Data Quality - Data Preprocessing - Measures of similarity and dissimilarity. Exploration: Summary statistics – Visualization.

UNIT – III

Association rules: Introduction – Methods to discover association rule – Apriori algorithm Partition Algorithm – Pincher search algorithm – Dynamic Item set algorithm – FP Tree growth algorithm. Classification: Decision Tree classification – Bayesian Classification – Classification by Back Propagation.

UNIT - IV

Clustering Techniques: Introduction – Clustering Paradigms – Partitioning Algorithms – K means & K Mediod algorithms – CLARA – CLARANS – Hierarchical clustering – DBSCAN – BIRCH – Categorical Clustering algorithms – STIRR – ROCK – CACTUS. Introduction to machine learning – Supervised learning – Unsupervised learning – Machine learning and data mining. Neural Networks: Introduction – Use of NN – Working of NN Genetic Algorithm: Introduction –Working of GA.

UNIT - V

Web Mining: Introduction –Web content mining – Web structure mining –Web usage mining –Text mining –Text clustering, Temporal mining -Spatial mining –Visual data mining – Knowledge mining – Various tools and techniques for implementation using weka, Rapidminer and Matlab.

Text books:
1. Arun K Pujari , "Data Mining Techniques", University press, 2008.
2. C S R Prabhu, "Data Warehousing – concepts, techniques and applications ", 2nd Edition, Prentice Hall of India, 2002.

Reference Books:

1. Jaiwei Han, Michelinne Kamber , "Data Mining : Concepts and Techniques" , Harcourt India / Morgan Kauffman publishers, 2008.
2. Alex Berson , Stephen J.Smith , "Data Warehousing , Data Mining & OLAP ", Tata McGraw Hill, 2004.

ELECTIVE COURSES
ELECTIVE GROUP I

551551 OBJECT ORIENTED ANALYSIS AND DESIGN

Objective: Fundamental of Objects and Methodologies, Modeling Language for Objects, Analyze and Test Objects.

UNIT I

Object Oriented Systems Development overview – Object Basics – Object Oriented Systems Development Life Cycle. Object Oriented Methodologies: Rumbaugh Methodology - Booch Methodology – Jacobson Methodology - Patterns – Frameworks – Unified Approach – Unified Modeling Language (UML) - Models Need – Static and dynamic Models – UML diagrams – Class diagram -Use case diagram – Dynamic Behavior Diagrams –Packages – Model Constraints.

UNIT II

Object Oriented Analysis: OOA Process – Business Process Model – Use Case Model –Developing Effective Documentation - Object Analysis: Classification – Approaches for Identifying Classes – Identifying Object Relationships: Associations, Super-Sub Class Relationships, Aggregation – Identifying and Defining Attributes – Identifying and Defining Methods.

UNIT III

Object Oriented Design: OOD Process – Design Axioms and Corollaries – Design Patterns – Designing Classes: Class Visibility – Refining Attributes – Designing Methods and Protocols – Packages and Managing Classes.

UNIT IV

Access Layer Object Storage and Interoperability: Database Management Systems – Logical and Physical database organization - Distributed Databases and Client-Server Computing –Distributed Objects Computing – Object Oriented DBMS – Object Relational Systems – Multidatabase Systems – Designing Access Layer Classes – User Interface Design: Designing View Layer Classes – Macro and Micro Level Process – View Layer Interface – Prototyping the User Interface.

UNIT V

Object Oriented Testing: Testing Strategies – OO Testing Techniques - Class Testing, State Based Testing, Polymorphism Testing, Inheritance and Integration Testing – Test Cases – Test Plan – Continuous Testing – Myers's Debugging Principles – Usability Testing – User Satisfaction Test.

Text Book:
1. Ali Bahrami, "Object Oriented Systems Development", Tata McGraw-Hill, 2008
Reference Books:
1. James Rumbaugh et.al "Object Oriented Modeling and Design", PHI, 2002.
2. Stephen R. Schach, "Introduction to Object Oriented Analysis and Design", Tata McGraw-Hill, 2003
3. James Rumbaugh, Ivar Jacobson, Grady Booch "The Unified Modeling Language Reference Manual", Addison Wesley 2005
4. Martin Fowler, "UML Distilled", Second Edition, PHI/Pearson Education.2002

551552 SOFTWARE PROJECT MANAGEMENT

Objective: Learn Basics of Project Management Principles, Cost, Risk of Software Projects.

UNIT I
Introduction: Project - Definition - Software projects vs other types of project - Project Management Activities - plans, methods and methodologies-categorizing software projects - problems with software projects-setting objectives-stakeholders- Management control- Project Planning : Overview - Step wise project planning- project selection -identifying project scope, objectives and project infrastructure-Identify project products and activities-estimate effort-Identify activity risks-Allocate resources-review/publicize plan-Execute plan and lower levels of planning.

UNIT II
Project evaluation: Strategic assessment-technical assessment – Cost-benefit analysis-cash flow forecasting-cast-benefit evaluation techniques-Risk evaluation - Selection of an appropriate project approach: Process models- Waterfall model- V-process model- spiral model-software prototyping-categorizing prototypes- Dynamic system Development method-Extreme programming-Managing iterative processes-selecting the most appropriate process model.

UNIT III
Software effort estimation : Stages of estimation-problems with over-and under-estimates-software effort estimation techniques-function point analysis- Objects points-A procedural code-oriented approach-COCOMO: a parametric model-Activity planning : objectives-project schedules-sequencing and scheduling activities-network planning models-formulating a network model-forward pass- backward pass-Identifying the critical path-Activity float-shortening the project duration-Identifying critical activities.

UNIT IV
Risks management : Risks – Nature – Types – Managing Risks - Hazard identification-Hazard analysis-Risk planning and control-Evaluating risks to the schedule - Resource allocation: Nature of resources-Identifying resource requirements-Scheduling resources-creating critical paths- Resource schedule-cost schedules- Scheduling sequence - Monitoring and control : creating the framework-collecting the data-visualizing progress-cost monitoring-Earned value-prioritizing monitoring-change control.

UNIT V
Managing contracts : Types of contract- stages in contract placement-contract management-acceptance-managing people and organizing teams: Understanding behavior-organizational behavior : Selecting the right person for the job- Motivation- Oldham-Hackman job characteristics model-working in groups- Decision making-Leadership-Organizational structures –Software quality:Software quality in project planning - importance -ISO 9126-practical software quality measures- External standards-techniques to enhance software quality-Quality plans.

Text Book:

1. Bob Hughes and Mike Cotterll ,"Software Project Management", Tata McGraw- Hill Edition 2011.

Reference Books:

1. Walker Royce ,"Software Project Management", Pearson Edition, 2012.
2. Joel Henry ,"Software Project Management", Pearson Edition 2004.
3. Pankj Jalote ,"Software Project Management in Practice", Pearson Edition 2005.

551553 SOFTWARE ENGINEERING

Objective: Studying Engineering Approaches of Building Software, Requirement, Design, Identifying Risks and Software testing.

UNIT I
Introduction: Role of software, Software myths. Generic view of process: A layered technology, a process framework, The Capability Maturity Model Integration (CMMI), Process patterns, Process assessment, Personal and Team process models. Process model: The waterfall model, Incremental process models, Evolutionary process models, The Unified process.

UNIT II
Requirement Engineering: Design and Construction, Requirement Engineering Tasks, Requirements Engineering Process, Validating Requirements. Building the Analysis Model: Requirement analysis, Data Modeling concepts, Object-Oriented Analysis, Scenario-Based Modeling, Flow-Oriented Modeling Class-Based Modeling, Creating a Behavioral Model.

UNIT III
Design Engineering: Design process and quality, Design concepts, the design model. Architectural Design: Software architecture, Data design, Architectural styles and patterns, Architectural Design. User interface design: The Golden rules, User interface analysis and design, Interface analysis, Interface design steps, Design evaluation.

UNIT IV
Testing Strategies: Approach to Software Testing, Unit Testing, Integration Testing, Test strategies for Object-Oriented Software, Validation Testing, System Testing, the art of Debugging, Black-Box and White-Box testing. Product Metrics: Software Quality, Product Metrics, Metrics for Analysis Model, Design Model, Source code and Metrics for testing, Metrics for maintenance. Metrics for Process and Projects Domains: Software Measurement, Metrics for Software Quality and Software Process.

UNIT V
Risk Management: Reactive vs. Proactive Risk strategies, software risks, Risk identification, Risk projection, Risk refinement, Risk Mitigation, Monitoring and Management, RMMM Plan. Quality Management: Quality concepts, Software quality assurance, Software Reviews, Formal Technical reviews, Statistical Software quality Assurance, Software reliability, The ISO 9000 quality standards.

Text Book:
1. Roger S Pressman,” Software Engineering, A practitioner’s Approach”, 6th Edition, Tata McGraw-Hill 2010.

Reference Books:
1. Sommerville ,”Software Engineering”, 8th Edition, Pearson Education 2007.
2. K.K. Agarwal et.al ,”Software Engineering”, 3rd Edition New Age International Publishers 2007.
3. James F. Peters, Witold Pedrycz - John Wiley & Sons ,”Software Engineering an Engineering Approach”, 2000.
4. Waman S Jawadekar ,”Software Engineering Principles and Practice”, Tata McGraw-Hill 2004.

ELECTIVE GROUP II

551554 MOBILE APPLICATION DEVELOPMENT

Objective: To provide an overall knowledge about Mobile Devices, Communication methodologies and its application development

Unit I
Introduction- The Mobile Ecosystem: Operators - Networks - Devices - Platforms - Operating Systems - Application Frameworks - Applications - Services.

Unit II
Mobile Devices Profiles - Options for development - Categories of Mobile Applications: SMS - Mobile Websites - Mobile Web Widgets - Native Applications - Games - Utility Apps - Location Based Services(LBS) Apps - Informative Apps - Enterprise Apps.

Unit III
Mobile Information Architecture: Introduction - Sitemaps - Click Streams - Wireframes - Prototyping - Architecture for Different Devices. Mobile Design: Interpreting Design - Elements of Mobile Design - Mobile Design Tools - Designing for Different Device/ Screens.

Unit IV
J2ME Overview -J2ME Architecture and Development Environment- Small Computing Device Requirements, Run-Time Environment, MIDlet Programming, Java Language for J2ME, J2ME SDK, J2ME Wireless Toolkit .

Unit V
Case Study: Google Android: Introduction - Android Development Environment- Development Framework- SDK, Eclipse - Emulator, Android AVD - Project Framework. Apple IOS - RIM Blackberry - Samsung Bada - Nokia Symbian - Microsoft Windows Phone. .

Text Books:
1. Brian Fling," Mobile Design and Development" ,OReilly Media, Inc 2009
2. James Keogh ,"J2ME: The Complete Reference", Tata McGrawHill 2003.

References Books:
1. Pei Zheng and Lionel Ni ,"Smart Phone and Next-Generation Mobile Computing", Elseveir 2006
2. Mark L. Murphy "Beginning Android", Apress 2009 .

551555 MOBILE COMMUNICATIONS

Objective: Studying Wireless Technologies, Algorithms to program the Mobile devices

UNIT I

Introduction- Applications-vehicles- Mobile and Wireless devices- History of wireless communications- Mobile Communication Market – A Simplified and reference model – Overview – Wireless Transmission – Signals – Antennas – Signal Propagation – Multiplexing – Modulation – Spread Spectrum.

UNIT II

Medium Access Control – motivation for a MAC- SDMA – FDMA – TDMA – Comparison of S/T/F/ CDMA. – Telecommunication Systems –GSM – System Architecture – Protocols – DECT – TETRA.

UNIT III

Satellite system – History – Applications – BASICS – GEO 139 – LEO 139 – MEO 140 – Routing – Localization – Handover – Examples – Broad cast Systems – Overview – Cyclic Repetition of data – Digital Video and Audio Broadcasting.

UNIT IV

Mobile Network Layer – Mobile IP – Goals, assumptions- Entities and term logy – IP Packet Delivery – Tunneling and encapsulation – Optimization - Dynamic Host Configuration Protocol – ad hoc networks – Routing- Destination sequence distance vector – Dynamic source routing – Hierarchical algorithms – Alternative metrices.

UNIT V

Mobile Transport layer- Traditional TCP 292 – Congestion control 292 – Slow start 292 – Fast retransmit / fast recovery 293 – Implication on mobility 294- Indirect TCP – Snooping TCP – Mobile TCP – Fast retransmit / fast recovery – transmission / time-out freezing – selective retransmission – transaction oriented TCP – WAP .

Text Book:
1. Jochen Schiller, "Mobile Communications", Second Edition Reprint 2014 – Pearson Education, ISBN-10: 9332535884, ISBN-13: 978-9332535886

References Books:
1. Theodore S. Rappaport, "Wireless Communications Principles and Practice", Second Edition – Pearson Education, 2009. ISBN 978-81-317-2882-6

2. Tony Wakefield, DaveMacNally, David Bowler, "Introduction to Mobile Communications", Informa Telecoms & Media, 2007. ISBN-10: 1-4200-4653-5, ISBN-13:978-1-4200-4653-3

551556 MULTIMEDIA AND ITS APPLICATIONS

Objective: Understanding Components of Multimedia, Programming practice of components

UNIT I:
Introduction: Multimedia and Data Stream-Medium-Main properties of a Multimedia System-Communication System-Traditional Data Streams characteristics-Asynchronous Transmission Mode-Synchronous Transmission Mode-Data Stream Characteristics for Continuous Media-Information Unit – Multimedia Authoring tools- Adobe – Macromedia Director – Flash – Dream Viewer – VRML Basics.

UNIT II:
Sound and Audio: Basic Sound Concepts-Audio Formats-Music-MIDI Concepts-MIDI Devices-MIDI Messages,Speech:Speech Generation-Speech Analysis-Speech Transmission-Image and Graphics: Basic Concepts-Digital Image Representation-Image Format-Graphics Format-Computer Image Processing-Image Synthesis-Image Analysis-Image Transmission.

UNIT III:
Video and Animation: Basic Concepts-Video Signal Representation-Computer Video Format-Television-Conventional Systems-Enhanced Definition System-High Definition Systems-Transmission-Computer Based Animation-Animation Languages-Methods of Controlling Animation-Display of Animation-Transmission of Animation.

UNIT IV:
Data Compression: Coding Requirements-Basic Compression Techniques-JPEG-Image Preparation-DCT based Mode-LosslessMode-Hierarchical Mode-H.261-Coding Algorithms-MPEG-MPEG 2-MPEG 4-DVI-Audio and Still Image Encoding-Video Encoding.

UNIT V:
Multimedia Applications: Introduction-Media Preparations-Media Composition-Text and Graphics Editors-Image Editors-Animation Editors-Sound Editors-Video Editors-Media integration-Multimedia Editors-Hypermedia Editors-Authoring tools-Media Communication-Tele Services-Implementation of Conversational, Messaging, Retrival Services-Media Entertainment-Virtual Reality-Interactive Video-Interactive Audio-Games.

Text Book:
1. Multimedia: Computing, Communications and Applications, Ralf Steinmetz and Klara Nahrstedt Pearson education 2004.
2. Fundamentals of Multimedia, Ze – Nian Li and Mark S.Drew, Pearson Education 2004.

Reference Books:

1.Principles of Interactive Multimedia, Mark Elsom-Cook, TATA McGraw-Hill Publishing Company, 2004.
2.Multimedia Systems, Ralf Steinmetz and KlaraNahrstedt, SpringerInternational Edition, 2007.
3.Multimedia Systems Design,PrabhatK.Andleigh and Kiran Thakrar,PHI,2007.

ELECTIVE GROUP III
551557 WEB APPLICATION DEVELOPMENT
Objectives: To acquire knowledge on the usage of recent platforms in developing web applications

UNIT I
J2EE Platform 9 Introduction -Enterprise Architecture Styles - J2EE Architecture - Containers - J2EE Technologies - Developing J2EE Applications - Naming and directory services - Using JNDI - JNDI Service providers - Java and LDAP - LDAP operations - Searching an LDAP server - Storing and retrieving java objects in LDAP - Application Servers - Implementing the J2EE Specifications - J2EE packaging and Deployment - J2EE packaging overview - Configuring J2EE packages

UNIT II
STRUTS AND HIBERNATE 9 Struts Architecture - Struts classes - Action Forward, Action Form, Action Servlet, Action classes - Understanding struts - config.xml, Understanding Action Mappings, Struts flow with an example application, Struts Tiles Framework, Struts Validation Framework – Hibernate - Architecture of Hibernate - Downloading Hibernate - Exploring HQL - Understanding Hibernate O/R Mapping.

UNIT III
LAMP STACK 9 Overview of Lamp Stack - Features of Lamp Stack –Understanding Python Understanding LAMP and Its Effect on Web Development

UNIT IV
.Net, C# 9 Introduction - .Net revolution - .Net framework and its architecture – CLR – What is Assembly – Components of Assembly – DLL hell and Assembly Versioning. Overview to C# - C # Compilation and Execution Process – C# Fundamentals (Data types, Operators, Programming constructs) – Inheritance –Sealed Classes – Interface - Overloading – OverRiding – Method Hiding – C# Property – Exception Handling

UNIT V
ASP.NET AND SILVERLIGHT 9 ASP.Net- IIS - ASP.Net Page Life Cycle – ASP Vs ASP.Net - HTML Controls Vs Server side Controls – Validation Controls – Data binding in ASP.Net – Caching – Configuration in ASP.Net (web.config) – Session management – View State in ASP.Net – ASP.Net. Introduction - RIA –

Text Books:
1. Struts: The Complete Reference, James Holmes 2nd Edition 2007 McGraw Hill Professional
2. Subrahmanyam Allamaraju and Cedric Buest , "Professional Java Server Programming(J2EE 1.3 Edition), ", Shroff Publishers & Distributors Pvt Ltd
3. Patrick Peak And Nick Heudecker, Patrick Peak, Nick Heudecker Hibernate Quickly, " 2007 Dreamtech

Reference Books:
1. Jesse Liberty , 'Programming C#, " , 4th Edition, O'Reilly Media
2. Mario Szpuszta, Matthew MacDonald , "Pro ASP.NET 4 in C# 2010: Includes Silverlight 2, "Apress, Third Edition
3. Jason Beres, Bill Evjen, Devin Rader , 'Professional Silverlight 4 Print", December 2012 www.free- ebooks-library.com
4. James Lee, Brent Ware , "Open Source Development with LAMP: Using Linux, Apache, MySQL, Perl, and PHP" Addison Wesley, Pearson 2009
5. Vern Ceder ,"The Quick Python Book," Second Edition, Manning Publications Company,2010

551558 CLOUD COMPUTING

Objective: To understand service oriented architecture and virtual storage applications

UNIT I
Cloud Computing – Introduction – History – Working of cloud computing – Cloud computing today – Pros and cons of Cloud Computing – Benefits of cloud computing – Non users of Cloud computing – Developing cloud services – Pros and Cons of Cloud service Development – Types of Cloud Service Development – Discovering Cloud Services development services and tools.

UNIT II
Cloud computing for everyone: Centralizing Email Communications – Collaborating of Grocery lists – Collaborating on To-Do lists – Collaborating on Household budgets – Collaborating on Contact lists – Communicating across the community – Collaborating on Schedules – Collaborating on group projects and events – Cloud computing for the corporation

UNIT III
Using cloud services : Exploring online calendar applications – Exploring online scheduling applications – Exploring online planning and task management – Collaboration on event manangement – Collaboration on Contact Management – Collaboration on Project Management – Colaborating on Word Processing – Collaborating on Databases – Storing and Sharing files and other online content.

UNIT IV
Cloud Computing Environments – A Classification of Cloud Implementations – Amazon Web Services – IaaS – Vmware vCloud – Iaas – Google AppEngine – PaaS – Windows Azure Platform – PaaS – Salesforce.com – SaaS / PaaS – Microsoft Office Live – SaaS – Google Apps – SaaS – A Comparison of Cloud Computing Platforms.

UNIT V: Cloud Virtualization Technology**:** Introduction-Virtualization Defined-Virtualization Benefits-Server Virtualization- Hypervisor Management Software-Logical Partitioning (LPAR)-VIO Server-Virtual Infrastructure Requirements-Cloud Virtualization: Introduction-Storage Virtualization-Storage Area Network-Cloud Server Virtualization-Virtualized Data Centre.

Text Books:
1. Michael Miller ,"Cloud computing – Web based applications that change the way you work and collaborate online", Pearson Education Inc., 2008
2. Dr. Kumar Saurabh, "Cloud Computing – Insight into New-Era Infrastructure", First Edition 2011, WISELY India Pvt. Ltd, New Delhi.

Reference Books:
1. Cloud Security – A Comprehensive guide to secure cloud computing, Ronald L. Krutz and Russell Dean Vines, Wiley India Pvt Ltd, 2010.
2. Anthony T. Velte, Toby J. Velte, Robert Elsenpeter ,"Cloud Computing – A Practical Approach", Tata McGraw Hill, 2010.

551559 DIGITAL IMAGE PROCESSING

Objectives: To study the image fundamentals and mathematical transforms necessary for image processing

UNIT I

Digital Image Processing: Origins of Digital Image Processing, Steps in Digital Image Processing, Digital Image Fundamentals: Elements of Visual Perception, Light and the Electromagnetic Spectrum, Image Sensing and Acquisition, Image Sampling and Quantization, Basic Relationships between Pixels, Mathematical Tools used in Digital Image Processing.

UNIT II

Image Transformation & Filters: Basic Intensity Transformation Functions, Histogram Processing, Fundamentals of Spatial Filtering, Smoothing Spatial Filter, Sharpening Spatial Filters, Combining Spatial Enhancement methods, Fuzzy techniques for Intensity Transformation and Spatial Filtering. Filtering in the Frequency Domain: Preliminary Concepts, Sampling and the Fourier Transforms of Sampled Functions, The Discrete Fourier, Filtering in the Frequency Domain, Image Smoothing and Sharpening using Frequency Domain Filters.

UNIT III

Image Restoration, Reconstruction and Image Segmentation: Image Degradation/Restoration process, Noise Models, Restoration in the presence of Noise only-Spatial Filtering, Periodic Noise Reduction by Frequency Domain Filtering, Linear, Position-Invariant Degradations, Estimating the Degradation Functions, Inverse Filtering, Wiener Square Error Filtering, Geometric Mean Filter, Image Reconstruction from Projections. Image Segmentation: Point, Line and Edge Detection, Thresholding, Region-Based Segmentation, Segmentation Using Morphological Watersheds.

UNIT IV

Color Image Processing: Color Fundamentals, Color Models, Pseudocolor Image Processing, Full Color Image Processing, Color Transformation, Smoothing and Sharpening, Image Segmentation Based on Color, Noise in Color Images. Wavelets and Multiresolution Processing: Multiresolution Expansion, Wavelet Transforms in One Dimension, The Fast Wavelet Transforms, Wavelet Transforms in Two Dimensions, Wavelet Packets. Image Compression: Fundamentals, Basic Compression Methods, Digital Image Watermarking.

UNIT V

Morphological Image Processing: Erosion and Dilation, Opening and Closing, The Hit-Or-Miss Transformation, Basic Morphological Algorithms, Gray-Scale Morphology. Object Recognition: Patterns and Pattern Classes, Recognition Based on Decision-Theoretic Methods, Structural Methods.

Text Book:
1. Rafael C. Gonzalez, Richard E. Woods, "Digital Image Processing", 3rd Edition 2008,
   Pearson Education.

Reference Books

1. A.Jain,"Fundamentals of Digital Image Processing", Prentice Hall of India, 2001. 2. B.Chandra and D.Dutta Majumder , "Digital Image Processing and Analysis " Prentice-Hall of India private limited , New delhi, 2006.

ELECTIVE GROUP IV

551560 SOFT COMPUTING

Objective: Exposure to Soft Computing, Neural Networks, use of Fuzzy in Soft Computing and solving optimization problem using GA

UNIT I
Basic concept of Soft Computing – Components – Characteristics – Applications – Fundamentals of Neural Networks: Mathematical model, Properties of neural network, Typical architectures: single layer, multilayer, competitive layer; - learning methods: Supervised, Unsupervised & reinforced; Common activation functions; Feed forward, Feedback & recurrent Neural Networks – Application areas

Unit II
Back Propagation Networks : Architecture of a Back Propagation Network – Back Propagation Learning – Illustration – Applications – Effects of Tuning Parameters of the Back Propagation Neural Network – Selection of Various Parameters in BPN – Variations of Standard Back Propagation Algorithm. – Associative memory – Bidirectional Associative memory (BAM) – BAM structure – types – Discrete – exponential – Associative memory for real coded pattern pairs – Applications

UNIT III
Fuzzy Sets : Fuzzy versus Crisp; Fuzzy sets—membership function – fuzzy set operations – properties of fuzzy sets – Crisp relations – Cartesian project – other crisp relation – operations on relations - Fuzzy relations - Cartesian product, Operations on relations;

Unit IV : Fuzzy system and logic :   Crisp logic—Laws of propositional logic, Inference in Propositional logic. Predicate logic- Interpretations, Inference - Fuzzy logic-Quantifiers, Inference - Fuzzy Rule based system - Defuzzification methods – applications.

UNIT V
Genetic Algorithm : Basic concept - Role of GA in optimization - Fitness function - Selection of initial population - Cross over(different types) – Mutation – Inversion – Deletion - Constraints Handling; Evolutionary Computation - Genetic Programming; Schema theorem - Multiobjective & Multimodal optimization in GA – Applications -   Travelling Salesman Problem, Graph Coloring problem;

Text Book:

1. T.S.Rajasekaran & G.A. Vijaylakshmi Pai, "Neural Networks, Fuzzy Logic & Genetic Algorithms– Synthesis & applications", PHI, 2009

References Books:

1. Simon Haykin, "Neural Networks- A Comprehensive foundation", 2nd Ed; Pearson, 2009.
2. Sanchez, Takanori, Zadeh, "Genetic Algorithm & fuzzy Logic Systems" , World Scientific, 1997
3. Goldberg David E., "Genetic Algorithm", Pearson, 2007
4. Zimmermann H. J., "Fuzzy Set Theory & Its Applications", Allied Publishers Ltd. 2000
5. Klir & Yuan, "Fuzzy Sets & Fuzzy Logic", PHI, 1998.

551561 WEB INTELLIGENCE SYSTEMS

Objective: Knowledge of Search Engine, Studying fundamentals of Intelligence System, Forecasting, and Analyzing Intelligence System

UNIT I
Introduction to Intelligent Web: Inside the search engine - Examples of intelligent web applications - Basic elements of intelligent applications - Machine learning, data mining – Searching, Reading, indexing, and searching.

UNIT II
Listen and Load: Streams, Information and Language, - Statistics of Text - Analyzing Sentiment and Intent – Load - Databases and their Evolution.

UNIT III
Clustering And Classification: An overview of clustering algorithms - Clustering issues in very large datasets - The need for classification - Automatic categorization of emails and spam filtering - Classification with very large datasets - Comparing multiple classifiers on the same data.

UNIT IV
Reasoning: Reasoning: Logic and its Limits, Dealing with Uncertainty - Mechanical Logic - The Semantic Web - Limits of Logic - Description and Resolution - Collective Reasoning.

UNIT V
Predicting: Statistical Forecasting - Neural Networks - Predictive Analytics - Sparse Memories - Sequence Memory - Network Science – Data Analysis: Regression and Feature Selection - Case Study - set of retrieved and processed news stories.

Text Book:
1. Haralambos Marmanis, Dmitry Babenko, "Algorithms of the Intelligent Web", Manning Publications, 2009.

Reference Books:
1. Christopher D. Manning, Prabhakar Raghavan, Hinrich Schütze, "An Introduction to Information Retrieval", Cambridge University Press, 2009.
2 Mark Gardener, "Beginning R - The Statistical Pr ogramming Language", John Wiley & Sons, Inc., 2012.

551562 GRID COMPUTING

Objective: Knowledge of Parallel Computing and Utilization of Shared resources

UNIT I
Introduction-Early Grid Activities-Current Grid Activities- An overview of Grid Business Areas-Grid applications-Grid Computing organizations and their roles-Organizations Developing Grid Computing Toolkits and the Frame Work-Oraganizations Building and Using Grid Based solutions to solve Computing, Data and Network requirements—commercial Organizations Building and using Grid Based Solutions.

UNIT II
The Grid Computing Anatomy—Grid Problem-Grid Computing Road Map- Merging the Grid Services Architecture with Web services Architecture: Service Oriented Architecture- Web service Architecture- XML, Related Technologies and their Relevance to Web Services-XML Message and Enveloping-SOAP,Processing Model, features, modules-Service Message Description Mechanism-Relationship between Web service and Grid service

UNIT III
Open Grid Serives Architecture(OGSA)- OGSA Use cases- Commercial Data Centre(CDC)-National Fusion Collaboratory(NFS)-Online media and Entertainment-OGSA Platform Components-Open Grid services Infrastructure : Introduction-Grid Services-A high level Introduction to OGSI-Technical Details of OGSI specification.

UNIT IV
OGSA Basic Services: Common Management Model-Service Domain-Policy Architecture-Security Architecture-Metering and Accounting-Common Distributed Logging-Distributed Data Access and Replication

UNIT V
The Grid Computing Toolkits: GLOBUS GT3 Toolkits Architecute-GT3 Software Architecture Model-GLOBUS Tool kit High-Level Services:Resource Discovery and Monitoring-Resource Allocation-Data Management-Information Services-Index Services-Resource –Resource Information Provider Service-Resource Management Service-Data Management Services-OGSI.Net Middleware solutions

Text Book:

1. Joshy Joseph, Craig Fellenstein, "Grid Computing", IBM Press, Pearson Education, Indian Reprint 2012

Reference Book:

1. Ian Foster, Carl Kesselman, "The Grid 2: Blue Print for a New Computing Infrastructure", Morgan Kaufmann Publishers(Elsevier), II Edition.